



State of California, Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

Project Title: Building 59 Upgrade & Installation and Operation of NERSC-9

Lead Agency: University of California, Lawrence Berkeley National Laboratory

Project Location: One Cyclotron Road, Berkeley, CA 94720

Contact Person: Jeff Philliber, Chief Environmental Planner.
One Cyclotron Road, MS 76-234A, Berkeley, CA 94720

Project Description

The University of California, Lawrence Berkeley National Laboratory (UC LBNL) proposes to install and operate a next generation high-performance computing (“supercomputing”) system in the existing Wang Hall at the Lawrence Berkeley National Laboratory main hill site in Berkeley, Alameda County, California. (Hereinafter, the new high-performance computing system to be installed is referred to as “NERSC-9¹,” and this project is referred to as the “NERSC-9 project” or the “proposed project.” Wang Hall, which was formerly known as the “Computational Research and Theory” [CRT] facility, is also referred to as “Building 59.” Lawrence Berkeley National Laboratory is referred to as “LBNL” or “Berkeley Lab.”)

UC LBNL would install the NERSC-9 supercomputer in the space to be vacated by an existing high-performance computing system (NERSC-7). Operation of the NERSC-9 high-performance computing system would help support the continually increasing needs of scientists for complex simulation and data analysis. Along with the new supercomputer, additional power, cooling, and distribution equipment would be installed to augment existing building systems. These system augmentations would be necessary to accommodate NERSC-9 operating in tandem with the existing (though not yet fully installed and operational) NERSC-8 supercomputer. These facility upgrades would increase the capacity of building electrical, water, and cooling systems beyond levels reviewed in the CRT EIR (SCH#2007072106, April 2008). All upgrades would be located within the existing building and associated cooling infrastructure areas, and the project would not make any changes to the facility’s building structure. The project would not increase the number of employees and visitors that would be present in the building.

¹ NERSC stands for “National Energy Research Scientific Computing Center.”

Environmental Review Process

The University of California (UC or "the University") will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the proposed project. An Initial Study has been prepared in accordance with the California Environmental Quality Act (CEQA), the *CEQA Guidelines*, and the *University of California Procedures for Implementation of CEQA* to identify potential environmental impacts that will be addressed in the EIR. The attached Initial Study includes a description of the proposed project. It is anticipated that the EIR will address environmental impacts in the following resource area: greenhouse gas emissions.

A copy of this Notice of Preparation (NOP), Initial Study (IS), and public scoping meeting announcement are available on the following website: <http://www.lbl.gov/community/env-rev-docs.html>. UC LBNL will hold a public scoping meeting for the EIR on June 21, 2016 at the North Berkeley Senior Center. More information regarding the scoping meeting is provided in Attachment A.

This notice is to solicit your views on the scope and contents of the forthcoming NERSC-9 project EIR. We request that any comments be received no later than 5:00 PM on June 30, 2016. Your name and a mailing address should be included with your comments. Please direct your comments to the attention of Jeff Philliber at the address noted above. Comments may also be submitted via email to the following address: planning@lbl.gov. If you have any questions regarding this NOP, please contact Jeff Philliber at the above address or via email at planning@lbl.gov.

Signature: Reva Nickelson Date: 8/1/16
Reva Nickelson, Director, Facilities Division
Lawrence Berkeley National Laboratory

cc: UC LBNL CEQA Agency and Public Mailing List

ATTACHMENT A: PUBLIC SCOPING MEETING

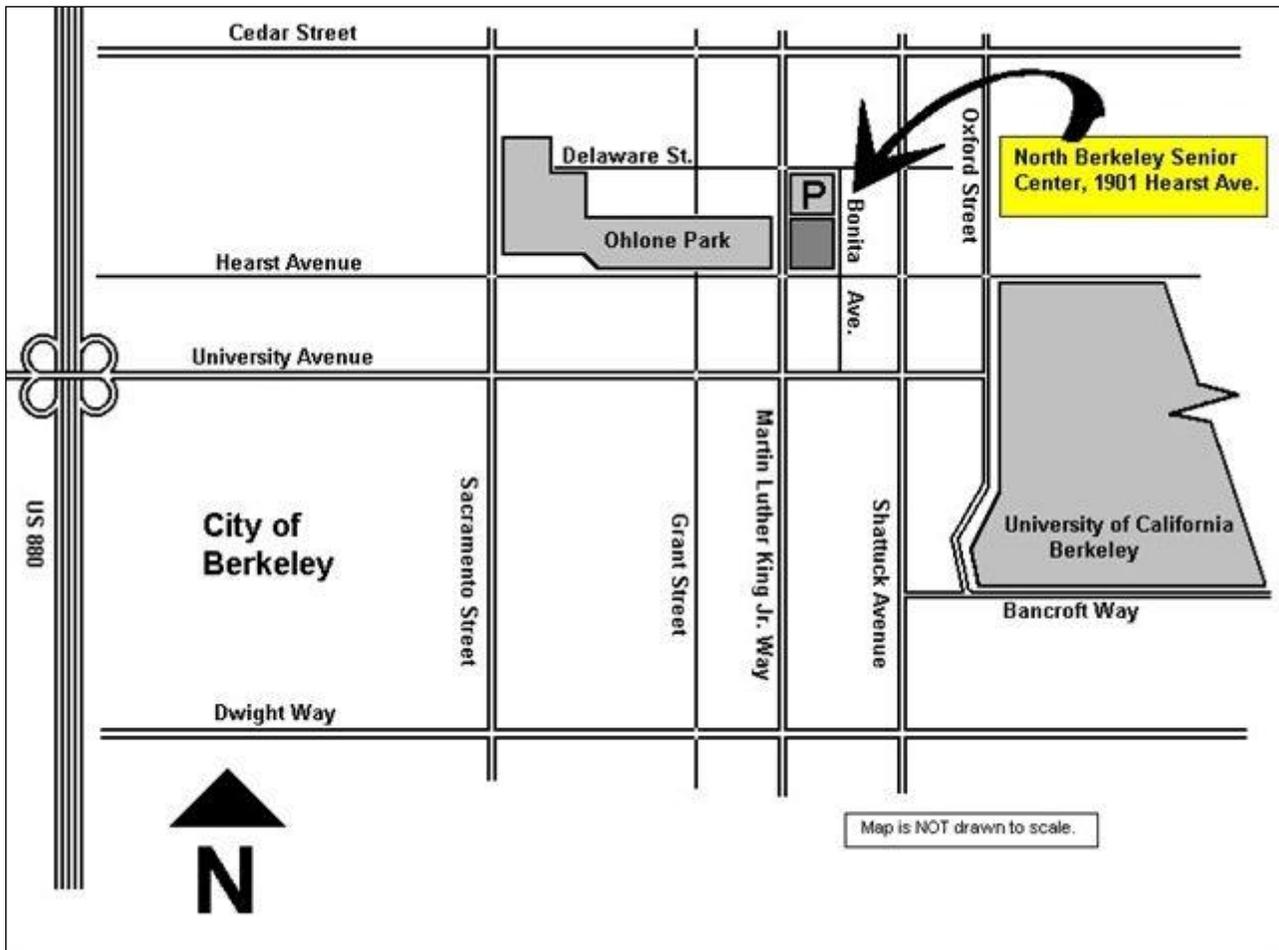
UC LBNL will hold a public scoping meeting open to all interested agencies and members of the public. The meeting is intended to present a brief overview of the Building 59 Upgrade & Installation and Operation of NERSC-9 project (“NERSC-9 project”), to identify environmental resource areas to be analyzed in the Draft EIR, and to invite public comments on the scope of the EIR analysis.

What: Scoping Meeting for the NERSC-9 project EIR

When: June 21, 2016 from 6:30 PM to 8:30 PM

Where: North Berkeley Senior Center, 1901 Hearst Street, Berkeley

Parking: Parking is available at the Senior Center and on surrounding streets (see map below)



**BUILDING 59 UPGRADE &
INSTALLATION AND OPERATION OF NERSC-9**

INITIAL STUDY

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1 ENVIRONMENTAL CHECKLIST/INITIAL STUDY	6
2 INTRODUCTION	7
3 PROJECT DESCRIPTION	9
4 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:	18
5 DETERMINATION	19
6 EVALUATION OF ENVIRONMENTAL IMPACTS	20
7 REFERENCES	80
8 REPORT PREPARERS	81

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 PROJECT LOCATION	11
2 SITE PLAN	12

1. ENVIRONMENTAL CHECKLIST/INITIAL STUDY

- Project Title:** Building 59 Upgrade & Installation and Operation of NERSC-9
("NERSC-9 project")
- Lead Agency:** The University of California, Lawrence Berkeley National Laboratory
- Location:** Lawrence Berkeley National Laboratory main hill site
One Cyclotron Road
Berkeley, California 94720
- Applicant:** See Lead Agency above
- Existing LRDP Designation:** Research and Academic
- Existing On-site Land Use:** The project site is (and would continue to be) occupied by LBNL Building 59 (Wang Hall).
- Surrounding Land Uses:** Surrounding land uses include Chu Road and LBNL's Building 50 complex to the north; LBNL's Building 70 complex to the east; Cyclotron Road and UC Berkeley Campus athletic, academic, and recreational facilities to the south; and Cyclotron Road and the Blackberry Canyon entrance gate to the west. LBNL's Cyclotron facility, City of Berkeley multi-family residential neighborhoods, and UC Berkeley student housing are further to the west.
- Description of Project:** See Project Description in Section 3 of this Initial Study.
- Interested and Responsible Agencies:**
- Bay Area Air Quality Management District

2. INTRODUCTION

2.1 Initial Study

Pursuant to Section 15063 of the *California Environmental Quality Act (CEQA) Guidelines* (Title 14, California Code of Regulations, Sections 15000 et seq.), an Initial Study is a preliminary environmental analysis that is used by the lead agency as a basis for determining whether an EIR, a Mitigated Negative Declaration, or a Negative Declaration is required for a project. The *CEQA Guidelines* require that an Initial Study contain a project description; a description of environmental setting; an identification of environmental effects by checklist or other similar form; an explanation of environmental effects; a discussion of mitigation for significant environmental effects; an evaluation of the project's consistency with existing, applicable land use controls; and the names of persons who prepared the study.

2.2 EIR Process

This environmental analysis is an Initial Study for the proposed Building 59 Upgrade & Installation and Operation of NERSC-9 project (also referred to as the "NERSC-9 project" or the "proposed project" throughout this document). The purpose of this Initial Study is to evaluate the potential environmental impacts of the proposed project to determine what level of additional environmental review, if any, is appropriate.

This environmental analysis incorporates by reference the Lawrence Berkeley National Laboratory (LBNL) 2006 Long Range Development Plan (LRDP) EIR (SCH No. 2000102046), the 2007 Computational Research and Theory (CRT) Facility EIR (SCH No. 2007072106), and the 2010 CRT Environmental Assessment/FONSI in accordance with Section 15150 of the *CEQA Guidelines*.

The analysis contained in this Initial Study concludes that the proposed project would result in the following categories of impacts, depending on the environmental issue involved: no impact; less-than-significant impact; or a potentially significant impact. As shown in the Determination form in Section 6 of this document and based on the analysis contained in this Initial Study, it has been determined that the proposed project may result in potentially significant impacts. Therefore, an EIR will be prepared after circulation of this Initial Study and Notice of Preparation (NOP).

2.3 Public and Agency Review

This Initial Study and NOP are being circulated for public and agency review from June 1, 2016 to June 30, 2016. Copies of this document are available for review at the following locations and online at <http://www.lbl.gov/community/NERSC-9-project/>. Copies of the 2006 LRDP, the 2006 LRDP EIR, the 2007 CRT Facility EIR, and 2010 CRT Facility Environmental Assessment/FONSI are also available for review online at <http://www.lbl.gov/community/planning/ldrp/> or at the following location:

- Berkeley Public Library, 2090 Kittredge Street, 2nd Floor Reference Desk, Berkeley, CA 94704

Comments on this Initial Study/NOP pertinent to the scope of the forthcoming NERSC-9 project EIR must be received by 5:00 PM on June 30, 2016 and should be sent to:

Jeff Philliber, Chief Environmental Planner
Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 76-225
Berkeley, CA 94720

Or by e-mail to planning@lbl.gov.

2.4 Project Approvals

As a public agency principally responsible for approving or carrying out the proposed project, the University of California is the Lead Agency under CEQA and is responsible for certifying the adequacy of the environmental document and approving the proposed project. It is anticipated that the Board of Regents of the University of California (The Regents) or its delegated authority will consider approval of the proposed project in late 2016.

2.5 Organization of the Initial Study

This Initial Study is organized into the following sections:

Section 1 - Project Information: provides summary background information about the proposed project, including project location, lead agency, and contact information.

Section 2 - Introduction: summarizes the scope of the document, the project's review and approval processes, and the document's organization.

Section 3 - Project Description: presents a description of the proposed project, including the need for the project, the project's objectives, and the elements included in the project.

Section 4 - Environmental Factors Potentially Affected: addresses whether this Initial Study identifies any environmental factors that involve a significant or potentially significant impact that cannot be reduced to a less-than-significant level.

Section 5 - Determination: indicates whether impacts associated with the proposed project would be significant and what, if any, additional environmental documentation is required.

Section 6 - Evaluation of Environmental Impacts: contains the Environmental Checklist form for each resource area. The checklist is used to assist in evaluating the potential environmental impacts of the proposed project. This section also presents a background summary for each resource area, and an explanation of all checklist answers.

Section 7 - References: lists references used in the preparation of this document.

Section 8 - Report Preparers: lists the names of individuals involved in the preparation of this document.

3. PROJECT DESCRIPTION

3.1 Project Summary

The National Energy Research Scientific Computing Center (NERSC) program, located at the LBNL main hill site, is the primary scientific computing facility for the Department of Energy (DOE) Office of Science, which supports basic and applied research across multiple scientific disciplines. Such research enhances the United States competitiveness and maintains U. S leadership in science and technology. The NERSC-9 project is the proposed installation of a next generation supercomputer referred to as NERSC-9 in the existing Wang Hall (aka Building 59 or CRT Facility) on the LBNL main hill site as a replacement for an existing high-performance computing system called “Edison” (also referred to herein as “NERSC-7”) that would be phased out. Along with the new supercomputer, additional power, cooling, and distribution equipment would be installed in Building 59 to augment existing building systems. These system augmentations would be necessary to accommodate NERSC-9 operating in tandem with the existing (though not yet fully installed and operational) NERSC-8 supercomputer². These facility upgrades would increase the capacity of building electrical, water, and cooling systems beyond levels originally reviewed in the CRT EIR (SCH#2007072106, April 2008). All upgrades would be located within the existing building and associated cooling infrastructure areas, and the project would not make any changes to the CRT building structure. The project would not increase the number of employees and visitors that would be present in the building.

3.2 Project Purpose

The purpose of the Building 59 Upgrade & Installation and Operation of NERSC-9 project is to provide additional computing capacity to help meet the continually increasing needs of scientists for computational resources for simulation of physical phenomena as well as data analysis of sensor and experimental data. The NERSC-9 system is intended to provide 16-to-30 times the performance of NERSC-7, which it would replace, while improving energy efficiency by approximately 200 percent. System capacity to allow simultaneous operation of NERSC-9 and NERSC-8 systems is a necessary feature of CRT and the NERSC program: it allows a retired high-performance computing system (e.g., NERSC-7, or Edison) to be phased out, shut down, and removed and a new system (e.g., NERSC-9) to be installed in its place and gradually phased in without interruption to NERSC’s computational functions (i.e., NERSC-8 would continuously function during this period).

3.3 Project Location and Surrounding Uses

The LBNL hill site is situated in the eastern hills of the cities of Berkeley and Oakland in Alameda County; it occupies approximately 200 acres that are owned by the University of California. Existing buildings at the LBNL hill site are used for wet, dry, and “heavy” laboratories, office space, and associated uses. The eastern portion of the LBNL hill site is in the city of Oakland while the western portion of the LBNL hill site is in the city of Berkeley.

² Some building system improvements are currently underway or planned to accommodate full operations of NERSC-8; these improvements have already been reviewed in the CRT EIR (SCH#2007072106; certified by the UC Regents in April 2008) and approved. Such improvements are not considered to be part of this proposed project; nevertheless, some of these future improvements will be conservatively analyzed as if they were part of the project for the purposes of this CEQA analysis (e.g., the already-approved, fifth cooling tower).

