

CHAPTER 4

Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology

4.0 Introduction

Chapter 4 includes discussion of baseline conditions and presents the thresholds of significance (“Significance Standards”) used in this EIR to assess the program-level impacts of the 2014 LRDP. Following this introductory material, the rest of this chapter is divided into 15 major sections, one for each environmental topic considered. Each major section contains: environmental and regulatory regional setting information regarding the environmental topic, relevant background and regulatory material, the Significance Standards and the analysis methodology for the topic. The Regional Setting section describes those regional baseline conditions pertinent to an environmental topic and thus, provides the context for an analysis of potential impacts resulting from implementation of the 2014 LRDP. Site-specific setting information applicable to a particular proposal at a campus site is presented in the relevant chapter in which campus site impacts are discussed (i.e., Chapters 6 through 9). The Regulatory Considerations section summarizes relevant federal, state and local laws that govern various aspects of an environmental topic.

The preparation of this EIR was preceded by an Initial Study (included as Appendix A), which determined that the 2014 LRDP would not result in certain identified impacts. Each of the environmental resource sections clearly identifies those effects that were adequately addressed in the Initial Study and are therefore not evaluated further in this EIR. The topics of Agriculture and Forestry Resources and Mineral Resources were determined in the Initial Study to require no further analysis in the EIR. Accordingly, these topics are not discussed in this EIR.

4.0.1 Baseline

The environmental setting sections describe the baseline physical environmental conditions. For purposes of the analyses in this EIR, the baseline is the most recent completed academic year: 2012-2013.

This EIR evaluates environmental impacts in terms of changes resulting from implementation of the 2014 LRDP as compared to existing conditions. With a few exceptions as stated in the text, the

conditions that would result at the LRDP planning horizon year (2035) are compared to baseline conditions to characterize the changes that would result from implementing the 2014 LRDP.

4.0.2 Levels of Significance

This EIR uses a variety of terms to describe the levels of significance of adverse impacts identified during the course of the environmental analysis. The following are definitions of terms used in this EIR:

- **Less than Significant Impact.** Impacts that are adverse but are not substantial because they do not exceed the specified standards of significance.
- **Potentially Significant.** Impacts that exceed the defined standards of significance and that may be eliminated or reduced to a less-than-significant level through the implementation of feasible mitigation measures.
- **Significant and Unavoidable.** Impacts that exceed the defined standards of significance and that cannot be eliminated or reduced to a less-than-significant level through the implementation of feasible mitigation measures.

4.0.3 Analysis of Cumulative Effects

The geographic extents of potential cumulative effects of the 2014 LRDP differ according to the environmental topic. For each environmental topic area, the analysis specifies the geographic scope of the cumulative impact, considers whether implementation of the 2014 LRDP in conjunction with past, present, and probable future projects would result in potentially significant cumulative impacts, and finally, determines whether the LRDP's contribution to that effect would be "cumulatively considerable." Cumulative impacts of the 2014 LRDP are discussed in Chapter 10 of this EIR.

4.1 Aesthetics

This section presents the Regional Setting, Regulatory Considerations, Significance Standards, and Analysis Methodology for the evaluation of Aesthetics impacts. 2014 LRDP Aesthetics effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Aesthetics effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.1.1 Regional Setting

The regional setting for aesthetics is the City of San Francisco, a relatively dense urban environment that is built out in most areas. Visual resources and issues within the City focus predominantly on protection of waterfront views and long-range views and encouragement of development that is compatible with adjacent existing or planned development and neighborhoods. Each campus site is located in a visually distinct area of the City, characterized by natural landforms and topography, existing buildings and unique land use patterns.

4.1.2 Regulatory Considerations

4.1.2.1 UCSF Facilities Design Guidelines

New development at UCSF is guided by the *Facilities Design Guidelines*. The guidelines set forth design objectives and special considerations for UCSF projects, with an emphasis on a project's functional requirements, overall economy and technical guidelines.

The *Facilities Design Guidelines* also contain specific policies related to landscaping at UCSF campus sites. These policies include designing landscapes at entrances and exits to UCSF facilities (e.g., roadways, parking lots and pedestrian areas) to maximize visibility and allow adequate lighting. Vegetation should be compatible with the natural limitations presented by the Bay Area's climate and soil conditions, and also be appropriate for man-made environments (e.g., adequate for use as street trees). Additional policies related to landscaping include incorporating water and energy conservation features and utilizing low-maintenance materials.

4.1.2.2 UCSF Physical Design Framework

Development at UCSF is also guided by the *Physical Design Framework*, which sets forth a vision for the physical development of all UCSF campus sites. It serves as the foundation for UCSF to plan and design future projects according to a clear and consistent set of planning and design principles, guidelines and strategies. The *Physical Design Framework* contains six planning principles that are universally applicable to UCSF campus sites. They express key thematic concepts of Context, Connectivity, Cohesiveness, Collegiality, Community and Conservation.

Each of the above principles contains related specific guidelines, such as designing buildings to fit within their urban context, considering massing, style, pattern and color of buildings in the vicinity; relating buildings to pedestrians and scale to human activity and visual interest; providing a positive campus interface at campus edges; providing comfortable, activated campus open spaces; and incorporating sustainability features in buildings.

4.1.2.3 San Francisco General Plan

The City's General Plan includes policies that pertain to views and visual quality. The policies most relevant to aesthetics are contained in the Urban Design Element of the General Plan. Policies 1.1 through 1.5 of the City Pattern section of the Urban Design Element relate to the appearance of buildings and landscaping, and their total effect that characterizes the various city districts. These policies also recognize and protect major public views in the city, with particular attention to views of open space. Policies 2.4 through 2.6 of the Conservation section of the Urban Design Element address notable landmarks of aesthetic or other importance, as well as convey a need to respect the character of nearby older development in the design of new buildings. The Major New Development section of the Urban Design Element, Policies 3.1 through 3.7, relate to building design and the visual relationship between new and established development, with an emphasis on promoting a harmonious relationship between existing and new buildings, relating building heights to important attributes of the city pattern and to heights of existing buildings, and recognizing the special urban design problems posed in development of large properties. Policy 4.15 of the Neighborhood Environment section of the Urban Design Element includes requirements for protecting the livability and character of neighborhoods from intrusion of incompatible new development. Although the University is not subject to local planning policies whenever using land under its control in furtherance of its educational mission, the University strives to be consistent with local policies where feasible.

4.1.2.4 San Francisco Planning Code

The standards contained within the San Francisco Planning Code are used to analyze the potential wind and shadow impacts of projects. San Francisco Planning Code Section 148 establishes, in certain districts of San Francisco, wind speed criteria for the comfort and safety of pedestrians. Wind speeds in excess of 26 miles per hour (equivalent wind speed for a single hour of the year) are considered hazardous. As a general rule, structures less than 100 feet tall are not considered to be of sufficient height to alter wind speeds at ground level and are therefore usually not evaluated for wind effects. San Francisco Planning Code Section 295 generally prohibits development above a height of 40 feet if it would cause significant new shadow on open space under the jurisdiction of the San Francisco Recreation and Park Commission between one hour after sunrise and one hour before sunset, at any time of the year.

4.1.3 Significance Standards

Would the implementation of the proposed 2014 LRDP:

- a) Have a substantial adverse effect on a scenic vista?

- b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- c) Substantially degrade the existing visual character or quality of the site and its surroundings?
- d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?
- e) Exceed the LRDP EIR significance standard by substantially reducing sunlight or significantly increasing shadows in public open space areas, or by increasing pedestrian-level wind speeds above the hazard level set forth in the San Francisco Planning Code?

Regarding criterion b), after evaluation of the activities proposed by the 2014 LRDP, the Initial Study concluded that implementation of the 2014 LRDP would clearly result in no impact or a less-than-significant impact. Therefore, this criterion is not discussed further in the EIR.

4.1.4 Analysis Methodology

For purposes of this EIR, the visual impact assessment provides a description of the physical setting surrounding UCSF campus sites to illustrate the backdrop against which impacts of the 2014 LRDP are evaluated. The scale, massing, bulk and form of the proposed 2014 LRDP development proposals are evaluated in the context of surrounding development. The existing physical characteristics include short-range and long-range views; the type, height and scale of existing development on or near a campus site; man-made landmarks such as major highways or skyline views; and natural landmarks such as hillsides or San Francisco Bay. In general, views from public streets and parks are emphasized; impacts on private views are not considered under CEQA. Generally, this analysis does not evaluate the visual impacts of final site plans or building designs for LRDP development proposals unless specific design information is available at this time. Basic assumptions are discussed regarding the physical appearance of proposed new buildings and other LRDP activities.