The LBNL hill site is surrounded by a mix of land uses, including open space, institutional uses, and residential and neighborhood commercial areas. The University of California, Berkeley, including the Strawberry Canyon open space areas, is south and southeast of the LBNL hill site. Residential neighborhoods and a small neighborhood commercial area in the city of Berkeley are to the north and northwest, and regional open space, including the 2,000-acre Tilden Regional Park, is to the northeast.

3.4 Project Site

The proposed NERSC-9 project would be located in the western portion of the LBNL site within the existing Wang Hall (Building 59) (see **Figure 1, Project Site**). Building 59 is an approximately 140,000-gsf building with 32,000 gsf of high-performance computing (HPC) space on one floor and office space on two floors. A mechanical room is located beneath the HPC floor and an electrical room is also located adjacent to the mechanical room. The building is located on the hillside adjacent to the Blackberry Gate entrance to the LBNL hill site. The facility entrance is on Perlmutter Road and the building is within walking distance or a short shuttle bus trip of the UC Berkeley Physical and Computer Science Departments.

Chu Road and LBNL's Building 50 complex, which is composed of a large lecture hall, a library, and buildings for computing, research, and office space, are located to the north. LBNL's Building 70 complex, consisting mainly of laboratory space, is located to the east. Other surrounding land uses include: Cyclotron Road and UC Berkeley Campus athletic, academic, and recreational facilities to the south; and Cyclotron Road, the Blackberry Canyon entrance gate, and Building 88, which houses LBNL's Cyclotron facility, to the west. City of Berkeley multi-family residential neighborhoods and UC Berkeley student housing are also located further to the west.

3.5 Project Components

The proposed project includes the installation and operation of a new high-performance computing system (NERSC-9), up to three cooling towers, a backup generator, water pumps, heat exchangers, electrical substations, air handling units, UPS panel, and exhaust fans. (See **Figure 2, Site Plan**). The project components are described below.

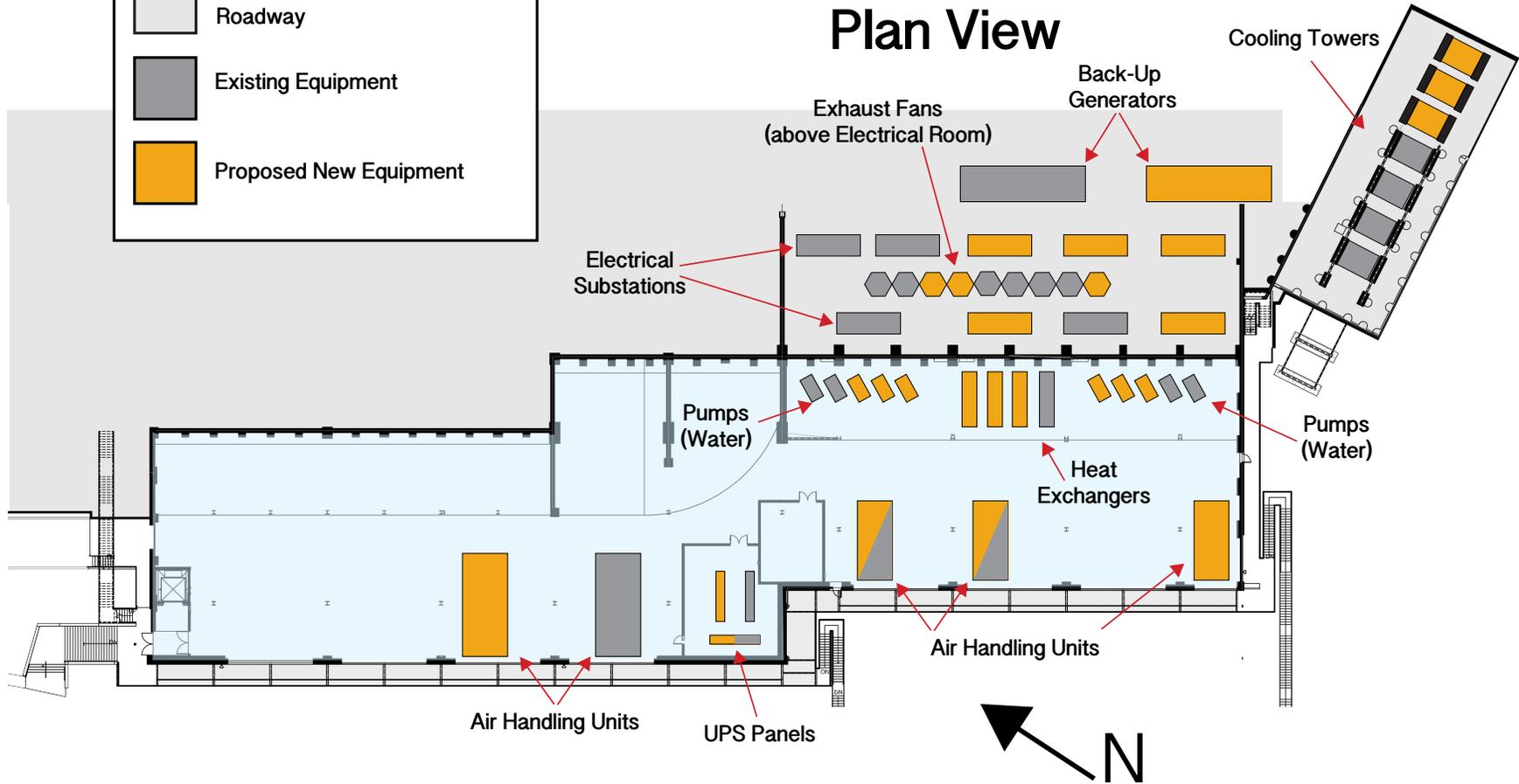
High-Performance Computing System

The proposed NERSC-9 high-performance computing system would be installed on the HPC floor of Building 59. In order to operate seamlessly while upgrading high performance computing systems, the building was designed and constructed to accommodate simultaneous operation of two systems. This allows the current generation high-performance computing system to continue to operate when a next generation is installed and phased into operation. Currently, NERSC-7 is operating while NERSC-8 is being installed and phased in. NERSC-8 is partially operational and will be fully operational by mid-2016. After NERSC-7 is phased out and then removed, NERSC-9 would be installed and gradually phased in.

The building interior itself would not undergo major structural modification, as the 32,000-gsf HPC floor is contiguous and largely column-free and has headroom to maximize flexibility in configuring supercomputer arrays. It includes a raised-floor system that provides access to data and electrical cabling, and it also serves as a supply air chase for air-cooled equipment.

Bldg 59 NERSC 9 Upgrades: Plan View

	Bldg. 59 Interior (Mechanical Level)
	Exterior Concrete Pad / Roadway
	Existing Equipment
	Proposed New Equipment



Proposed equipment sizes and locations are approximate, schematic, and not to scale. For illustrative purposes. Some of the above identified proposed new equipment are already approved in previous NEPA/CEQA decision; others are exclusive to the proposed NERSC-9 project.

SOURCE: Lawrence Berkeley National Laboratory

Cooling Towers

Cooling to the HPC floor and office space is currently provided by a bank of four high-efficiency evaporative cooling towers, approximately 15 feet high, and a chiller outbuilding located near the exterior southeast corner of the HPC portion of Building 59. The cooling towers are located on a concrete pad/foundation and the area is enclosed by a concrete wall. A fifth cooling tower was approved as part of the previously approved CRT project but has not been installed yet and is planned to be installed in conjunction with the NERSC-9 project. Although it is intended to be installed whether or not the proposed project moves forward, this already-approved fifth cooling tower will conservatively be considered a part of this project for CEQA analysis purposes. In addition to this already approved, fifth cooling tower, the proposed NERSC-9 project would add up to two additional cooling towers for a total of up to three new cooling towers (**Table 1**). All three would occupy the existing concrete cooling tower foundation/pad that was designed for the installation of additional cooling towers. The current system along with the (up to) three proposed cooling towers would serve liquid and air-cooled computational equipment. The cooling towers would operate at full capacity only during the warmest days of the year, typically in August.

Backup Generator and Fuel Tank

Building 59 is currently equipped with a 1.25 megawatt (MW) standby generator. To accommodate the planned high-performance computing installation, the proposed project may also install a second 1.25 MW standby generator or multiple smaller generators with equivalent combined capacity, adjacent to the existing unit. Additionally, diesel fuel would be stored in a new, approximately 2,300 gallon above-ground fuel tank to service the new standby generator.

Other Equipment

Up to six electrical substations would be installed in the building's electrical rooms, and six water pumps, three heat exchangers, up to four air handling units, and additional uninterruptable power supply (UPS) equipment would be installed inside the mechanical room.

3.6 Infrastructure and Utilities

Each of the new components listed above would require integration into the existing building utility and infrastructure systems.

Water Supply

Building 59 connects to an 8-inch high-pressure water main located beneath Seaborg Road for water supply. No changes to the water main are required. Current water consumption for the Wang Hall Facility is estimated at approximately 35 million gallons per year (mgy) or an average of about 96,000 gallons per day (gpd). At peak project buildout and operation, estimated water consumption would be approximately 55 mgy or an average of about 151,000 gpd. This includes demand for domestic water, fire suppression water, and cooling tower water. The proposed project would include recirculation of cooling water, which would reduce water demand.

Table 1
Current and Proposed Conditions

Item	Building 59 Current Use (2016)	NERSC-9 Project^a	Building 59 Projected Use at full Project Operation (2020)^b
Average Electrical Power (MW)	7.5	13.5	-
Peak Electrical Power (MW)	8.9	10.5	27.5
Average Water Use (MGY)	35	20	55
Number of Cooling Towers	4	3	7
Capacity (MW) of substations	12.5 MW	15 MW	27.5 MW
Capacity (MW) of standby generators	1.25 MW	1.25 MW	2.5 MW
Number of Air Handling Units	3	4	7
Number of Heat Exchangers	1	3	4
Number of Exhaust Fans	6	3	9
Number of Building Occupants	300	0	300

^a—Some project components are subject to minor changes as design undergoes value engineering and refinement.

^b—While the facility is not currently operating at its fully approved capacity, it is steadily ramping up to full operations. Therefore, in some of the above table categories, 2020 use levels are projected to be somewhat higher than can be achieved by adding project operations to current conditions.

Sanitary Sewer System

Sanitary sewer service is currently provided by a connection to the sewer main beneath Cyclotron Road. Improvements to the sanitary sewer system would not be required as the project would not increase the amount of wastewater discharged from the site.

Storm Drainage

The existing Building 59 storm drain system includes roof drains, overflow drains, and interior downspouts that connect to the onsite storm drain system. Improvements to the storm drain system would not be required as no new impervious surface (e.g., additional buildings or equipment pads) is proposed that could result in increased runoff from the project site. The existing storm drain system at the project site has sufficient capacity to meet the current needs of the drainage area.

Electricity

Electrical power is provided by the Western Area Power Administration (WAPA) and delivered to the LBNL site (Grizzly Peak substation) via PG&E's distribution system. From there, electricity is delivered to Building 59 through a medium-voltage underground duct bank. At the present time, the peak power load of Building 59 is 8.9 MW (which is steadily increasing as NERSC-8 comes on line up to a full electrical distribution capacity of 12.5 MW). While Building 59 was previously expected to result in a peak electrical energy demand of 17 MW, with the installation of NERSC-9 in 2020, peak electrical demand would increase to a maximum 27.5 MW. To provide this power to the facility, as noted above, up to six electrical substations would be added to the building's mechanical room.

No off-site improvements to LBNL's site-wide electrical distribution system are proposed as part of this project. The Grizzly Peak substation is expected to be upgraded over the next few years as part of ongoing utility modernization and planning efforts. These Grizzly Peak substation improvements would occur independently from any decision on the proposed CRT upgrade.

Backup power requirements at the present time are served by a 1.25 MW diesel-powered backup generator. As part of the proposed project, a second 1.25 MW diesel-powered backup generator, or multiple smaller generators with equivalent combined capacity, would be installed in the building's electrical room.

Natural Gas

Natural gas is not used in Building 59 and demand for natural gas would not increase due to the proposed project.

3.7 Access, On-Site Circulation, and Parking

Automobile access to Building 59 is available from Cyclotron Road and Seaborg Road. Approximately four parking spaces are provided for disabled guests near Building 59. Additional, limited-time parking spaces are provided for use by delivery and maintenance vehicles. Staff parking is provided in the existing parking lots. The building is within 500 feet of both the Horseshoe Parking Lot F to the south and Blackberry Canyon Parking Lot D to the north. The facility also includes parking for approximately 30 bicycles. Public transportation is available through the LBNL shuttle system.

3.8 Hazardous Materials On-Site

The proposed 1.25 MW backup generator would be tested monthly and would thereby create relatively small amounts of diesel exhaust. These emissions would be vented through an exhaust system specifically designed to disperse and prevent re-entrainment of exhaust into Building 50 or nearby buildings. Chemicals that might be used and stored during the operational phase of the project would include diesel fuel stored in the new fuel tank used to service the new backup generator. This above-ground storage tank would be secured with spill-prevention and secondary containment systems to prevent any accidental, uncontrolled releases.

Research that is conducted in Wang Hall is limited to computing and computing-related operations and does not involve radioactive materials, hazardous chemicals, hazardous organic or inorganic materials, nano-scale materials, or genetically modified/transgenic plant materials and microorganisms. Additionally, no “wet” laboratories are located in the building.

3.9 Project Population

The existing Wang Hall accommodates approximately 300 employees, of which approximately 225 are LBNL staff and 75 are UC Berkeley staff and students. As the proposed project involves an in-kind replacement of an older high-performance computing system, there would be no increase in the number of persons working in or conducting research in Wang Hall as a result of the proposed project.

3.10 Construction and Schedule

Project construction would occur in two phases. The first phase, which would commence in 2017 and end in 2019, would include installation of the electrical and mechanical infrastructure (e.g., substations, cooling towers, pumps, and other equipment). In the second phase, beginning in 2019, the distribution piping and cabling would be installed. NERSC -7 would be removed and NERSC 9 installed during the second phase as well. It is anticipated that NERSC 9 would be fully operational in 2021. A breakdown of the project schedule is shown in **Table 2** below.

As the table indicates, at peak, the construction of the project would generate up to 40 daily construction worker trips and up to 3 truck trips.

Construction equipment would include delivery and light construction vehicles, a crane, generators, and hand-held tools. Deliveries and construction staging would take place on either the loading dock at the Building 59 north end or on the paved area to the east of Building 59 and the project is not expected to use any unpaved land adjacent to the building during construction. However, a large crane (or cranes) would likely be used to lift and place heavy equipment such as the cooling towers into place. The crane(s) may be temporarily placed on a paved area or on an area of compacted, unpaved land (such as the area immediately north of the existing cooling tower pad. This is within the area that was previously disturbed during the construction of Building 59).

Table 2
Project Schedule

#	Project Phase	Starting Timeframe	Ending Timeframe	Peak Number of onsite construction workers	Avg. number of daily onsite construction truck trips (round trips)
1	Additions to Bldg. 59 Facility: Electrical, Mechanical Infrastructure	2017	2019 (24 months)	40	3
2	Installation of piping, cabling, and NERSC-9 System	2019	2020 (18 months)	20	2
3	Full operation of NERSC-9	2021			

3.11 Consistency with the LRDP

The 2006 LRDP is the land use plan applicable to the proposed project. The project would be located in the existing Wang Hall building, which is located in the southeastern portion of the Berkeley Lab main hill site on land designated as Research and Academic. The existing uses in the building are consistent with this land use designation.

The proposed project would not change the uses in or function of the building. The project would not add building space to LBNL nor increase the Laboratory's population. The NERSC-9 project would not cause an increase in Wang Hall's occupancy, which was evaluated in the CRT EIR as being up to 300 persons.

Wang Hall would continue to operate in the manner described, reviewed, and approved in the CRT EIR. It would continue to remain consistent with the stated and previously analyzed land use designation; space, population, and parking projections; and policy objectives, and goals of the 2006 LRDP.

4. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

As identified in Section 15063(c) of the State CEQA Guidelines, the purpose of this Initial Study is to: (1) inform responsible agencies and the public of the nature of the proposed project and its location, (2) identify impacts that would clearly not result or would clearly be less than significant and therefore will not be discussed in the EIR, and (3) provide a general description of the topics intended to be addressed in the EIR.

The environmental factors checked below could be potentially affected by implementation of the proposed project and/or by cumulative impacts resulting from implementation of the proposed project in conjunction with other expected developments. These factors will be evaluated in the project EIR.

	Aesthetics		Agricultural and Forest
	Air Quality		Biological Resources
	Cultural Resources		Geology and Soils
	Hazards and Hazardous Materials	X	Greenhouse Gas Emissions
	Land Use and Planning		Hydrology and Water Quality
	Noise		Mineral Resources
	Public Services		Population and Housing
	Transportation/Traffic		Recreation
	Utilities and Service Systems, including Energy	X	Mandatory Findings of Significance

5. DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the proposed proponent. EITHER A MITIGATED NEGATIVE DECLARATION OR ENVIRONMENTAL IMPACT REPORT will be prepared.

I find that the proposed project MAY have a significant effect on certain environmental factors beyond those covered in previous CEQA analysis, and a FOCUSED ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measure based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT will be prepared.

Signature: _____


Jeff Philliber, UC LBNL Chief Environmental Planner

Date: _____

MAY 31, 2016

6. EVALUATION OF ENVIRONMENTAL IMPACTS

Introduction

Appendix G of the State CEQA Guidelines provides a suggested format to use when preparing an Initial Study. The Environmental Checklist used in this document adopts a slightly different format with respect to response column headings, while still addressing the Appendix G checklist questions for each environmental issue area.

Project-specific and Cumulative Impacts

The attached Environmental Checklist uses the following response headings to identify potential environmental effects that will be addressed in the Building 59 Upgrade & Installation and Operation of NERSC-9 project EIR:

Impact to be Analyzed in the EIR: An effect that may or may not be significant that will be addressed in the project EIR. The effect may be a less than significant impact that will be addressed to provide a more comprehensive analysis, an impact for which further analysis is necessary or desirable before a determination about significance can be made, an impact that is potentially significant but may be reduced to a less than significant level with the adoption of mitigation measures, or an impact that may be significant and unavoidable.

No Additional Analysis Required: An effect that would either not occur or would clearly be less than significant impact under CEQA criteria, and no additional analysis beyond that provided in the Initial Study is necessary.

6.1 Aesthetics

6.1.1 Background

LBNL

The LBNL hill site is located on the steeply sloping hillsides of the Berkeley-Oakland hills, rising from elevation 500 feet above mean sea level (msl) near the Blackberry Canyon Gate to about 1,000 feet above msl at the northern border of the site. The hills provide a semi-natural, vegetated open space backdrop to the LBNL hill site. The hills are wooded with native stands of oaks and California bay or with introduced eucalyptus or conifers. The entire LBNL hill site cannot be viewed from any one single off-site vantage point. However, portions of the LBNL hill site are visible from residential neighborhoods, public roadways, and public vantage points in the areas that adjoin LBNL. Views of individual buildings or groups of buildings are available from public vantage points such as the Memorial Stadium, the Lawrence Hall of Science, and Grizzly Peak Road. As described in the 2006 LRDP EIR, portions of the LBNL hill site are visible in medium range views (less than 1 mile) from nearby elevated off-site locations such as the residential neighborhoods in the north and northwestern portions of the City of Berkeley. Long-range views (greater than 1 mile) are available from downtown Berkeley and the Berkeley Marina.

The visual character of LBNL's built environment is eclectic. Many buildings display an industrial look and utilitarian quality. Many buildings are painted in neutral colors to blend with the natural setting. Some of the buildings are recognizable landmarks, including Building 50 and the Advanced Light Source, both of which are also visible from off-site locations.

Some amount of nighttime lighting is produced on the LBNL hill site as a result of interior and exterior lighting associated with LBNL buildings, roadways and parking lots. All buildings and parking areas are equipped with downward-directed light fixtures for nighttime lighting.

Project Site

The NERSC-9 project would be located in the existing Building 59, located in the western portion LBNL hill site, immediately upslope of LBNL's Blackberry Gate main entrance. All upgrades and improvements would take place inside the existing Building 59 or within an exterior area adjacent to the southeast corner of the building. The proposed project would not involve construction of any buildings and would not be visible from off-site areas near the LBNL hill site.

6.1.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
AESTHETICS - Would the project:		
a. Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** The proposed project would not involve any exterior building modifications. The majority of the project would involve installation of equipment within the existing Building 59. Exterior work would involve installing up to three cooling towers adjacent to four existing cooling towers, using an existing foundation pad. This pad is located southeast of Building 59 and surrounded by mature trees to the south. Both the building and trees block off-site views of the existing and proposed new cooling towers. Laydown area for building work would largely take place on the paved areas immediately east of Building 59, and the building would screen views of the laydown area from the surrounding off-site areas. Although a large crane may be used to install outdoor equipment such as the cooling towers and would be visible from off-site locations, the crane would be present for only a limited portion of the construction duration and much of it would be screened from views by intervening trees on the hillside surrounding Wang Hall. Therefore, the temporary impact of the project during construction would be less than significant and there would be no long term impact of the project on scenic vistas. Further analysis is not required.
- b. **No Additional Analysis Required.** The nearest state highways to the project site are Interstate 80, Interstate 580, Highway 24, and Highway 13. None of the highways are very close to the project site and the portions of these highways that are within the vicinity of the project site are not designated or eligible as scenic routes. There are no other scenic resources located on the project site that would be affected by the implementation of the proposed project. Therefore, there would be no impact to scenic resources on-site or within the vicinity of a designated state scenic highway. Further analysis is not required.
- c. **No Additional Analysis Required.** As noted above, the proposed project would not involve any building construction. Installation activities would be temporary in nature and would mainly occur within the existing Building 59. Exterior work would involve installing (up to) three cooling towers

adjacent to existing cooling towers within the existing cooling tower enclosure. As a result, there would be no permanent impact to the existing visual character of the project site or its surroundings as a result of the proposed project. Further analysis is not required.

- d. **No Additional Analysis Required.** The project would not add any new sources of light and glare. Further analysis is not required.

6.1.3 Cumulative Impacts

Because there would be no long-term project impact on aesthetics, the project would not contribute to any cumulative impacts regarding aesthetics. Furthermore, cumulative visual impacts of the 2006 LRDP are addressed under LRDP Impact VIS-5 (page IV.A-30) of the EIR. The 2006 LRDP EIR concluded that implementation of the 2006 LRDP, in conjunction with cumulative development, would alter the visual character of, and change views of, the Oakland-Berkeley hills in the vicinity of Berkeley Lab. The EIR concluded that because the 2006 LRDP development (with mitigation) would not result in significant visual or light and glare impacts, because little other development is expected that could result in overlapping (cumulative) visual impacts, and because the 2006 LRDP would not result in adverse impacts that would occur in combination with the UC Berkeley projects, the cumulative aesthetic effects of the 2006 LRDP would be less than significant. The proposed project is within the scope of the development described and evaluated in the 2006 LRDP EIR. Therefore, the proposed project's cumulative aesthetic effects are adequately addressed under LRDP Impact VIS-5 and would be less than significant. No conditions have changed and no new information has become available since certification of the 2006 LRDP EIR that would alter this previous analysis. Further analysis is not required.

6.2 Agricultural and Forest Resources

6.2.1 Background

The LBNL hill site does not contain any designated or actively farmed land. Public Resources Code Section 12220 defines forest land as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

Project Site

The project site is considered “Urban and Built-Up” by the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). The project site and surrounding areas are currently developed and there are no agricultural uses. Although there may be forested areas in some portions of the LBNL site that qualify as forest land, the project vicinity does not contain forest land.

6.2.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
AGRICULTURAL AND FOREST RESOURCES - Would the project:		
a. 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code section 4526)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to nonforest use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a.-e. No Additional Analysis Required. The project site is located in an urbanized area. According to the FMMP, there is no Farmland within the boundaries of LBNL hill site. The project would not result in the

conversion of farmland to a non-agricultural use on-site and off-site because there is no farmland within the LBNL hill site or in the vicinity of the Berkeley Lab. There is also no forest land on the project site. Therefore, implementation of the proposed project would not impact agricultural and forest resources, and no further analysis is required.

6.2.3 Cumulative Impacts

Because there would be no project impact on agricultural and forest resources, the project would not contribute to any cumulative impacts on these resources. Further analysis is not required.

6.3 Air Quality

6.3.1 Background

The project area is subject to air quality planning programs developed in response to both the Federal Clean Air Act (CAA) and the California Clean Air Act (CCAA). Within the San Francisco Bay Area, air quality is monitored, evaluated, and regulated by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Bay Area Air Quality Management District (BAAQMD).

LBNL

LBNL is located in Alameda County, which, along with eight other counties, is within the San Francisco Bay Area Air Basin (SFBAAB or Basin).

Air pollutants are emitted by a variety of sources, including mobile sources such as automobiles; stationary sources such as manufacturing facilities, power plants, and laboratories; and area sources such as homes and commercial buildings. While some of the air pollutants that are emitted need to be examined at the local level, others are predominantly an issue at the regional level. For instance, ozone is formed in the atmosphere in the presence of sunlight by a series of chemical reactions involving oxides of nitrogen (NO_x) and reactive organic gases (ROG). Because these reactions are broad-scale in effects, ozone typically is analyzed at the regional level (i.e., in the Basin) rather than the local level. On the other hand, other air pollutants such as sulfur dioxide (SO₂), respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), carbon monoxide (CO), lead (Pb), and toxic air contaminants (TAC) are a potential concern in the immediate vicinity of the pollutant source because the pollutants are emitted directly or are formed close to the source. Therefore, the study area for emissions of SO₂, PM₁₀, PM_{2.5}, CO, Pb, and TAC is the local area nearest the source, such as in the vicinity of congested intersections, whereas the study area for regional pollutants such as NO_x and ROG is the entire Basin.

Air pollutants typically are categorized as criteria pollutants or TACs. The criteria pollutants are those regulated at the federal level by US EPA and at the state level by CARB. These include ozone, PM₁₀, PM_{2.5}, CO, NO₂, SO₂, and Pb. Ozone is a secondary pollutant formed during photochemical reactions with precursor pollutants. As such, ozone is measured by assessing emissions of its precursors, Reactive Organic Gases (ROG) and NO₂. Both US EPA and CARB have established federal and state ambient air quality standards for these criteria pollutants. The primary sources of criteria pollutants at the LBNL hill site include automobiles and heating equipment.

TACs are airborne pollutants for which there are no air quality standards but that are known to have adverse human health effects. Examples include aromatic and chlorinated hydrocarbons, certain metals, and asbestos. Adverse health effects can be carcinogenic, short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources such as automobiles and trucks, particularly diesel-fueled vehicles; and area sources, such as farms, landfills, construction sites, and residential areas. Sources of TACs around the LBNL hill site include diesel buses and trucks; laboratory vent emissions; boilers in individual buildings; standby generators; and painting operations.

Air quality in the Basin is monitored by the BAAQMD and CARB. Based on pollutant concentrations measured at monitoring stations within the Basin, the SFBAAB is classified as being in attainment or non-

attainment of federal and state air quality standards. The Basin is in attainment or unclassified for all federal and state standards except for the state and federal ozone standards and the state standards for particulate matter. Specifically, the SFBAAB is a marginal nonattainment area for the federal 8-hour standard for ozone; a nonattainment area for federal PM2.5 standard; a nonattainment area for the California 1-hour and 8-hour ozone standard; a nonattainment area for the California 24-hour and annual PM10 standards, as well as the California annual PM2.5 standard.

Some groups of people are considered more sensitive to adverse effects from air pollution than the general population. These groups are termed “sensitive receptors.” Sensitive receptors include children, the elderly, and people with existing health problems, who are more often susceptible to respiratory infections and other air quality-related health problems. Schools, childcare centers, hospitals, and nursing homes are all considered sensitive receptors. Air pollution impacts are assessed, in part, based on potential effects on sensitive receptors.

Project Site

Sensitive land uses in the vicinity of the proposed project include residential neighborhoods and university student housing. The nearest residences are approximately 600 feet away. The UC Berkeley campus lies west of the project site. Sensitive land uses on the campus, which are in proximity of the project site, include a dormitory and Foothill Student Housing facility. Vehicles are the primary sources of air pollution in the vicinity of the project site. Other sources of emissions in the vicinity of the project site include standby generators associated with various existing buildings, and fume hoods located in laboratories, which are vented to the roofs of laboratory buildings.

6.3.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:		
a. Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	Impact to be Analyzed in the EIR	No Additional Analysis Required
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Expose people to substantial levels of toxic air contaminants (TACs), such that the exposure could cause an incremental human cancer risk greater than 10 in one million or exceed a hazard index of one for the maximally exposed individual?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a.-b. No Additional Analysis Required. The project site is located in the SFBAAB, which is currently designated a non-attainment area for PM₁₀, PM_{2.5}, and ozone. Project construction activities would be limited to installing equipment inside Building 59 or on existing pads and paved areas adjacent to the building. No grading of undeveloped land or major exterior construction would be involved. Therefore the construction emissions would be minimal and would not violate any air quality standard. Furthermore, the project would implement **LRDP Mitigation Measures AQ-1a and AQ-1b.**

LRDP Mitigation Measure AQ-1a

The BAAQMD’s approach to dust abatement calls for “basic” control measures that should be implemented at all construction sites, “enhanced” control measures that should be implemented at construction sites greater than four acres in area, and “optional” control measures that should be implemented on a case-by-case basis at construction sites that are large in area or are located near sensitive receptors, or that, for any other reason, may warrant additional emissions reductions (BAAQMD, 1999).

During construction of individual projects proposed under the LRDP, LBNL shall require construction contractors to implement the appropriate level of mitigation (as detailed below), based on the size of the construction area, to maintain project construction-related impacts at acceptable levels; this would reduce the potential impact to a less-than-significant level.

Elements of the “basic” dust control program for project components that disturb less than one acre shall include the following at a minimum:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- Pave, apply water three times daily (or as sufficient to prevent dust from leaving the site), or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily or as appropriate (with water sweepers using reclaimed water if possible) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily or as appropriate (with water sweepers using reclaimed water if possible) if visible soil material is carried onto adjacent public streets.

Elements of the “enhanced” dust abatement program for project components that disturb four or more acres shall include all of the “basic” measures in addition to the following measures:

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily (or as sufficient to prevent dust from leaving the site), or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Elements of the “optional” control measures are strongly encouraged at construction sites that are large in area or located near sensitive receptors, or that for any other reason may warrant additional emissions reductions:

- Install wheel washers for all exiting trucks, or wash off tires or tracks of all trucks and equipment leaving the site.
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 miles per hour.
- Limit the area subject to excavation, grading, and other construction activity at any one time.
- Pave all roadways, driveways, sidewalks, etc. as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off-site. Their duties shall include holidays and

weekend periods when work may not be in progress. The names and telephone numbers of such persons shall be provided to the BAAQMD prior to the start of construction.

Mitigation Measure AQ-1b

To mitigate equipment exhaust emissions, LBNL shall require its construction contractors to comply with the following measures:

- Construction equipment shall be properly tuned and maintained in accordance with manufacturers' specifications.
- Best management construction practices shall be used to avoid unnecessary emissions (e.g., trucks and vehicles in loading and unloading queues would turn their engines off when not in use).
- Any stationary motor sources such as generators and compressors located within 100 feet of a sensitive receptor shall be equipped with a supplementary exhaust pollution control system as required by the BAAQMD and the California Air Resources Board.
- Incorporate use of low-NO_x emitting, low-particulate emitting, or alternatively fueled construction equipment into the construction equipment fleet where feasible, especially when operating near sensitive receptors.
- Reduce construction-worker trips with ride-sharing or alternative modes of transportation.

With respect to project operations, the proposed NERSC-9 would add stationary sources of emissions to the existing building but would not add any new employees and therefore would not result in any increase in mobile source emissions. The stationary sources added by the proposed project would include (up to) three new cooling towers and a 1.25 MW standby generator. Cooling towers operate on electricity and do not produce any combustion emissions. However the evaporation process from cooling towers produces a small amount of PM₁₀ and PM_{2.5} emissions. With respect to the standby generator, it would be routinely tested for up to 50 hours per year. Criteria pollutant emissions from the routine testing of the generator were estimated using AP-42 emission factors provided by the U.S. EPA.