In addition, Public Resources Code Section 21099(d), effective January 1, 2014, provides that, “aesthetics and parking impacts of a residential, mixed-use residential, or employment center projects on an infill site located within a transit priority area shall not be considered significant impacts on the environment.” Accordingly, aesthetic impacts are no longer to be considered in determining if a project has the potential to result in significant environmental effects for projects that meet all of the following three criteria:

- a) The project is in a transit priority area;
- b) The project is on an infill site; and
- c) The project is residential, mixed-use residential, or an employment center.

Activities proposed by the 2014 LRDP would have a significant effect if they would result in pedestrian-level wind speeds that exceed the hazardous level as established by San Francisco Planning Code Section 148, or if it would result in substantial new shadows on designated public open space under the jurisdiction of the Recreation and Park Commission during daylight hours. Shadow impacts on the usability of public open space not under the jurisdiction of the Recreation and Park Commission are also considered.

4.2 Air Quality

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Air Quality impacts. 2014 LRDP Air Quality effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Air Quality effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures*, and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.2.1 Regional Setting

4.2.1.1 Climate and Meteorology

UCSF's campus sites are located within the San Francisco Bay Area Air Basin. The air basin's moderate climate steers storm tracks away from the region for much of the year, although storms generally affect the region from November through April. San Francisco's proximity to the onshore breezes stimulated by the Pacific Ocean provide for generally very good air quality in the San Francisco area.

Temperatures in the San Francisco area average in the mid-50s annually, generally ranging from the low 40s on winter mornings to mid-70s during summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby San Francisco Bay. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the "rainy" period from November through April. Precipitation may vary widely from year to year as a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and drought conditions.

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants regionally. The project campuses lie within the Peninsula climatological subregion. Marine air traveling through the Golden Gate is a dominant weather factor affecting dispersal of air pollutants within the region. Increased temperatures create the conditions in which ozone formation can increase.

4.2.1.2 Ambient Air Quality – Criteria Air Pollutants

As required by the 1970 federal Clean Air Act, the United States Environmental Protection Agency (USEPA) initially identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. USEPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead are the six criteria air pollutants originally identified by USEPA. Since that time, subsets of particulate matter have been identified for which

permissible levels have been established. These include particulate matter of 10 microns in diameter or less (PM_{10}) and particulate matter of 2.5 microns in diameter or less ($PM_{2.5}$).

The Bay Area Air Quality Management District (BAAQMD) is the regional agency with jurisdiction for regulating air quality within the nine county San Francisco Bay Area Air Basin (SFBAAB). The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table 4.2-1** presents a five-year summary for the period 2009 to 2013 of the highest annual criteria air pollutant concentrations, collected at the air quality monitoring station operated and maintained by the BAAQMD at Sixteenth and Arkansas Streets, in San Francisco's lower Potrero Hill area, which is the closest monitoring station to the campus sites. Table 4.2-1 also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). Concentrations shown in bold indicate an exceedance of the standard.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOC by some regulating agencies) and nitrogen oxides (NO_x). The main sources of ROG and NO_x , often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Table 4.2-1 shows that, according to published data, the most stringent applicable standard, the state 1-hour standard of 9 parts per hundred million [pphm], was not exceeded and the federal 8-hour standard of 8 pphm was also not exceeded in San Francisco between 2009 and 2013.

Carbon Monoxide (CO)

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table 4.2-1, the more stringent state CO standards were not exceeded between 2009 and 2013. Measurements of CO indicate hourly maximums ranging between 9% to 29% of the more stringent state standard, and maximum 8-hour CO levels that are approximately 19% to 32% of the allowable 8-hour standard.