Table 3, Estimated Operational Emissions, shows the project's predicted operational emissions in terms of annual emissions in tons and average daily operational emissions in pounds per day. As shown in **Table 3**, average daily and annual emissions of ROG and NO_x (which are ozone precursors), PM₁₀, or PM_{2.5} emissions associated with project operation would not exceed the significance thresholds. As a result, the project's impact associated with operational emissions of criteria pollutants would be less than significant. No further analysis is required.

Table 3
Estimated Operational Emissions

Scenario	ROG	NOx	PM10	PM2.5
Annual Emissions (tons per year)				
Standby Generator	0.00	0.54	0.00	0.00
Cooling Towers	0.00	0.00	0.03	0.03
<i>Total</i>	<i>0.00</i>	<i>0.54</i>	<i>0.03</i>	<i>0.03</i>
BAAQMD Thresholds (tons per year)				
	10	10	15	10
Exceeds Threshold?	No	No	No	No
Daily Emissions (pounds per day)				
Standby Generator	0.18	21.78	0.06	0.06
Cooling Towers	0.00	0.00	1.41	1.41
<i>Total</i>	<i>0.18</i>	<i>21.78</i>	<i>1.47</i>	<i>1.47</i>
BAAQMD Thresholds (pounds per day)				
	54	54	82	54
Exceeds Threshold?	No	No	No	No

Source: Illingworth & Rodkin, 2016

- c. **No Additional Analysis Required.** As shown in **Table 3** above, installation of NERSC-9 and accompanying equipment would not significantly add to short- and long-term emissions of criteria air pollutants from mobile and stationary sources, including PM₁₀, PM_{2.5}, and ROG and NO_x that are ozone precursors for which the air basin is in nonattainment. The impact would be less than significant. No further analysis is required.
- d. **No Additional Analysis Required.** The proposed project would not expose sensitive receptors to substantial CO concentrations as the proposed project would not add any new vehicle trips. There would be no impact. No further analysis is required.
- e. **No Additional Analysis Required.** There is no history of odor complaints from the LBNL hill site and the proposed project site is fairly distant from off-site receptors, with the nearest off-site receptors within the Foothill Student Housing Complex located below and about 685 feet to the southwest of Building 59. Ongoing activities from the proposed project are not expected to create nuisance or objectionable odors affecting substantial numbers of people, particularly off-site. Therefore no impact related to objectionable odors would occur and no further analysis is required.
- f. **No Additional Analysis Required.** The project does not include any processes that would generate toxic air contaminants that could affect sensitive receptors that are located approximately 685 to 700 feet to the southwest and west of the project site. The routine testing of the standby generator would result in a small amount of diesel exhaust emissions (emitted as PM_{2.5}) that would be vented from the electrical room roof top exhausts periodically. However, as shown in **Table 3** above, the maximum allowable PM_{2.5} emissions from the generator would be low. Furthermore, the electrical room exhausts are located to the

east of the building and not on the building aspect that is towards the sensitive receptors. Additionally, the standby generator would require a permit from the BAAQMD. The air district stipulates the maximum number of hours in a year that the generator may be operated for testing and maintenance (i.e., no more than 50 hours), and requires that the generator meet the stipulated PM_{2.5} emission rate, and that the operation of the generator not result in human health effects on nearby receptors. For all of these reasons, the routine testing of the generator would not expose nearby sensitive receptors to substantial levels of toxic air contaminant emissions that could result in human health impacts. The impact would be less than significant. No further analysis is required.

6.3.3 Cumulative Impacts

Criteria Pollutants

The SFBAAB is currently designated as a nonattainment area for state and national ozone standards and particulate matter standards. Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, the BAAQMD CEQA Air Quality Guidelines states that a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. According to the BAAQMD, if a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Because as shown in the analysis above, the proposed project would not exceed any of BAAQMD's thresholds of significance, the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under the federal and state ambient air quality standards. The impact would be less than significant.

Furthermore, the 2006 LRDP EIR evaluated the cumulative effects on air quality from criteria pollutant emissions associated with LBNL growth and development under the 2006 LRDP, together with anticipated future cumulative development in Berkeley and the Bay Area in LRDP Impact AQ-5 (page IV.B-47). The EIR concluded that the LRDP's contribution to the cumulative criteria air pollutant emissions from regional growth would not be "cumulatively considerable." Therefore, growth and development pursuant to the 2006 LRDP would not contribute considerably to cumulative increases in criteria pollutants, and the cumulative effect would be less than significant. The proposed project is within the scope of the growth and development evaluated in the 2006 LRDP EIR. Therefore, the proposed project's cumulative air quality effects are adequately addressed under LRDP Impact AQ-5 and are determined to be less than significant.

The 2006 LRDP EIR also evaluated the potential for traffic associated with full development under the 2006 LRDP to expose sensitive receptors to high carbon monoxide (CO) concentrations in the area of congested intersections (LRDP Impact AQ-3) and other pollutants. The analysis concluded that the CO concentrations would not exceed air quality standards.

No conditions have changed and no new information has become available since certification of the 2006 LRDP EIR that would alter this previous analysis. No further environmental evaluation is required.

Toxic Air Contaminants

LRDP Impact AQ-6 evaluated cumulative human health impacts from the implementation of the 2006 LRDP in combination with other contributing projects to determine whether the TAC emissions would

result in an exceedance of the BAAQMD significance threshold (cancer risk in excess of 10-in-a-million) used at the time for the evaluation of both project-level and cumulative impacts. Since the LBNL 2006 LRDP EIR was prepared, the threshold has changed, as further described below. The 2006 LRDP EIR analysis concluded that, although the cumulative emissions of TACs would decrease as a result of new regulations and improved technologies, the cumulative emissions of TACs associated with the 2006 LRDP (including the CRT project), combined with toxic air contaminant emissions from sources on the UC Berkeley campus under the UC Berkeley 2020 LRDP, would result in a maximum off-site cancer risk of 22-in-a-million, exceeding the significance threshold in use at that time. Using the standard, the cumulative impact was deemed to be significant in the LBNL 2006 LRDP EIR. The 2006 LRDP EIR noted that even with the implementation of LRDP Mitigation Measure TRANS-1c to reduce vehicular TAC emissions, the impact would not be reduced to a less than significant level. Therefore, the EIR concluded that the impact would be significant and unavoidable. As noted above, the proposed project is within the scope of development envisioned under the 2006 LRDP and analyzed in the 2006 LRDP EIR for environmental impacts, including human health effects. The proposed project would generate minimal TAC emissions associated with the periodic testing of the standby generator which would contribute to this significant cumulative impact.

As noted above, in 2010, the BAAQMD issued updated CEQA Air Quality Guidelines that included new thresholds of significance to evaluate environmental impacts, including a threshold of 100 in 1 million to evaluate cumulative cancer risk impacts. Under the subsequent threshold of 100 in 1 million, the 2006 LRDP's cumulative TAC impact of 22-in-a-million is less than significant, as is the cumulative impact of the proposed project. The cumulative impacts of the proposed project would therefore be less than significant.

6.4 Biological Resources

6.4.1 Background

LBNL

Similar to other developed areas in the Berkeley-Oakland hills, the LBNL hill site is characterized by clusters of development interspersed with open space that contains a mosaic of vegetation types and wildlife habitats, including oaks and mixed hard wood forests, native and non-native grasslands, chaparral, coast scrub, marsh and wetland communities, and riparian scrubs and forests. Grasslands are the predominant plant community and make up approximately 67 acres of the LBNL hill site. Grasslands consist mostly of annual grasses either as open grassland or as an understory in relatively open eucalyptus and pine stands. Eucalyptus stands are the second most dominant plant community with approximately 22 acres under such stands. Oak-Bay woodland is found on about 12 acres of the LBNL hill site and consists of a mix of coast live oaks and California bay. Coast live oak woodland occurs over 9 acres of the LBNL hill site and California bay woodland occurs on 5.5 acres of the hill site, and is concentrated mainly in the drainages. Coastal scrub occurs on approximately 8.5 acres and includes both California sagebrush scrub and coyote brush scrub. Developed areas at the LBNL hill site have been landscaped with non-native ornamentals in the past and native and drought resistant plants in recent years.

The 2006 LRDP EIR evaluated the potential for the LBNL hill site to support special status plant and wildlife species. Based on the evaluated species, the EIR noted that five special status plant species and 21 special status wildlife species had at least a moderate potential to occur on the LBNL hill site. The EIR also determined that four habitats at the LBNL hill site qualified as sensitive habitats, including known habitat of Lee’s micro-blind harvestman, potential Alameda whipsnake habitat, critical Alameda whipsnake habitat, and riparian and wetland habitat.

Project Site

The project site is located on a hillside and is developed with buildings and paved areas. A small intermittent drainage is located approximately 50 feet to the south of the project site. There are screening trees that surround the southern portion of Building 59 and the cooling tower cluster.

6.4.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
BIOLOGICAL RESOURCES - Would the project:		
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	Impact to be Analyzed in the EIR	No Additional Analysis Required
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** According to Figure IV. C-2 in the LBNL 2006 LRDP EIR, the project site is within a high potential area for the Alameda whipsnake. There may be suitable habitat for the Alameda whipsnake in the vicinity of the project site. However, all exterior work would take place on currently developed Building 59 hardscape and in areas previously disturbed in conjunction with the construction of Building 59. Areas devoid of vegetation and contiguous to development and human activity are not considered to be viable habitat for the species (the Alameda whipsnake avoids areas where ground cover cannot visually obscure it from birds of prey; it also avoids human activity). Nevertheless, the project would implement **LBNL Mitigation Measures BIO-5c through 5f** and project construction crews who might work in unpaved areas as required for crane placement would undergo required Alameda whipsnake awareness training. Therefore no habitat for the species would be disturbed and impacts to the species would be avoided.

LRDP Mitigation Measure BIO-5c:

A full-time designated monitor shall be employed at project sites that are within or directly adjacent to areas designated as having high potential for whipsnake occurrence, or (2) Daily site surveys for

Alameda whipsnake shall be carried out by a designated monitor at construction sites within or adjacent to areas designated as having moderate potential for whipsnake occurrence.

Each morning, prior to initiating excavation, construction, or vehicle operation at sites identified as having moderate or high potential for whipsnake occurrence, the project area of applicable construction sites shall be surveyed by a designated monitor trained in Alameda whipsnake identification to ensure that no Alameda whipsnakes are present. This survey is not intended to be a protocol-level survey. All laydown and deposition areas, as well as other areas that might conceal or shelter snakes or other animals, shall be inspected each morning by the designated monitor to ensure that Alameda whipsnakes are not present. At sites in high potential areas the monitor shall remain on-site during construction hours. At sites in moderate potential areas the monitor shall remain on-call during construction hours in the event that a snake is found on-site. The designated monitor shall have the authority to halt construction activities in the event that a whipsnake is found within the construction footprint until such time as threatening activities can be eliminated in the vicinity of the snake and it can be removed from the site by a biologist permitted to handle Alameda whipsnakes. The USFWS shall be notified within 24 hours of any such event.

LRDP Mitigation Measure BIO-5d:

Alameda whipsnake awareness and relevant environmental sensitivity training for each worker shall be conducted by the designated monitor prior to commencement of on-site activities. All on-site workers at applicable construction sites shall attend an Alameda whipsnake information session conducted by the designated monitor prior to beginning work. This session shall cover identification of the species and procedures to be followed if an individual is found on-site, as well as basic site rules meant to protect biological resources, such as speed limits and daily trash pickup.

LRDP Mitigation Measure BIO-5e:

Hours of operation and speed limits shall be instituted and posted. All construction activities that take place on the ground (as opposed to within buildings) at applicable construction sites shall be performed during daylight hours, or with suitable lighting so that snakes can be seen. Vehicle speed on the construction site shall not exceed 5 miles per hour.

LRDP Mitigation Measure BIO-5f:

Site vegetation management shall take place prior to tree removal, grading, excavation, or other construction activities. Construction materials, soil, construction debris, or other material shall be deposited only on areas where vegetation has been mowed.

Areas where development is proposed under the 2006 LRDP are subject to annual vegetation management involving the close-cropping of all grasses and ground covers; this management activity would be performed prior to initiating project-specific construction. Areas would be re-mowed if grass or other vegetation on the project site becomes high enough to conceal whipsnakes during the construction period. In areas not subject to annual vegetation management, dense vegetation would be removed prior to the onset of grading or the use of any heavy machinery, using goats, manual brush cutters, or a combination thereof.

With mitigation, the impact would be less than significant. Further analysis is not required.

In order to deliver certain large pieces of equipment, such as the backup generator and cooling towers, to the appropriate locations around Building 59, a large crane or cranes may need to be temporarily installed and operated adjacent to the building. Although no trees are planned for removal or disturbance, trees that surround the southern portion of Building 59 and the cooling tower pad may provide habitat for special-status birds or bat species. Noise associated with the delivery of equipment and installation of the cooling towers could possibly affect special-status bird and/or bat species that may inhabit these nearby trees. However, the proposed project would be required to implement **LRDP Mitigation Measures BIO-1a** and **BIO-1b** that are listed below and are a part of the project. With the implementation of these mitigation measures, the project would have a less than significant impact on nesting birds and bats. No further analysis is required.

LRDP Mitigation Measure BIO-1a

Direct disturbance, including tree and shrub removal or nest destruction by any other means, or indirect disturbance (e.g., noise, increased human activity in area) of active nests of raptors and other special-status bird species (as listed in Table IV.C-1 in the LBNL 2006 LRDP EIR) within or in the vicinity of the proposed footprint of a future development project shall be avoided in accordance with the following procedures for Pre-Construction Special-Status Avian Surveys and Subsequent Actions. No more than two weeks in advance of any tree or shrub removal or demolition or construction activity involving particularly noisy or intrusive activities (such as concrete breaking) that will commence during the breeding season (February 1 through July 31), a qualified wildlife biologist shall conduct pre-construction surveys of all potential special-status bird nesting habitat in the vicinity of the planned activity and, depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on special-status nesting birds:

1. Pre-construction surveys are not required for demolition or construction activities scheduled to occur during the non-breeding season (August 1 through January 31).
2. If pre-construction surveys indicate that no nests of special-status birds are present or that nests are inactive or potential habitat is unoccupied, no further mitigation is required.
3. If active nests of special-status birds are found during the surveys, a no-disturbance buffer zone will be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined through consultation with the CDFW, taking into account factors such as the following:
 - Noise and human disturbance levels at the project site and the nesting site at the time of the survey and the noise and disturbance expected during the construction activity;
 - Distance and amount of vegetation or other screening between the project site and the nest; and
 - Sensitivity of individual nesting species and behaviors of the nesting birds.
4. Noisy demolition or construction activities as described above (or activities producing similar substantial increases in noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed

that any breeding birds taking up nests would be acclimated to project-related activities already under way). However, if trees and shrubs are to be removed during the breeding season, the trees and shrubs will be surveyed for nests prior to their removal, according to the survey and protective action guidelines 3a through 3c, above.

5. Nests initiated during demolition or construction activities would be presumed to be unaffected by the activity, and a buffer zone around such nests would not be necessary.
6. Destruction of active nests of special-status birds and overt interference with nesting activities of special-status birds shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I, Noise, of this EIR shall be implemented.