**TABLE 4.2-1
 SUMMARY OF SAN FRANCISCO AIR QUALITY MONITORING DATA (2009–2013)**

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured ^a				
		2009	2010	2011	2012	2013
Ozone						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (pphm)	>9 pphm ^b	7	8	7	7	7
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (pphm)	>7 pphm ^c	6	5	5	5	6
Carbon Monoxide (CO)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>20 ppm ^b	4.3	1.8	1.8	2.0	1.8
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>9 ppm ^b	2.9	1.4	1.2	1.2	1.4
Suspended Particulates (PM₁₀)						
- Days 24-Hour Standard Exceeded ^d		0	0	0	1	0
- Maximum 24-Hour Concentration (µg/m ³)	>50 µg/m ³ ^b	36	40	46	51	44
Suspended Particulates (PM_{2.5})						
- Days 24-Hour Standard Exceeded ^e		1	3	2	1	2
- Maximum 24-Hour Concentration (µg/m ³)	>35 µg/m ³ ^c	36	45	47	36	49
- Annual Average (µg/m ³)	>12 µg/m ³ ^b	9.7	10.5	9.5	8.2	10.1
Nitrogen Dioxide (NO₂)						
- Days 1-Hour Standard Exceeded		0	0	0	1	0
- Maximum 1-Hour Concentration (pphm)	>10 pphm ^c	6	9	9	12	7
Sulfur Dioxide (SO₂)^f						
- Days 24-Hour Standard Exceeded		ND	ND	ND	ND	ND
- Maximum 24-Hour Concentration (ppb)	>40 ppb ^b	ND	ND	ND	ND	ND

NOTES:

Bold values are in excess of applicable standard. "ND" indicates that data is not available.
 ppm = parts per million; pphm = parts per hundred million; ppb=parts per billion
 µg/m³ = micrograms per cubic meter
 ND = No data or insufficient data

- ^a Number of days exceeded is for all days in a given year, except for particulate matter. PM₁₀ and PM_{2.5} are monitored every six days and therefore the number of days exceeded is out of approximately 60 annual samples.
- ^b State standard, not to be exceeded.
- ^c Federal standard, not to be exceeded.
- ^d Based on a sampling schedule of one out of every six days, for a total of approximately 60 samples per year.
- ^e Federal standard was reduced from 65 µg/m³ to 35 µg/m³ in 2006.
- ^f Sulfur dioxide monitoring was terminated in San Francisco in 2009. Monitoring only continues near refineries.

SOURCE: BAAQMD, Bay Area Air Pollution Summary, 2009 – 2013. Available online at: <http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx>.

Particulate Matter (PM₁₀ and PM_{2.5})

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from man-made and natural sources. Particulate matter is measured in two size ranges: PM₁₀ for particles less than 10 microns in diameter, and PM_{2.5} for particles less than 2.5 microns in diameter. In the Bay Area, motor vehicles generate about one-half of the air basin's particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction

are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the California Air Resources Board (CARB), studies in the United States and elsewhere “have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks,” and studies of children’s health in California have demonstrated that particle pollution “may significantly reduce lung function growth in children.” The CARB also reports that statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California (CARB, 2007). Among the criteria pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, the BAAQMD was reporting, in its *CEQA Air Quality Guidelines*, that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. High levels of particulate matter can exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions.

Table 4.2-1 shows that an exceedance of the state PM₁₀ standard occurred on one monitored occasion between 2009 and 2013 in San Francisco. It is estimated that the state 24-hour PM₁₀ standard of 50 micrograms per cubic meter (µg/m³) was exceeded on up to 6 days per year between 2009 and 2013.¹ The BAAQMD began monitoring PM_{2.5} concentrations in San Francisco in 2002. The federal 24-hour PM_{2.5} standard was not exceeded until 2006, when the standard was lowered from 65 µg/m³ to 35 µg/m³. It is estimated that the state 24-hour PM_{2.5} standard was exceeded on up to 54 days per year between 2009 and 2013. The state annual average standard was not exceeded between 2009 and 2013.

PM_{2.5} is of particular concern because epidemiologic studies have demonstrated that people who live near freeways and high-traffic roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children (SFDPH, 2008).

Nitrogen Dioxide (NO₂)

NO₂ is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO₂. Aside from its contribution to ozone formation, NO₂ can increase the risk of acute and chronic respiratory disease and reduce visibility. NO₂ may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. Table 4.2-1 shows that the current state standard for NO₂ is being met in San Francisco. In 2010, the U.S. EPA implemented a new 1-hour NO₂ standard presented in **Table 4.2-2**. Currently, the CARB is recommending that the Bay Area air basin be designated as an attainment area for the new standard. This new federal standard was exceeded on one day at the San Francisco station between 2009 and 2013.

¹ PM₁₀ and PM_{2.5} are sampled every sixth day; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table.