LRDP Mitigation Measure BIO-1b

Project implementation shall avoid disturbance to the maternity roosts of special-status bats during the breeding season in accordance with the following procedures for Pre- Construction Special-Status Bat Surveys and Subsequent Actions. No more than two weeks in advance of any demolition or construction activity involving concrete breaking or similarly noisy or intrusive activities, that would commence during the pup-rearing season (April 15 through August 31), or winter hibernacula season (October 15 through March 1, depending on weather conditions) a qualified bat biologist, acceptable to the CDFW, shall conduct pre-demolition surveys of all potential special-status bat breeding habitat in the vicinity of the planned activity. Depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on breeding special-status bats:

1. If active roosts are identified during pre-construction surveys, a no disturbance buffer will be created by the qualified bat biologist, in consultation with the CDFW, around active roosts during the breeding season. The size of the buffer will take into account factors such as the following:
 - Noise and human disturbance levels at the project site and the roost site at the time of the survey and the noise and disturbance expected during the construction activity;
 - Distance and amount of vegetation or other screening between the project site and the roost; and
 - Sensitivity of individual nesting species and the behaviors of the bats.
2. If pre-construction surveys indicate that no roosts of special-status bats are present, or that roosts are inactive or potential habitat is unoccupied, no further mitigation is required.
3. Pre-construction surveys are not required for demolition or construction activities scheduled to occur during the non-breeding and winter hibernacula season (September 1 through October 15, and March 1 through April 15).
4. Noisy demolition or construction activities as described above (or activities producing similar substantial increases in noise and activity levels in the vicinity) commencing during the non-

breeding season and continuing into the breeding season do not require surveys (as it is assumed that any bats taking up roosts would be acclimated to project-related activities already under way). However, if trees are to be removed during the breeding season, the trees would be surveyed for roosts prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.

5. Bat roosts initiated during demolition or construction activities are presumed to be unaffected by the activity, and a buffer is not necessary.
6. Destruction of roosts of special-status bats and overt interference with roosting activities of special-status bats shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I, Noise, shall be implemented.

- b. No Additional Analysis Required.** There are no existing drainages or other sensitive communities on the project site that could be affected by project implementation. The project would involve installation of NERSC-9 and associated equipment within the existing Building 59 or on outside paved or previously disturbed areas adjacent to the building. Therefore, the proposed project would have no effect on riparian habitat or a sensitive natural community, as defined in local or regional plans, policies, regulations or by the CDFW or USFWS. No further analysis is required.
- c. No Additional Analysis Required.** The project site is developed with Building 59 and paved areas. There are no jurisdictional wetlands or water courses on the project site. Therefore, there would be no impact on wetlands as defined by Section 404 of the Clean Water Act and no further analysis is required.
- d. No Additional Analysis Required.** The project site is developed and surrounded by institutional uses. Although there could be some wildlife movement in the project vicinity, the project site is not part of an established wildlife movement corridor or a native wildlife nursery site. Therefore, there would be no impact to wildlife movement and no further analysis is required.
- e. No Additional Analysis Required.** The proposed project would not involve any site clearance or tree removal. The project would not conflict with policies protecting biological resources. Thus, there would be no impact and no further analysis is required.
- f. No Additional Analysis Required.** No Habitat Conservation Plans or Natural Community Conservations Plans have been adopted that encompass the project area. Therefore, no impact would occur and no further analysis is required.

6.4.3 Cumulative Impacts

The proposed project would result in no impacts on certain biological resources such as wetlands and sensitive habitats and to the extent the project construction activities could affect Alameda whipsnake or nesting birds, LRDP mitigation measures would reduce those impacts to less than significant. Therefore with mitigation, the project would not make a cumulatively considerable contribution to any cumulative impacts on these resources.

Furthermore, as concluded in the 2006 LRDP EIR, LBNL growth and development pursuant to the 2006 LRDP, when combined with development under the UC Berkeley LRDP as well as surrounding (primarily residential) development in the Oakland-Berkeley hills, would contribute to a reduction of open space and, consequently, habitat for native plants and wildlife, including special-status species

(LRDP Impact BIO-7, page IV.C-57), but the impact would be less than significant. No conditions have changed and no new information has become available since certification of the 2006 LRDP EIR that would alter this previous analysis. Given that the proposed project is located in an area that is developed and does not contain any natural habitat, the proposed project would not contribute to the cumulative impact associated with the reduction of native habitat and open space. Further analysis is not required.

6.5 Cultural Resources

6.5.1 Background

LBNL hill site history is presented in the 2006 LRDP EIR and is based on information from technical studies prepared for the project area, including archival research at the California Historical Resources Information System's Northwest Information Center; a cultural resources evaluation and survey; an archaeological survey report; and the first of a series of reports being prepared as part of an inventory and evaluation of potential historically significant buildings and structures at the LBNL hill site.

Previous Site-Wide Studies

As part of the environmental analysis for the 1987 LRDP EIR, as amended, all undeveloped land and then-proposed building locations were examined for potential historical and archaeological resources. All reasonably accessible parts of the LBNL hill site area were examined. Special attention was given to areas of relatively flat land or rock outcrops. The steep hillsides were not examined intensively, although transects were made through accessible areas. Based on the findings of the historic and archaeological resources survey, no indications of historic or prehistoric archaeological resources were encountered in any location on the LBNL hill site. Based on this survey, the LBNL hill site was determined not to be eligible for listing on the National Register of Historic Places.

Current Studies of Archaeological Resources

Field surveys and archival research at the California Historical Resources Information System's Northwest Information Center have been undertaken to determine whether any archaeological resources have been discovered at the LBNL hill site. The Northwest Information Center has indicated there is a "low potential for Native American sites in the project area" and thus "a low possibility of identifying Native American or historic-period archaeological deposits in the project area." Additionally, field studies conducted at various times at the LBNL hill site have not encountered any archaeological resources. Native American archaeological sites in this portion of Alameda County tend to be situated on terraces along ridgetops, mid-slope terraces, alluvial flats, near ecotones, and near sources of water, including springs. LBNL is situated on a steep slope adjacent to Strawberry Creek. Therefore, there is a low-to-moderate potential for Native American sites to be present on the LBNL hill site.

Project Site

In March 2010, archaeologists from Condor Country Consulting inspected and surveyed the Building 59 project site to assess the potential for any intact archaeological sites to be present within the project area. No archaeological or historic resources were encountered other than one isolated fragment of obsidian found in a highly disturbed context on the side of a steep slope. The archaeologist concluded that it was likely an imported item and/or deposited from the construction of Building 70A that is located upslope (Condor Country Consulting 2010).

No cultural resources were encountered at the project site during the construction of Building 59.

6.5.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
CULTURAL RESOURCES - Would the project:		
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** The proposed project does not involve demolition or alteration to any building or structure that would be considered a historic resource. Therefore, there would be no impact related to historical resources and no further analysis is required.
- b. - d. **No Additional Analysis Required.** The proposed project would not involve any building construction or ground disturbing activities. Equipment installation would mainly be interior to Building 59 and the (up to) three cooling towers that would be installed outside would be placed in a previously paved area. Other than the limited use of some previously disturbed land adjacent to the cooling tower pad for the placement of a crane, no land disturbance is proposed as part of the project. Thus, due to the nature of the project, no impacts to archaeological or paleontological resources would occur. Similarly, no human remains would be disturbed. Further analysis is not required.
- e. **Impact to be Analyzed in the EIR.** Assembly Bill (AB) 52, which came into effect on July 1, 2015, requires that lead agencies consider the effects of projects on tribal cultural resources and conduct consultation with federally and non-federally recognized Native American tribes early in the environmental review process. According to AB 52, it is the responsibility of the tribes to formally request of a lead agency that they be notified of projects in the lead agency's jurisdiction so that they may request consultation. Although at this time, no tribes have contacted UC LBNL requesting notification regarding proposed projects at the LBNL hill site, UC LBNL is proactively sending out letters to tribes in Alameda County notifying them of the proposed project at the same time that the NOP is being issued. As noted above, the proposed project does not involve the construction of new buildings or any major ground disturbing activities and the potential for any tribal cultural resources to exist on the LBNL hill site is low. Therefore,

no impacts to tribal cultural resources are anticipated. Nonetheless, more information regarding the AB 52 process and the completion of consultation will be provided in the Draft EIR.

6.5.3 Cumulative Impacts

Because there would be no project impact on cultural resources, the project would not contribute to any cumulative impacts on these resources. Further analysis is not required.

6.6 Geology and Soils

6.6.1 Background

LBNL

The LBNL hill site is located on the western slopes of the Berkeley-Oakland hills within the central region of the Coast Range Geomorphic province. The Miocene Orinda Formation, composed of poorly indurated non-marine mudstone and sandstone, underlies most of the site. The western and southern portions are underlain by older marine mudstone and sandstone deposits. Some of the higher elevation portions of the site and a portion of the eastern part of the site are underlain by Moraga Formation rocks, and a small portion of the eastern extent of the site is underlain by shallow marine sandstones of the Claremont Formation. The entire site is mapped by the California Department of Conservation, Geologic Survey (CGS) as MRZ-1, an area where no significant mineral or aggregate deposits are present. The majority of the hill site soils are Xerorthents-Millsholm complex, 30 to 40 percent slope. These soils are well-drained and susceptible to erosion. Other soil types on the hill site include Altamont Clay, Mayhem loam, and Mayhem-Los Gatos complex, all soil types highly susceptible to erosion.

The Hayward Fault and associated Earthquake Fault Zone traverses the western edge of the Berkeley Lab site near the Blackberry Canyon Gate. The San Andreas Fault Zone is approximately 19 miles southwest of the LBNL hill site. According to the USGS Working Group on California Earthquake Probabilities estimates, there is a 27 percent chance of an earthquake of M 6.7 on the Hayward-Rodgers Creek Fault system by 2032 and a 21 percent chance of an earthquake of M 6.7 on the San Andreas Fault by 2032. The LBNL hill site is expected to experience strong ground shaking from a seismic event on any of the Bay Area major faults. CGS has designated much of the LBNL hill site as a Seismic Hazard Zone for earthquake-induced landslides. The CGS has not designated any portion of the LBNL hill site as a Seismic Hazard Zone for liquefaction.

Project Site

The project site is developed with Building 59 and associated roads and paved surfaces. The project site is located within the Hayward Fault zone, as defined by the Alquist-Priolo Earthquake Fault Zoning map. However, a fault investigation that was conducted before the construction of Building 59 did not identify any active fault traces at the project site.

6.6.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
GEOLOGY AND SOILS - Would the project:		
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:		
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	Impact to be Analyzed in the EIR	No Additional Analysis Required
known fault? Refer to Division of Mines and Geology Special Publication 42.		
ii. Strong seismic ground shaking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii. Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv. Landslides?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. i-iv. No Additional Analysis Required.** Although Building 59 falls within the Hayward Fault zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Map, the site of the building does not contain any active faults and fault rupture is not a concern. As mentioned above, the entire LBNL hill site is likely to experience strong ground shaking during most large magnitude earthquakes located in the Bay Area. The existing building was designed and constructed in accordance with recommendations from the site specific geotechnical investigation. Therefore, impacts related to seismic-related ground failure and damage were addressed prior to and during the construction of the building. The proposed project would install the NERSC-9 high-performance computing system and associated equipment in Building 59 and adjacent exterior cooling tower enclosure. No new buildings are planned. Thus, there would be no impacts related to seismic-related ground failure and no further analysis is required.
- b. No Additional Analysis Required.** Although the project site is located on a hillside, there would be no construction activities that would increase rates of erosion. All installation of NERSC-9 and related equipment would be on paved areas and no soils would be disturbed. If needed, a crane may be used to install the cooling towers and would be placed in an unpaved area to the east of Building 59 and north of the cooling tower pad in an area that was previously graded during the construction of Building 59. However, the duration of this activity would be short and appropriate erosion control measures would be implemented to avoid soil erosion and discharge of sediment from the project site. Therefore, no impact would occur and no further analysis is required.

- c.-d. **No Additional Analysis Required.** As noted above, the project would be located on a hillside but within a previously developed building or adjacent exterior paved areas. Building 59, which the proposed project is located in, was designed in accordance with the site-specific geotechnical investigation and is in compliance with building standards and codes. Therefore, no impacts related to ground instability or location on expansive soils would occur and no further analysis is required.
- e. **No Additional Analysis Required.** The project site is currently developed and sewers are available for the disposal of wastewater. Therefore, implementation of the project would not require the construction of septic tanks for wastewater disposal. No further analysis is required.

6.6.3 Cumulative Impacts

Because, as noted in the analysis above, there would be no project impacts related to geology and soils, the project would not contribute to any cumulative impacts to these topics. Further analysis is not required.

6.7 Greenhouse Gas Emissions

6.7.1 Background

Definition of Greenhouse Gases

“Greenhouse gases” (so called because of their role in trapping heat near the surface of the earth), including those emitted by human activity, are implicated in global climate change, commonly associated with “global warming.” These greenhouse gases (GHGs) trap heat in the earth’s atmosphere by reflecting solar energy (i.e., long wave radiation) back toward the earth’s surface. The greenhouse effect is responsible for maintaining a habitable climate on earth, but human activity has caused increased concentrations of these gases in the atmosphere. Increasing concentrations of GHGs are therefore considered to contribute towards increasing global temperatures as well as increasing variability in regional and global weather patterns.

The principal GHGs are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Of GHGs generated by human activities, carbon dioxide and methane are generated in the largest quantities. Emissions of carbon dioxide are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. There is general international scientific agreement that human-caused increases in GHGs have contributed to and will continue to contribute to global warming, although there is less agreement concerning the magnitude and rate of the warming.

LBNL

LBNL activities that generate GHG emissions include the use of motor vehicles (mobile sources) and building heating (area sources), as well as indirect sources such as electricity generation. These sources represent the great majority of GHGs produced in association with the activities at LBNL, because LBNL does not emit industrial or agricultural gases, and thus generates little in the way of GHGs other than carbon dioxide. While certain research activities may incorporate other GHGs, their use typically results in minimal emissions. Moreover, while some refrigeration units at LBNL use a hydrofluorocarbon chemical, such as HFC-134a, this class of chemical is a U.S. EPA-acceptable alternative to the more harmful ozone-depleting substances (chlorofluorocarbons) that were banned in the 1990s. LBNL refrigeration units are closed-loop systems that do not emit during normal operation. When work is performed on these systems, EPA-certified refrigerant recovery equipment is used, which effectively eliminates emissions.

On-road transportation sources (i.e., automobiles, trucks, and buses) represent the largest source of GHG emissions, consistent with existing Bay Area and statewide patterns of GHG emissions. Electricity generation (both from in-state and out-of-state power plants) represents the second largest source of GHG emissions for LBNL (although most of these emissions occur outside the Bay Area).

Project Site

The direct sources of GHG emissions in the vicinity of the project site include standby generators associated with various existing buildings. Indirect sources include vehicles and the use of electricity and natural gas in Lab buildings.

6.7.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
GREENHOUSE GAS EMISSIONS - Would the project:		
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

DISCUSSION:

a., b. **Impact to be Analyzed in the EIR.** The proposed project would not add new building space to the LBNL hill site. Furthermore, as noted in the Project Description, it would not increase the total number of employees and visitors who would travel to and from Building 59. Therefore, there would be no increase in GHG emissions from operational vehicle trips to the project site. The proposed project would, however, require additional electricity to operate the high-performance computing system, additional water to operate the facility’s cooling system, and the installation of a back-up generator. All of these project elements would result in direct and indirect GHG emissions. The NERSC-9 project EIR will estimate the direct and indirect GHG emissions from the implementation of the proposed project and evaluate whether the emissions would exceed the BAAQMD’s thresholds for GHGs emitted by development projects. The EIR will also evaluate whether the project would conflict with any applicable plan, policy or regulation adopted by LBNL for the purpose of reducing GHG emissions.

6.7.3 Cumulative Impacts

Cumulative impacts related to GHG emissions will be evaluated in the NERSC-9 project EIR.

6.8 Hazards and Hazardous Materials

6.8.1 Background

Definition of Hazardous Materials

The term hazardous material is defined in different ways for different regulatory programs. The 2006 LRDP EIR uses the definition given in California Health and Safety Code Section 25501(o), which defines hazardous material as:

...any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.

Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

In addition to hazardous chemicals, biohazardous and radioactive materials are also used in laboratories at LBNL.

LBNL Hazardous Materials Plans and Policies

UC LBNL has developed an Integrated Safety Management (ISM) System that establishes environment, safety, and health policies and procedures to ensure all work is performed safely and in a manner that strives for the highest protection for the employees, guests, visitors, the public, and the environment. In addition, UC LBNL has developed an Environmental Management System to implement sound environmental stewardship practices that protect the air, water, land, and other resources that could potentially be affected by facility operations. The UC LBNL Environment, Health, and Safety (EH&S) Division has the primary responsibility of developing strategies for compliance with applicable local, state, and federal laws and regulations. EH&S has the authority to require abatement of any condition or operation that could endanger people or facilities at the LBNL hill site or result in violations of pertinent federal or state laws or LBNL policies concerning health and safety. EH&S develops specific policies and programs in the following areas: industrial hygiene, chemical safety, physical safety, radiation safety, biohazard safety, hazardous waste management, and environmental protection.