**TABLE 4.2-2
 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS**

Pollutant	Averaging Time	State (SAAQs ^a)		Federal (NAAQS ^b)	
		Standard	Attainment Status	Standard	Attainment Status
Ozone	1 hour	0.09 ppm	N	NA	See Note c
	8 hour	0.07 ppm	U ^d	0.075 ppm	N/Marginal
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO ₂)	1 hour	0.18 ppm	A	0.100 ppm	U
	Annual	0.030 ppm	NA	0.053 ppm	A
Sulfur Dioxide (SO ₂)	1 hour	0.25 ppm	A	0.075 ppm	A
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Particulate Matter (PM ₁₀)	24 hour	50 µg/m ³	N	150 µg/m ³	U
	Annual ^e	20 µg/m ³ ^f	N	NA	NA
Fine Particulate Matter (PM _{2.5})	24 hour	NA	NA	35 µg/m ³	N
	Annual	15 µg/m ³	N	12 µg/m ³	A
Sulfates	24 hour	25 µg/m ³	A	NA	NA
Lead	30 day	1.5 µg/m ³	A	NA	NA
	Cal. Quarter	NA	NA	1.5 µg/m ³	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	See Note h	A	NA	NA

NOTES:

A = Attainment; N = Nonattainment; U = Unclassified; NA = Not Applicable, no applicable standard; ppm = parts per million; µg/m³ = micrograms per cubic meter.

- ^a SAAQS = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.
- ^b NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM₁₀ standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour PM_{2.5} standard is attained when the three-year average of the 98th percentile is less than the standard.
- ^c The United States Environmental Protection Agency (U.S. EPA) revoked the national 1-hour ozone standard on June 15, 2005.
- ^d This state 8-hour ozone standard was approved in April 2005 and became effective in May 2006.
- ^e State standard = annual geometric mean; national standard = annual arithmetic mean.
- ^f In June 2002, The California Air Resources Board (CARB) established new annual standards for PM_{2.5} and PM₁₀.
- ^g On January 9, 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour PM_{2.5} national standard. This EPA rule suspends key SIP requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour PM_{2.5} standard until such time as the Air District submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.
- ^h Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70%. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCE: Bay Area Air Quality Management District (BAAQMD), Standards and Attainment Status, 2012a, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, accessed February 19, 2014; and U.S. EPA National Ambient Air Quality Standards, 2011, <http://www.epa.gov/air/criteria.html>, accessed February 19, 2014.

The U.S. EPA has also established requirements for a new monitoring network to measure NO₂ concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites are required in California, three of which will be in the Bay Area. These monitors are planned for Berkeley, Oakland, and San Jose. The Oakland station

commenced operation in February 2014 while the other two are not yet operational but will be by January 2015. The new monitoring data may result in a need to change area designations in the future. The CARB will revise the area designation recommendations, as appropriate, once the new monitoring data become available.

Sulfur Dioxide (SO₂)

SO₂ is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO₂ has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease. Table 4.2-2 shows that the state standard for SO₂ is being met in the Bay Area, and pollutant trends suggest that the air basin will continue to meet this standard for the foreseeable future.

In 2010, the U.S. EPA implemented a new 1-hour SO₂ standard presented in Table 4.2-2. The U.S. EPA has initially designated the SFBAAB as an attainment area for PM_{2.5}. Similar to the new federal standard for NO₂, the U.S. EPA has established requirements for a new monitoring network to measure SO₂ concentrations to be operational by January 2013 (USEPA, 2010a). No additional SO₂ monitors are required for the Bay Area because BAAQMD jurisdiction has never been designated as non-attainment for SO₂ and no SIP or maintenance plans have been prepared for SO₂ (BAAQMD, 2013).

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacturers of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, the U.S. EPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 µg/m³ to 0.15 µg/m³. The U.S. EPA revised the monitoring requirements for lead in December 2010. These requirements focus on airports and large urban areas resulting in an increase in 76 monitors nationally (USEPA, 2010b).

4.2.1.3 Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis in which human health exposure to toxic substances is estimated and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.²

In addition to monitoring criteria pollutants, both the BAAQMD and CARB operate TAC monitoring networks in the San Francisco Bay Area Air Basin. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air and therefore tend to produce the most significant risk. The nearest BAAQMD ambient TAC monitoring station to the 2014 LRDP area is the station at Sixteenth and Arkansas Streets in San Francisco. **Table 4.2-3** shows ambient concentrations of carcinogenic TACs measured at the Arkansas Street station, and the estimated cancer risks from a lifetime exposure (70 years) to these substances is also reported in the table. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in San Francisco are similar to those for the Bay Area as a whole. Therefore, the estimated average lifetime cancer risk resulting from exposure to TAC concentrations monitored at the San Francisco station does not appear to be any greater than for the Bay Area as a region.

**TABLE 4.2-3
 ANNUAL AVERAGE AMBIENT CONCENTRATIONS OF CARCINOGENIC TOXIC
 AIR CONTAMINANTS MEASURED AT BAAQMD MONITORING STATION IN 2012,
 10 ARKANSAS STREET, SAN FRANCISCO**

Substance	Concentration	Cancer Risk per Million^a
Gaseous TACs		
	(ppb)	
Acetaldehyde	0.50	2
Benzene	0.20	19
1,3-Butadiene	0.034	13
Carbon Tetrachloride	0.082	22
Formaldehyde	1.01	7
Perchloroethylene	0.010	0.4
Methylene Chloride	0.087	0.3
Chloroform	0.018	0.5
Trichloroethylene	0.01	0.1
Particulate TACs		
	(ng/m³)	
Chromium (Hexavalent)	0.065	10
Total Risk for All TACs		74.3

NOTES:

TACs = toxic air contaminants; BAAQMD = Bay Area Air Quality Management District; ppb = part per billion; ng/m³ = nanograms per cubic meter.

^a Cancer risks were estimated by applying published unit risk values to the measured concentrations.

SOURCE: California Air Resources Board, *Ambient Air Toxics Summary-2012*, available online at: <http://www.arb.ca.gov/adam/toxics/sitesubstance.html>

² In general, a health risk assessment is required if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk; then the applicant is subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, calculating the increased risk of cancer as a result of exposure to one or more TACs.

Roadway-Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases and also contribute to particulates by generating road dust and through tire wear. Epidemiologic studies have demonstrated that people living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. Air pollution monitoring conducted in conjunction with epidemiologic studies has confirmed that roadway-related health effects vary with modeled exposure to particulate matter and nitrogen dioxide. In traffic-related studies, the additional non-cancer health risk attributable to roadway proximity was seen within 1,000 feet of the roadway and was strongest within 300 feet. (CARB, 2005) As a result, the CARB recommends that new sensitive land uses not be located within 500 feet of a freeway or urban roads carrying 100,000 vehicles per day. In 2008, the City of San Francisco adopted amendments to the Health Code (discussed below under “Regulatory Framework”), requiring new residential projects near high-volume roadways to be screened for particulate matter exposure hazards and, where indicated, to conduct an analysis of exposure and to mitigate hazards through design and ventilation.

Diesel Particulate Matter (DPM)

The CARB identified diesel particulate matter (DPM) as a toxic air contaminant in 1998, primarily based on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. The CARB estimated average Bay Area cancer risk from exposure to diesel particulate, based on a population-weighted average ambient diesel particulate concentration, is about 480 in one million, as of 2000, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The risk in the Bay Area from DPM as determined by the BAAQMD declined from about 900 in one million in 1990 to about 525 in one million in 2001 and less than 300 in one million in 2012 (BAAQMD, 2014).³

Recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. The CARB community health risk assessments and regulatory programs have produced air quality information about certain types of facilities for consideration by local authorities when siting new residences, schools, day care centers, parks and playgrounds, and medical facilities (i.e., sensitive land uses). Sensitive land uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the non-cancer effects of air pollution. There is also substantial evidence that children are more sensitive to cancer-causing chemicals (CARB, 2005).

³ This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 0.40 (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the American Cancer Society. (American Cancer Society, “Lifetime Probability of Developing or Dying from Cancer,” last revised July 13, 2009, available online at http://www.cancer.org/docroot/CRI/content/CRI_2_6x_Lifetime_Probability_of_Developing_or_Dying_From_Cancer.asp)

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. In 2007, the CARB adopted the In-Use Off-Road Diesel Vehicle Regulation to reduce diesel DPM and NOx emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. Subsequent CARB regulations apply to new trucks and diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same particulate exhaust emissions as one truck built in 1988 (Pollution Engineering, 2006). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000.