Hazardous Materials Storage, Handling and Disposal

UC LBNL stores chemicals and other hazardous materials in aboveground tanks and storage drums. Hazardous, radioactive and mixed wastes are stored in designated areas in research and support areas throughout the LBNL hill site. From these locations, they are taken to the permitted Hazardous Waste Handling Facility (Building 85) for temporary storage and permitted treatment. From this site, the wastes are hauled off for treatment and disposal.

Other Hazards

Other potential hazards at the LBNL hill site include the presence of asbestos, lead-based paints, PCBs, and radioactive materials in structures; and soil and groundwater contamination in some areas of the hill site due to historical releases of hazardous and radioactive materials.

In 1988, UC LBNL began a rigorous evaluation of potential historical releases of contaminants to the environment as part of an investigation under RCRA, which was required for renewal of its Part B hazardous waste facility permit. This process revealed contamination in soil and groundwater due to past site activities. A number of interim corrective measures were undertaken during the 1990s to clean up soil and groundwater that posed an imminent threat to human health or the environment. The remaining contamination that exceeded the DTSC required site cleanup levels was addressed in a Corrective Measures Implementation (CMI) Work Plan, which was approved by DTSC in March 2006. In July 2007, DTSC determined that UC LBNL had implemented the approved remedies for the remaining soil contamination and that the approved remedies for groundwater had been constructed and were operating successfully. UC LBNL continues to perform monitoring using about 150 groundwater monitoring wells located throughout the hill site and one additional well located off-site. In addition, in connection with demolition of older structures, UC LBNL conducts surveys to identify locations where hazardous substances are present and to establish procedures to safely remove the substances.

Similar to other developed hillside areas, LBNL hill site's developed areas are interspersed with grassland areas and groves of trees. UC LBNL implements a vegetation management program to minimize the risk of wildland fires. In addition, Alameda County Fire Station 19 is located on the LBNL hill site.

Project Site

The proposed project would not involve the use of any hazardous materials other than small amounts of chemicals that would be used in the cooling towers to control scaling, and diesel fuel stored in a new fuel tank used to service a new backup generator. Research that is conducted in Building 59 is limited to computing and computing-related operations and does not involve radioactive materials, hazardous chemicals, hazardous organic or inorganic materials, nano-scale materials, or genetically modified/transgenic plant materials and microorganisms. Additionally, no "wet" laboratories are located in the building.

The NERSC-9 project site is located in a stand of eucalyptus and pine trees with a few immature redwood and oak trees, and a grassland understory. Areas adjacent to the site are also similar in terms of vegetation community and have a moderate to high risk of wildland fires.

6.8.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
HAZARDS AND HAZARDOUS MATERIALS- Would the project:		
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. For a project located within an airport land use plan or, where such plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wild lands?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** Research-related chemicals are not used in Building 59. Any wastes generated in Building 59 following the installation of NERSC-9 would be similar to current wastes that include only small amounts of office-related chemicals and chemicals used in building machinery and cooling systems. Any such wastes determined to be hazardous per regulations would be removed to the Hazardous Waste Handling Facility, aggregated appropriately, and shipped for treatment and disposal in compliance with applicable California hazardous waste regulations and Department of Transportation

regulations. Because only small amounts of chemical wastes would be generated by the facility following project implementation, any hazardous waste generation would be minor and would not impact the ability of LBNL to accumulate, transport, handle, and aggregate its cumulative waste stream. Therefore, there would be a less than significant impact and no further analysis is required.

- b. **No Additional Analysis Required.** The proposed project would augment the existing Building 59 backup generator with a second backup generator of the same capacity. A new, approximately 2,300 gallon fuel tank would be installed to provide fuel to the new back-up generator. This above-ground storage tank would be secured with spill-prevention and secondary containment systems to prevent any accidental, uncontrolled releases; this protection system would be regularly inspected by the jurisdictional fire marshal. Therefore, the fuel tank would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The impact would be less than significant impact and no further analysis is required.
- c. **No Additional Analysis Required.** There are no public or private elementary, middle, or high schools within one-quarter mile of the LBNL hill site. Therefore there would not be any impact on schools from project-related air toxic emissions. No further analysis is required.
- d. **No Additional Analysis Required.** As noted in the CRT Facility EIR, the facility is not located on a Cortese list, and thus would not result in a significant hazard to the public or environment. Therefore, there would be no impact and no further analysis is required.
- e. **No Additional Analysis Required.** The project site is more than 11 miles northeast of the Oakland Metropolitan Airport, and lies outside the boundaries of the Alameda County Airport Land Use Commission Plan for the Oakland Metropolitan Airport. Therefore, implementation of the project would not expose people on the project site to hazards from aircraft overflights. There would be no impact. No further analysis is required.
- f. **No Additional Analysis Required.** The project site is not located in the vicinity of a private airstrip. Therefore, implementation of the project would not result in an impact related to safety hazards associated with private airstrips. No further analysis is required.
- g. **No Additional Analysis Required.** The proposed project would not increase the number of people or the amount of property that could be exposed to regional, compounded, or terrorist-related catastrophic events. Regionally catastrophic events could include earthquakes or fires of sufficient magnitude to impair regional emergency support and service systems such that LBNL could not expect to receive aid from external sources. Due to the nature of the project, the proposed upgrades would not increase the daily population at the LBNL hill site nor the amount of property that could be exposed to catastrophic events. There would be no impact. No further analysis is required.
- h. **No Additional Analysis Required.** Development of the proposed project would not increase the amount of facility space at the LBNL hill site. Building 59 would continue to meet required safety standards and fire codes and implement LBNL's vegetation management program, which would limit damage to assets from these fires and would reduce potential wildland fire hazards to a less than significant level. Therefore, the project would not expose any new structures or persons to a significant risk from wildland fires. There would be no impact. No further analysis is required.

6.8.3 Cumulative Impacts

For most of the hazards and hazardous materials issues analyzed above, there would be no project impact, and the project would not contribute to any cumulative impacts related to these issues. With respect to the impact associated with the routine use and transportation of hazardous materials, the project would involve a new fuel storage tank that would be located inside the building and maintained in compliance with applicable laws and regulations. As a result of compliance with the law, the potential for accidental spills would be minimal and the project would not contribute considerably to a cumulative impact associated with the routine use of hazardous materials. Further analysis is not required.

6.9 Hydrology and Water Quality

6.9.1 Background

LBNL

Surface Water Hydrology

The LBNL hill site is located within the Blackberry and Strawberry Canyons in the East Bay Hills, with the majority of the hill site in Strawberry Canyon. The northwestern portion of the LBNL hill site drains to the North Fork of Strawberry Creek in Blackberry Canyon whereas the majority of the site drains to the South Fork of Strawberry Creek in Strawberry Canyon. The total watershed area of the Strawberry Creek North and South Forks pertinent to LBNL is 878 acres, of which about 202 acres are within the LBNL hill site. A number of smaller drainages discharge into the South Fork, including Ravine Creek, Ten-Inch Creek, Chicken Creek, No Name Creek, and Botanical Garden Creek. Runoff from the LBNL hill site that drains into the South Fork of Strawberry Creek is routed into a mid-canyon retention basin from where it is released downstream at flow rates consistent with the design parameters of the storm drainage systems of UC Berkeley and the City of Berkeley. Runoff from the LBNL hill site that drains into the North Fork exits the site at the bottom of Blackberry Canyon from where it flows through a series of check dams and settlement basins before entering the City's storm water system.

Groundwater Resources

Groundwater at the LBNL hill site occurs at depths ranging from zero feet to approximately 100 feet below ground surface. Groundwater flow patterns generally reflect the site topography with groundwater flowing to the south for the vast majority of the site. Groundwater is not used for potable or irrigation uses on the LBNL hill site.

Flooding

The LBNL hill site is not located within a 100-year flood plain as determined by the Federal Emergency Management Agency flood hazard mapping.

Surface Water and Groundwater Quality

UC LBNL has had a storm water management program in place for the hill site since 1992. This program is designed to control pollution of surface waters. Groundwater in some portions of the LBNL hill site has been affected by accidental releases of hazardous and radioactive materials. UC LBNL is implementing a remediation and monitoring program to address the groundwater contamination.

Project Site

The proposed project site is located in the North Fork watershed of Strawberry Creek. Cafeteria Creek, an intermittent tributary of the North Fork, is located to the southeast of the project site. The project site is mostly impervious and developed with Building 59 and paved areas.

6.9.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
HYDROLOGY AND WATER QUALITY- Would the project:		
a. Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, that would result in substantial erosion or siltation on or off site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, that would result in flooding on or off site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h. Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
j. Inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a., e., f. No Additional Analysis Required. Water quality is regulated by both state and federal agencies under the authority of the Clean Water Act. Projects that have the potential to degrade water quality are subject to the regulations of those agencies. The project site is currently developed with the existing Building 59 and is mostly impervious. The facility improvements and installation of equipment would occur inside Building 59 or on an existing concrete pad surrounded by a concrete wall located adjacent to the building. Therefore, the proposed project would not change the amount of impervious surfaces associated with the project site and would not result in an increase in runoff (or a reduction in infiltration) compared to existing conditions. Therefore off-site flooding or hydromodification-related erosion impacts would not occur.

Although the project site is located on a hillside, there would be no building construction or ground disturbing activities that would increase rates of erosion. All installation of NERSC-9 and related equipment would be on paved areas and no soils would be disturbed. To the extent it is needed, a crane may be used to install the cooling towers and may be placed in an unpaved area to the east of Building 59 and north of the cooling tower pad. However, the duration of this activity would be short and appropriate erosion control measures would be implemented to avoid soil erosion and discharge of sediment from the project site. The impact would be less than significant.

Water quality and drainage impacts associated with the NERSC-9 project would be less than significant and no further analysis is required.

b. No Additional Analysis Required. Water used at LBNL is supplied from the East Bay Municipal Utility District's Shasta Reservoir and Berkeley View Reservoir systems and groundwater at the site is not utilized. The proposed project would not require any groundwater withdrawal. Recharge of the groundwater table would not be affected by implementation of the proposed project because the project would not add any new impervious surfaces to the site. Furthermore, groundwater in the project area is not used for public water supply. Therefore, there would be no impact related to groundwater recharge or depletion of groundwater as a result of the project and no further analysis is required.

c.-d. No Additional Analysis Required. The proposed project would not alter the existing building's footprint. No additional structures would be constructed and no grading or excavation would occur. Therefore, there would be no impacts to the existing drainage patterns on the site. No further analysis is required.

g.-i. No Additional Analysis Required. The project site is not located within the Federal Emergency Management Agency's (FEMA) Flood Zone A (100-year flood zone). The project would not involve the construction of residential structures. Therefore, there would be no impact and no further analysis is required.

j. No Additional Analysis Required. Given the elevation and distance of the project site from the bay's edge, there would be no potential for flooding from a seiche or tsunami. Moreover, given the developed nature of the project vicinity, there is minimal potential for mudflows. Therefore, implementation of the project would result in no impact related to the risk of inundation from seiche, tsunami, or mudflow and no further analysis is required.

6.9.3 Cumulative Impacts

For most of the hydrology and water quality issues analyzed above, there would be no project impact, and the project would not contribute to any cumulative impacts related to these issues. With respect to the water quality impact associated with the limited construction activities outside Building 59, the affected area is small and the project would implement appropriate erosion control measures avoid soil erosion and discharge of sediment from the project site. Therefore the project would not contribute considerably to a cumulative water quality impact. No further analysis is required.

6.10 Land Use and Planning

6.10.1 Background

LBNL

The LBNL hill site covers approximately 200 acres in the eastern hills of Berkeley and Oakland. The site is largely buffered by undeveloped land owned by the University of California, although the northwest corner of the LBNL hill site generally abuts residential neighborhoods in the City of Berkeley.

Access to LBNL’s hill site is limited to three controlled-access vehicular gates on Cyclotron Road (the main Blackberry Canyon Gate) and Centennial Drive (the Strawberry Canyon and Grizzly Peak gates), all of which are staffed by an on-site security firm contracted by UC LBNL. Visitors primarily use the Blackberry Canyon Gate. The Grizzly Peak Gate is an exit-only gate after the morning commute hours.

The LBNL hill site is comprised of approximately 200 acres of land owned by the Regents of the University of California, adjacent to the University of California, Berkeley campus. The LBNL hill site includes research and support buildings and structures that are primarily part of a multi-program national research facility called the Lawrence Berkeley National Laboratory, which is managed and operated by the University of California under contract with the U. S. Department of Energy. The University is generally exempted by the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The western part of the LBNL hill site is within the Berkeley city limits, and the eastern part is within the Oakland city limits.

Project Site

The NERSC-9 project site is currently developed with Building 59, cooling tower cluster, roads and a paved area to the east of the building. The 2006 LRDP designates the project site Research and Academic. The project site is located in the western portion of the Lab site.

6.10.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
LAND USE AND PLANNING - Would the project:		
a. Physically divide an established community?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Conflict with applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** The project site is located on the LBNL hill site in an area currently developed with research and academic uses. Implementation of the project would not disrupt an existing community. Therefore, no impact would occur and no further analysis is required.
- b. **No Additional Analysis Required.** The 2006 LRDP is the applicable land use plan for the LBNL hill site. The LRDP establishes a framework of land-use principles and policies to guide future growth and change at the Berkeley Lab through 2025. The plan identifies projections in population, building space, and land uses.

The project site is designated Research and Academic under the 2006 LRDP. This land use designation provides for scientific research and associated support functions and constitutes the majority of the developed land on the LBNL hill site. The proposed project would involve upgrading the Wang Hall Facility, which already conforms to that land use category. Therefore the project is thus consistent with the 2006 LRDP land use designations.

The primary objectives of the 2006 LRDP are to revitalize existing facilities and infrastructure at the LBNL hill site and to guide the future development at the site. The 2006 LRDP identifies the following principal objectives:

- Strengthen and expand existing research programs to sustain and grow Berkeley Lab's role as a national research laboratory;
- Expand partnerships and collaborations to enhance Berkeley Lab's scientific and technical base;
- Provide flexibility to return staff from its off-site facilities leased in Berkeley and Oakland to the main hill site in order to enhance collaboration, productivity, and efficiency;
- Expand the capacity of existing high demand advanced facilities and provide broader functionality;
- Rehabilitate facilities that have outlived their intended purpose and can be cost-effectively adapted for use in regions of scientific discovery;
- Replace single-purpose facilities with new facilities programmed to accommodate multiple disciplines with advanced infrastructure suitable for future scientific endeavors; and
- Construct new scientific facilities to support future research initiatives and continued growth in existing programs.

The proposed project would support several of these key objectives of the 2006 LRDP. The NERSC program is the main computing facility for the Department of Energy Office of Science, which supports basic and applied research across multiple scientific disciplines. Such research enhances the United States competitiveness and maintains U.S. leadership in science and technology. The proposed NERSC-9 project would support the continually increasing needs of scientists for computational resources for simulation of physical phenomena as well as data analysis of sensor and experimental data. The proposed project is consistent with the objectives of the 2006 LRDP. No impact would occur. No further analysis is required.

- c. **No Additional Analysis Required.** No Habitat Conservation Plans or Natural Community Conservations Plans have been adopted that encompass the project area. Therefore, no impact would occur and no further analysis is required.

6.10.3 Cumulative Impacts

Because the proposed project would not result in any land use impact, it would not contribute to a cumulative land use impact. No further analysis is required.

6.11 Mineral Resources

6.11.1 Background

According to the State of California Department of Mines and Geology, Mineral Resource Zones and Resource Sectors map, the LBNL hill 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, development on the LBNL hill site would not impede extraction or result in the loss of availability of mineral resources.

6.11.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
MINERAL RESOURCES - Would the project:		
a. 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a.-b. No Additional Analysis Required. As noted above, 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 and no further analysis is required.

6.11.3 Cumulative Impacts

Because the proposed project would not result in any impact on mineral resources, it would not contribute to a cumulative impact on mineral resources. No further analysis is required.

6.12 Noise

6.12.1 Background

Characterization of Noise

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Technically, sound is described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB), and the decibel scale adjusted for A-weighting (dBA) is a special frequency-dependent rating scale that relates to the frequency sensitivity of the human ear.

Community noise usually consists of a base of steady “ambient” noise that is the sum of many distant and indistinguishable noise sources, as well as more distinct sounds from individual local sources. A number of noise descriptors are used to analyze the effects of community noise on people, including the following:

- Leq, the equivalent sound level, which is used to describe noise over a specified period of time, typically one hour.
- DNL, the energy average of the A-weighted sound levels occurring during a 24 hour period, with a 10 dBA “penalty” added to noise occurring during the hours of 10:00 PM to 7:00 AM to account for greater nocturnal noise sensitivity.
- CNEL, the Community Noise Equivalent Level, which is a 24-hour-average Leq with a “penalty” of 5 dB added to evening noise occurring between 7:00 PM and 10:00 PM, and a “penalty” of 10 dB added to nighttime noise occurring between 10:00 PM and 7:00 AM.

LBNL

Noise Sources

Within the boundaries of the LBNL hill site, ambient noise levels are generated by vehicular traffic on the road network, heating, ventilation and air conditioning equipment associated with buildings and other stationary equipment such as pumps, cooling towers, generators, and machine shop equipment. On-going construction projects also raise noise levels in the vicinity of the construction sites.

Sensitive Receptors

Sensitive receptors are noise-sensitive locations, where noise from a project's construction or operations could be experienced and could detract from or interfere with normal activities. Some land uses are considered more sensitive to ambient noise levels than others due to the amount of exposure and the types of activities involved. Typically sensitive receptors include residences, schools, medical facilities, parks, and outdoor recreation areas. The LBNL hill site does not immediately border residential areas, except along its western and northern boundary near Cyclotron Road.

Project Site

The primary existing noise sources in the vicinity of the NERSC-9 project site are vehicular traffic on Cyclotron Road and stationary sources associated with the nearby buildings. Secondary, intermittent

sources of noise include distant aircraft noise and sounds from parking lots. There are no noise-sensitive receptors in the vicinity of the project site. The noise sensitive receptors located off the LBNL hill site that are closest to the project site are students who live in the Foothill Student Housing Complex located below and about 685 feet to the southwest of Building 59. The Greek Theater, an entertainment venue on the campus, is located adjacent to Foothill Student Housing Complex. There are also multi-family residences and the Tibetan Nyingma Institute located approximately 790 feet west of Building 59 along Highland Place.

6.12.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
NOISE - Would the project result in:		
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a.- d. No Additional Analysis Required. The proposed project would not result in significant increases or changes in noise levels from sources such as construction activities, operation of buildings and infrastructure, and increased vehicular traffic.

Construction

The proposed project would have minimal construction activities since there would be no building construction or ground disturbing activities. The proposed project would involve the installation of the NERSC-9 high-performance computing system and accompanying equipment in the existing building. Most of the installation work would be indoors and construction period noise would be limited to noise associated with the deliveries of equipment and the installation of the (up to) three cooling towers. Furthermore, the deliveries and installation would occur to the east of Building 59 and sensitive receptors that are located to the southwest and west of Building 59 would not be exposed to the noise from these activities. Project construction would not involve any activities that would produce high levels of vibrations that could affect nearby receptors. The construction-phase noise and vibration impacts would be less than significant.

Operation

As noted in the Project Description, the proposed project would not increase the number of employees and visitors who would travel to and from Building 59. As a result, there would be no increase in traffic-related noise due to the proposed project.

With respect to noise from the operation of the additional equipment that would be added by the NERSC-9 project, the primary noise sources of concern would be the (up to) three new cooling towers that would be added to the existing cooling tower cluster and the air handlers added to the mechanical room. Table 13.40-1 in the Berkeley Municipal Code (BMC) presents the maximum exterior noise levels allowable for residential and commercial land uses. The City uses the noise levels to control the maximum noise from the operation of stationary equipment on one property from adversely affecting adjacent properties. According to the BMC, the maximum allowable exterior noise levels from the operation of stationary equipment as received on an adjacent residential property zoned R-3 and above (which is the zoning of the nearest off-site residential areas), are 60 dB(A) between the hours of 7 AM to 10 PM and 55 dB(A) from 10 PM to 7 AM.

In 2010, in support of the NEPA analysis for the CRT project, a detailed operational noise analysis was conducted by Illingworth and Rodkin. The study analyzed increases in noise levels at the nearest off-site receptors from the operation of five cooling towers. The study found that taking into consideration the attenuation due to distance and the shielding provided by the topography in the case of Foothill Student housing and attenuation due to distance and the shielding provided by Building 59 in the case of the Nyingma Institute, the calculated exterior noise levels from the cooling towers would be 43 to 44 dB(A) at Foothill Student Housing, the Nyingma Institute and in the surrounding areas, well below the BMC allowable level of 60 dB(A) for daytime hours for R-3 and R-5 zoning (LBNL 2011). The addition of up to three more cooling towers at the eastern end of the existing cooling tower cluster would not increase the noise levels substantially such that the noise levels at the nearest sensitive receptors would exceed the levels allowed in the BMC. Furthermore, **LRDP Mitigation Measure Noise-4**, which is a part of the proposed project and would be implemented, requires that noise from stationary sources such as cooling towers meet the Berkeley noise ordinance limits.

Similarly, with respect to new air handlers associated with the NERSC-9 project, the proposed project would implement **LRDP Mitigation Measure Noise-4**, and noise levels from the project air handlers would comply with the Berkeley noise ordinance limits at off-site sensitive receptors.

In summary, the construction and operation of the NERSC-9 project would result in less than significant construction and operational noise impacts. No further analysis is required.

LRDP Mitigation Measure Noise-4

Mechanical equipment shall be selected and building designs prepared for all future development projects pursuant to the 2006 LRDP so that noise levels from future building and other facility operations would not exceed the Noise Ordinance limits of the cities of Berkeley or Oakland for commercial areas or residential zones as measured on any commercial or residential property in the area surrounding the future LRDP project. Controls that would typically be incorporated to attain adequate noise reduction would include selection of quiet equipment, sound attenuators on fans, sound attenuator packages for cooling towers and standby generators, acoustical screen walls, and equipment enclosures.

- e. **No Additional Analysis Required.** The project site is not located within the boundaries of any airport land use plan and is more than 2 miles from the nearest public airport. Therefore, implementation of the proposed project would not be affected by operation of a public airport and there would be no impact. No further analysis is required.
- f. **No Additional Analysis Required.** The project site is not located within the vicinity of a private airstrip. Therefore, implementation of the project would neither impact nor be affected by a private airstrip. There would be no impact. No further analysis is required.

6.12.3 Cumulative Impacts

For most of the noise and vibration issues analyzed above, there would be no project impact, and the project would not contribute to any cumulative impacts related to these issues.

As discussed under LRDP Impact NOISE-5, the 2006 LRDP EIR found that growth and development under the 2006 LRDP would result in temporary contributions to cumulative noise impacts related to construction activities, resulting in a significant and unavoidable impact (page IV.I-22). The 2006 LRDP EIR also concluded that individual projects could result in cumulative noise impacts that would be less than significant because of the distance of individual projects to the nearest receptors and implementation of mitigation measures. Due to the nature of the proposed project and the shielding provided by the existing Wang Hall, the proposed project's contribution to the cumulative construction noise impact would not be cumulatively considerable, and the proposed project's cumulative impact would be less than significant.

LRDP Impact NOISE-6 of the 2006 LRDP EIR concluded that cumulative impacts related to noise levels from increased traffic and human activities would be less than significant. With respect to the project's operational noise, mitigation measures are included in the project which would reduce the impact to less than significant, rendering the project's contribution to cumulative operational noise cumulatively not considerable. No further analysis is required.

6.13 Population and Housing

6.13.1 Background

LBNL Population, Housing and Residence Patterns

In 2003, there were 3,800 people employed at LBNL. Most of these employees (56 percent) were full-time employees in scientific and technical positions. Administrative support positions accounted for 16 percent of LBNL employment. Faculty (seven percent of the total), and postdoctoral researchers (six percent of the total), as well as undergraduate and graduate students (combined representing 15 percent of the total) were also counted among the LBNL employees.

In 2003, over the course of the year, a total of about 2,500 people used LBNL facilities as guests. Guests include industry and government researchers working at LBNL for short-term assignments, scientists visiting from other academic institutions, or people from other institutions such as UC Davis who use LBNL facilities regularly over a period of weeks or months. On an average day, 40 percent of total annual guests use LBNL facilities. In 2003, this represented about 1,000 people on any given day. LBNL estimated an adjusted total daily population of 4,515 people for 2006, counting both employees and guests.³

LBNL employees and their dependents represented 2.0 percent of the Berkeley and Albany population in 2003. In all other residential locations, LBNL employees and their dependents accounted for less than one percent of the total population. LBNL employees and their dependents represented 0.3 percent of the total population of Emeryville, Oakland and Piedmont; 0.6 percent of the total population of El Cerrito, Richmond, and San Pablo; and 0.7 percent of the total population of Lafayette, Moraga, and Orinda. For the Bay Area region as a whole, LBNL employees and the other members of their households represented 0.1 percent of total regional population in 2003.

Project Site

The proposed project would not add any persons or housing to the LBNL hill site.

6.13.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
POPULATION & HOUSING - Would the project:		
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Displace substantial numbers of existing housing, necessitating	<input type="checkbox"/>	<input checked="" type="checkbox"/>

³ The LBNL estimate of adjusted daily population (ADP) is defined to include FTE employment plus 40 percent of total annual guests.

	Impact to be Analyzed in the EIR	No Additional Analysis Required
the construction of replacement housing elsewhere?		
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** The proposed project does not include residential uses, and would not require extension of roads or other infrastructure that could indirectly induce substantial population growth. It would generate between 20 and 40 short-term construction jobs. These jobs are expected to be filled by construction workers in the greater Bay Area where there is an ample construction workforce and not result in an influx of workers from outside the greater Bay Area. The installation of NERSC-9 would not increase the number of employees and visitors using Building 59. Therefore, the project would not cause population growth. There would be no impact and further analysis is not required.
- b., c. **No Additional Analysis Required.** The LBNL hill site does not include housing or long-term residential uses, and no housing would be displaced with implementation of the proposed project. No individuals would be displaced as a result of the project and no replacement housing would be required. Therefore, there would be no impact and no further analysis is required.

6.13.3 Cumulative Impacts

Because the proposed project would not result in any population and housing impacts, it would not contribute to a cumulative impact on these topics. No further analysis is required.

6.14 Public Services

6.14.1 Background

Fire Protection

The Alameda County Fire Department is under contract with UC LBNL to provide firefighting services and to staff and operate the on-site LBNL fire station. The Alameda County Fire Department provides the LBNL hill site an “around-the-clock” engine company staffed by four Hazardous Materials Emergency Response (HAZMAT) certified firefighters. UC LBNL and the City of Berkeley have developed an Automatic Aid Agreement, under which the LBNL on-site fire station is the first responder for a portion of north Berkeley, including portions of the UC Berkeley campus. The Berkeley Fire Department provides paramedic transport for LBNL; therefore, if a patient in a medical emergency requires transport to a hospital, a City of Berkeley ambulance responds at the Lab. The City of Oakland Fire Department served the far eastern and southeastern portion of the LBNL hill site. HAZMAT automatic aid is available through the Berkeley Fire Department or the Alameda County Fire Department. LBNL’s Master Emergency Program Plan establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster at the LBNL hill site.

Law Enforcement

Police services at the LBNL hill site are provided through a contract with the UC Berkeley Police Department (UCPD), as well as with a private security provider responsible for outside security needs including LBNL access, property protection, and traffic control. The UCPD handles all patrol, investigation, and related law enforcement duties for UC Berkeley, LBNL, and other University-owned properties. UCPD operates 24 hours a day, seven days a week, coordinating closely with the City of Berkeley Police Department. UCPD and the Oakland Police Department are members of the California Law Enforcement Master Mutual Aid Plan; all law enforcement agencies in the state belong to this plan to provide each other information and resources when needed. Additionally, UC LBNL has an annual renewable contract with UCPD that provides, when requested, law enforcement emergency response, limited patrols, criminal investigations, and VIP protection. UCPD and the Berkeley Police Department have an agreement regarding jurisdiction over off-site locations occupied by UC staff and LBNL staff; this agreement is reviewed and updated annually.

The LBNL hill site is secured by a perimeter fence that provides access through vehicle entrance points, hardware lock-and-key sets at critical doors, and by an electronic system pre-coded to permit entry only to authorized card holders. Vehicular access onto the LBNL hill site is controlled by security personnel at the three vehicle entrance gates who visually inspect entering vehicles.

Schools

The Berkeley Unified School District (BUSD) and Oakland Unified School District (OUSD) provide public elementary and secondary school services to dependents of LBNL personnel who live in these two communities.

Parks and Recreation

The East Bay Regional Park District (EBRPD) manages over 95,000 acres within Alameda and Contra Costa counties, including 65 regional parks, recreational areas, wilderness, shorelines, preserves, and land bank areas. EBRPD properties within the vicinity of the LBNL hill site include Tilden Park and the Claremont Canyon Preserve.

UC Berkeley manages parks and athletic and recreational facilities that serve the University and the wider community. Athletic and recreational facilities are located within the central campus and also within the Strawberry Canyon Recreation Area.

The City of Berkeley’s Parks, Recreation and Waterfront Department manages the city’s parks and open space. The City has 243 acres of City-owned and/or maintained parks and open space throughout Berkeley, excluding the 99-acre Aquatic Park.

The City of Oakland’s Office of Parks, Recreation and Cultural Affairs manages the city’s parks and recreation centers. According to the Open Space, Conservation and Recreation (OSCAR) Element of the Oakland General Plan, an estimated 3,073 acres of total parklands are available within Oakland’s city limits.

Project Site

Building 59 is currently served by public services agencies discussed above.

6.14.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
PUBLIC SERVICES		
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:		
i. Fire protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii. Police protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii. Schools?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv. Parks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v. Other public facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a.i. No Additional Analysis Required.** There would be no construction of buildings or additional employees associated with the proposed project. Thus, there would be no increase in the need for fire services. The new fuel tank used to provide fuel to the new standby generator would be secured with spill-prevention and secondary containment systems to prevent any accidental, uncontrolled releases. This protection system would be regularly inspected by the jurisdictional fire marshal. The impact of the proposed project in relation to fire services would be less than significant and no further analysis is required.
- a.ii. No Additional Analysis Required.** Implementation of the proposed project would not increase the need for police services. Police services are provided through the UCPD and a private on-site security firm on a contract basis. The private security firm is responsible for on-site security needs including access to the LBNL hill site, property protection, and traffic control, and can respond to any road accessible area of the LBNL hill site in less than five minutes. Under the existing contract, UCPD responds to LBNL as needed, and response times for UCPD are also less than five minutes. Implementation of the proposed project would not add any new employees to the LBNL hill site and there would be no increased demand for on-site security. Therefore, there would be no impact on police services and no further analysis is required.
- a.iii. No Additional Analysis Required.** The proposed project would not develop residential uses and therefore would not generate new student enrollment in the Berkeley Unified School District (BUSD) or Oakland Unified School District (OUSD) (or other school districts). There would be no new employees added for the proposed project, therefore no households would relocate to the cities of Berkeley and Oakland as a result of new employment generated. Thus, there would be no new students and construction of new school sites would not be required. There would be no impact on schools and no further analysis is required.
- a.iv. No Additional Analysis Required.** Since no new households would relocate to the LBNL commute area, there would be no new demand for parks and recreational facilities. Therefore, there would be no impact on parks and recreation and no further analysis is required.
- a.v. No Additional Analysis Required.** No other governmental services would be affected by the proposed project and no further analysis is required.

6.14.3 Cumulative Impacts

For most of the public service issues analyzed above, there would be no project impact, and the project would not contribute to any cumulative impacts related to these topics. With respect to the impact to fire services associated with a new fuel storage tank that would be installed as part of the project, the fuel tank would be located inside the building and maintained in compliance with applicable laws and regulations. As a result of compliance with the law, the potential for accidental spills would be minimal and the project would not contribute considerably to a cumulative impact on fire services. Further analysis is not required.

6.15 Recreation

6.15.1 Background

Background conditions for recreation are discussed under Section 6.14.1 above.

6.15.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
RECREATION - Would the project:		
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **No Additional Analysis Required.** Impacts associated with the increase in demand for parks and recreational facilities in the region as a result of project-related growth in employees are discussed in the response to 14a.iv, "Parks" above. As mentioned above, there would be no increase in population. Thus, no increase in demand for recreational facilities that could cause physical deterioration of recreational facilities would occur as a result of the proposed project. There would be no impact to existing recreational facilities and no further analysis is required.
- b. **No Additional Analysis Required.** The project would not include recreational facilities nor require the construction of new or expanded facilities. Therefore, there would be no impact and no further analysis is required.

6.15.3 Cumulative Impacts

Because there would be no project impact on recreational facilities, the project would not contribute to any cumulative impacts regarding recreation. Further analysis is not required.

6.16 Transportation/Traffic

6.16.1 Background

Regional and LBNL Roadway Network

The LBNL hill site is located near three regional highways: Interstate 80/580 is about 3 miles to the west and State Routes (SR) 24 and 13 are about 2 miles to the south. Access to I-80/580 is via arterial roads in the City of Berkeley and Oakland, including University Avenue, Ashby Avenue, Hearst Avenue, Gayley Road, and College Avenue. Access to SR 24 and 13 is via Tunnel Road.

The LBNL hill site is served by three roadway entrances: (1) the Blackberry Canyon Gate which is the main entrance and is on Cyclotron Road, north of the intersection of Hearst Avenue and Gayley Road in the southwestern portion of the LBNL hill site; (2) Strawberry Canyon Gate which is located at the eastern end of the LBNL hill site and is accessed via Centennial Drive; and (3) Grizzly Peak Gate located along the northern boundary of the LBNL hill site and also accessed via Centennial Drive. Internal circulation on the LBNL hill site is provided by an east-west roadway system that generally follows the site contours.

Roadway Levels of Service

Level of service (LOS) is a general measure of traffic operating conditions, whereby a letter grade from A (the best) to F (the worst) is assigned to roadway intersections. These grades represent the comfort and convenience associated with driving from the driver's perspective. To assess the worst-case traffic conditions, LOS is measured during morning (generally 7 AM to 9 AM) and afternoon (generally 4 PM to 6 PM) peak commute times. The LOS standard for City intersections is LOS D. Of the 20 city intersections evaluated in the 2006 LRDP EIR, only one intersection (Bancroft Way at Gayley Road/Piedmont Avenue) currently operates at an unacceptable level of service. The 2006 LRDP EIR and subsequent traffic analyses found that by 2025, even without traffic added by LBNL growth, three additional intersections (Hearst Avenue/Gayley Road/La Loma Avenue, Stadium Rim Way/Gayley Road, and Durant Avenue/Piedmont Avenue) would operate at unacceptable levels of service.

Parking

There are approximately 2,175 off-street and on-street parking spaces at the LBNL hill site. Because access to the LBNL hill site is controlled, parking facilities are not open to the general public. UC LBNL implements a permit parking program. UC LBNL discourages the use of single occupant vehicles for access to the site as part of its Transportation Demand Management (TDM) program.

Bicycle and Pedestrian Network

Due to the site's hilly terrain, about 10 percent of the employees use bicycles for their commutes. Pedestrian and bicycle facilities within the LBNL hill site are discontinuous. These facilities are used to move between nearby building clusters; for longer trips, the employees use shuttles or personal vehicles.

Transit

The LBNL hill site is served by LBNL shuttles that run between LBNL and the Center Street/Shattuck BART station on 10 minute headways on weekdays and an express shuttle that operates on an hourly

schedule during commute hours between the Lab and the Rockridge BART station. The LBNL shuttle stops have been coordinated with AC Transit bus lines serving downtown Berkeley.

Project Site

The project site is located near the Blackberry Canyon entrance and is served by Chu and Perlmutter Roads. The shuttle route that currently runs off-site to UC Berkeley and the City of Berkeley provides access to the project site through the shuttle stop at the Blackberry Canyon entrance gate and the stop located in Parking Lot A.

6.16.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
TRANSPORTATION/TRAFFIC - Would the project:		
a. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Result in inadequate emergency access?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

a., b. No Additional Analysis Required. The proposed project would not increase vehicle trips to the project area since no additional buildings or persons would be added.

Construction could result in a temporary increase in traffic associated with equipment deliveries, and construction worker commute trips. The 2006 LRDP EIR identified existing construction management “best practices” routinely undertaken at LBNL to limit otherwise potentially adverse construction-related impacts and set these forth as LBNL Best Practices 6a through 6c. The LRDP EIR identified these best practices as continuing best practices required to be incorporated into contract specifications and management oversight for all development projects under the 2006 LRDP. They require construction contractors to meet with UC LBNL and prepare a Construction Traffic Management Plan (CTMP) to lessen the impacts of construction on traffic and parking. The CTMP must propose truck routes, limit truck traffic during peak commute period (7:00 to 9:00 AM and 4:00 to 6:00 PM), and prepare a parking management plan for construction workers. A CTMP would be prepared and implemented during project construction. Furthermore, pursuant to LRDP Best Practice TRANS-6c, UC LBNL has instituted a program to manage aggregate construction truck trips to avoid exceeding impact thresholds during heavy truck activity periods. As a part of this program, the designated UC LBNL Construction Coordinator oversees each construction project on the LBNL site to keep the total number of one-way truck trips on the Hearst–Oxford–University Avenue truck route below 98 trips per day. Truck trips associated with the proposed project would also be subject to this LBNL site program; this would ensure that the project’s construction truck trips when added to truck trips from other ongoing construction projects would not exceed the established limit. Construction worker vehicle trips would be avoided by providing parking at an off-site location and bringing the workers to the site by bus.

Thus, the proposed NERSC-9 project would not result in a significant traffic impact and no further analysis is required.

- c. **No Additional Analysis Required.** The proposed project would not affect the air traffic patterns at any of the regional airports. The project does not include activities or structures that could hinder aviation activity. Therefore, implementation of the project would result in no impact related to air traffic patterns. No further analysis is required.
- d. **No Additional Analysis Required.** The proposed project would not change on-site circulation or surrounding roadways and intersections. Therefore, there would be no impact and no further analysis is required.
- e. **No Additional Analysis Required.** The proposed project would not change on-site circulation or emergency access. Thus, no impact would occur and no further analysis is required.
- f. **No Additional Analysis Required.** The project would not add any persons to the LBNL hill site. No impacts to public transit, bicycle, or pedestrian facilities would occur and no further analysis is required.

6.16.3 Cumulative Impacts

Because the project would not add any operational traffic, the project would not contribute to any cumulative traffic impacts. With respect to construction phase traffic, for reasons presented in items a, b above, a cumulatively considerable contribution to a traffic impact would be avoided by keeping the total LBNL-related one-way construction truck trips (including those associated with the proposed project) through Berkeley below 98 trips per day. Further analysis is not required.

6.17 Utilities and Service Systems

6.17.1 Background

Potable and Fire Protection Water: East Bay Municipal Utility District (EBMUD) provides high pressure water to the LBNL hill site via two points of connection – a 12-inch meter on Campus Drive in the Shasta Pressure Zone of the district and a 6-inch meter on Summit Road from the Berkeley View Pressure Zone. On the site, water is distributed by an extensive water distribution system which provides water not only to the buildings but also for use in cooling towers, for irrigation, and for other uses. UC LBNL also maintains three 200,000-gallon water storage tanks on-site for emergency water supply. In April 2015, EBMUD provided LBNL with a water supply assessment that assures a water supply of 92.5 million gallons per year (mgy) to the Berkeley Lab.

Wastewater: Wastewater generated at the LBNL hill site is collected in a gravity-flow system that eventually discharges into the City of Berkeley’s sanitary sewer system through a monitoring station located at Hearst Avenue and a second monitoring station located in Centennial Drive. The volume and quality of effluent at both monitoring stations is monitored and evaluated for compliance with EBMUD discharge requirements. From these monitoring stations, the discharge continues down into the City’s sewer system to be transported to EBMUD’s north interceptor sewer and then to the wastewater treatment facility in Oakland. Sanitary sewer sub-basin 17-503 which receives flows from the sewer main in Centennial Drive (and other areas of Berkeley and Oakland) is constrained around Dwight Avenue during peak wet weather conditions.

Storm Drainage: The LBNL hill site storm drain system is a gravity-fed system of open and culverted drainages that generally run east–west. The combined flows are then conveyed through the developed portions of the site to eventually discharge via outfalls into the open channels of the Strawberry Creek watershed.

Solid Waste: Non-hazardous solid waste is collected and transported off-site by a commercial waste contractor. UC LBNL implements an extensive program focused on waste minimization and recycling.

Electricity: UC LBNL purchases electricity from the Western Area Power Administration (WAPA). Electricity generated by WAPA is delivered to the LBNL’s Grizzly Peak Substation via the Pacific Gas & Electric (PG&E) transmission system. In 2015, the LBNL main hill site’s total electrical power consumption was 86,400 megawatt hours. The LBNL hill site maintains several stationary and portable standby electrical generators that are powered by diesel, gasoline, or natural gas.

Natural Gas: Natural gas is used on the LBNL hill site for heating buildings, to operate certain equipment and also in some experimental uses. Natural gas is delivered to the site by the PG&E system via a 6-inch line. The point of delivery is located above Cyclotron Road and below Building 88. Natural gas is distributed from this point of delivery to all buildings at LBNL. Two buildings (Buildings 73 and 73A) in the eastern portion of LBNL are served by another PG&E line located along Centennial Drive.

Other On-Site Utilities: UC LBNL also owns and operates other specialized utility systems that are needed for the research and specific equipment used on site. These include a LBNL site-wide compressed air system, a LBNL site-wide low conductivity water system, a closed loop cooling water system, building-specific purified water systems, and building-specific de-ionized water systems.

Project Site

All of the utilities that would be needed for the proposed project are currently available on the project site.

6.17.2 Environmental Checklist and Discussion

	Impact to be Analyzed in the EIR	No Additional Analysis Required
UTILITIES AND SERVICE SYSTEMS - Would the project:		
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new and expanded entitlements needed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Result in the need for increased chilled water or steam generation capacity or major distribution improvements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h. Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i. Require or result in the construction or expansion of electrical or natural gas facilities which would cause significant environmental	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	Impact to be Analyzed in the EIR	No Additional Analysis Required
impacts?		
j. Require or result in the construction or expansion of telecommunication facilities, which would cause significant environmental impacts?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a.,b.,f. **No Additional Analysis Required.** The project would not require infrastructure improvements for wastewater service at LBNL since there would be no increase in building space or population. Increased water use would not result in increased sanitary effluent as the cooling towers consume water through evaporation. Therefore, the NERSC-9 project would not contribute to the need for additional wastewater treatment facilities and no further analysis is required.
- c. **No Additional Analysis Required.** The proposed project would not increase the amount of impervious area on the project site. The building footprint would remain unchanged and no additional buildings or structures would be constructed. The new cooling towers would be installed on an existing concrete foundation. Installation of construction cranes would be temporary and on already impervious (asphalt-covered and/or hard-packed) surfaces. Thus, there would be no increase in runoff and no impact on storm water drainage facilities. No further analysis is required.
- d. **No Additional Analysis Required.** High-performance computing relies on intensive energy and cooling. The Building 59 upgrades would include installation of up to three new cooling towers, which – along with the facility’s four existing cooling towers – would rely on water for evaporative heat transfer (cooling). Water used for cooling would thereby increase by an expected 20 mgd over baseline use. Accordingly, total Building 59 water use is projected to increase to approximately 55 mgd, and overall LBNL water use to approximately 92 mgd by 2020. This is consistent with long-range planning coordination between UC LBNL and EBMUD and is within LBNL’s water supply assessment.

Building 59 is designed to produce high-performance computing with the maximum practicable degree of water and energy efficiency. For example, Building 59 is designed with massive, western-facing air-inlets to allow ocean-cooled air to augment the facility’s heat exchange capabilities. Running the same level of computations in less modern or more dispersed facilities elsewhere would most likely require much larger amounts of water and energy than would the proposed project. Given the proposed project’s access to existing, planned water resources and taking into consideration its water-conserving design, no further analysis is needed.

- e. **No Additional Analysis Required.** Implementation of the proposed project would result in increased demand for chilled water for space cooling purposes. This demand would be met by the proposed installation of additional cooling towers and cooling systems. Therefore, the proposed project would not result in the need for major distribution system improvements and no further analysis is required.
- g.-h. **No Additional Analysis Required.** The proposed project would not result in an increased waste stream since no new personnel or building space would be added to the project site. Therefore, the proposed project would not cause any landfill to exceed its permitted capacity and no impacts would occur on solid waste facilities. No further analysis is required.

- i. **No Additional Analysis Required.** Operation of the proposed project would draw upon relatively large amounts of electrical energy to power the existing and proposed high-performance computers and their support systems. By 2020, the project proposes to use up to 27.5 MW for total power capacity, which is approximately 18.6 MW greater than the power used in Building 59 at the present time and approximately 15 MW greater than the total power capacity reviewed in the CRT EIR. UC LBNL works closely with its energy providers (WAPA for energy supply and PG&E for distribution) to forecast future aggregate needs. It is anticipated that, by its fully operational date of 2020, the proposed project would not require the construction or expansion of electrical or natural gas facilities that would cause significant impacts. No further analysis is required.
- j. **No Additional Analysis Required.** The proposed project would not affect telecommunication facilities and no impact would occur. No further analysis is required.

6.17.3 Cumulative Impacts

The proposed project would not substantially burden the infrastructure and resources of utility providers to continue to supply the Laboratory with water, electricity, and natural gas, along with storm water, wastewater, solid waste disposal, and telecommunications services. As part of UC LBNL's planned growth, the proposed project is considered in the long-range regional planning of key utility providers and would not be considered to contribute to a cumulatively significant impact to utilities. Further analysis is not required.

The 2006 LRDP EIR analyzed the cumulative impact on utilities under LRDP Impact UTILS-6. According to that analysis, other foreseeable development in the City of Berkeley and in the LBNL area surrounding the Lab hill site would 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. The incremental increase in demand for utilities for storm water delivery systems, water supply, and solid waste associated with the 2006 LRDP would not be expected to represent a substantial increase in demand for utility and service systems that would require expanded facilities or entitlements, and existing utility delivery systems would be expected to handle growth anticipated under the 2006 LRDP. Therefore, the cumulative effect of 2006 LRDP development in combination with other foreseeable development would not be significant, nor would the LRDP development's contribution to any cumulative effects be cumulatively considerable. Because the proposed project is within scope of growth and development under the 2006 LRDP, the proposed project's cumulative effects are adequately addressed under LRDP Impact UTILS-6 and its contribution to any cumulative impacts would also not be considerable.

6.18 Mandatory Findings of Significance

	Impact to be Analyzed in the EIR	No Additional Analysis Required
MANDATORY FINDINGS OF SIGNIFICANCE		
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or pre-history?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

DISCUSSION:

- a. **Impact to be Analyzed in the EIR.** As noted in the checklist responses, the Building 59 Upgrade & Installation and Operation of NERSC-9 project would not adversely affect wildlife or fish habitat or cultural resources. However, it would result in substantial greenhouse gas emissions that could affect the quality of the environment. This is considered a potentially significant impact and will be analyzed in the Building 59 Upgrade & Installation and Operation of NERSC-9 project EIR.
- b. **Impact to be Analyzed in the EIR.** As noted in the checklist responses, the proposed project has the potential to contribute to cumulative impacts associated with greenhouse gas emissions. This cumulative impact will be analyzed in the Building 59 Upgrade & Installation and Operation of NERSC-9 project EIR. All other cumulative impacts would not require further evaluation.
- c. **Impact to be Analyzed in the EIR.** As discussed in this Initial Study, the project has the potential to directly or indirectly impact human beings via its greenhouse gas emissions. This is considered a potentially significant impact and will be analyzed in the Building 59 Upgrade & Installation and Operation of NERSC-9 project EIR.

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