Despite notable emission reductions, the CARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. The CARB notes that these recommendations are advisory and should not be interpreted as defined “buffer zones,” and that local agencies must balance other considerations, including transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, the CARB’s position is that infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level.

4.2.1.4 Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. The BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, colleges and universities, day care, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupation Safety and Health Administration (OSHA) to ensure the health and well-being of their employees (BAAQMD, 2011).

The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in San Francisco where building setbacks are limited and roadway volumes higher than most other parts of the Bay Area. Epidemiologic studies have consistently demonstrated that children and adults living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and lung development in children. Vehicles also contribute to particulates by generating road dust and through tire wear.

4.2.2 Regulatory Considerations

4.2.2.1 Federal Regulations

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

The current attainment status for the San Francisco Bay Area Air Basin, with respect to federal standards, is summarized above in Table 4.2-2. In general, the Bay Area Air Basin experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM₁₀ and PM_{2.5}), for which standards are exceeded periodically (see Table 4.2-1).

In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard.⁴ The U.S. EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 parts per million (ppm) effective May 27, 2008. In April 2012, the U.S. EPA designated the Bay Area as a marginal nonattainment region for the 0.75 ppm ozone standard established in 2008. The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM₁₀ and PM_{2.5}, for which the Bay Area is designated as “Unclassified.” “Unclassified” is defined by the Clean Air Act as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

On January 9, 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour PM_{2.5} national standard. This EPA rule suspends key State Implementation Plan (discussed below) requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as “non-attainment” for the national 24-hour PM_{2.5} standard until such time as the Air District submits a “redesignation request” and a “maintenance plan” to EPA, and EPA approves the propose redesignation.

4.2.2.2 State Regulations

Although the federal Clean Air Act established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is

⁴ “Marginal nonattainment area” means an area designated marginal nonattainment for the 1-hour national ambient air quality standard for ozone.

considerable diversity between the state and national ambient air quality standards, as shown in Table 4.2-2. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. As indicated in Table 4.2-2, the SFBAAB is designated as “nonattainment” for state ozone, PM₁₀, and PM_{2.5} standards. The SFBAAB is designated as “attainment” for other pollutants.

4.2.2.3 Regional and Local Regulations

Bay Area Air Quality Planning Relative to State and Federal Standards

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans or SIPs. The federal and state Clean Air Acts require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM₁₀ standard). The *2010 Bay Area Clean Air Plan* was adopted on September 15, 2010, by the BAAQMD, in cooperation with the Bay Area Metropolitan Transportation Commission (MTC), the Bay Conservation and Development Commission (BCDC), and the Association of Bay Area Governments (ABAG). The *2010 Clean Air Plan* outlines a multi-pollutant approach for addressing ozone, particulate matter, air toxics, and greenhouse gas emission reductions in a single, integrated strategy. The primary objectives of the plan are to improve local and regional air quality, protect public health, and minimize climate change impacts. The *2010 Clean Air Plan* replaces the *Bay Area 2005 Ozone Strategy*, adopted in 2006.

The *2010 Clean Air Plan* updates the *2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone; provide a control strategy to reduce ozone, particulate matter, toxic air contaminants, and greenhouse gases in a single, integrated plan; review progress in improving air quality in recent years; and establish emission control measures that have since been implemented. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2010 Clean Air Plan* also represents the Bay Area’s most recent triennial assessment of the region’s strategy to attain the state one-hour ozone standard (BAAQMD, 2010).

Toxic Air Contaminants

In 2005, the ARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The regulations generally limit idling of commercial motor vehicles (including buses and trucks) within 100 feet of a school or residential area for more than five consecutive minutes or periods aggregating more than five

minutes in any one hour. Buses or vehicles also must turn off their engines upon stopping at a school and must not turn their engines on more than 30 seconds before beginning to depart from a school. Also, state law Senate Bill 352 (SB 352) was adopted in 2003 and limits locating public schools within 500 feet of a freeway or busy traffic corridor (Section 17213 of the Education Code; Section 21151.8 of the Public Resources Code).

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over the nine-county region located in the San Francisco Bay Area Air Basin. ABAG, MTC, county transportation agencies, cities and counties, and various non-governmental organizations also participate in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs. BAAQMD is responsible for attaining and/or maintaining air quality in the region within federal and state air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the region and to develop and implement strategies to attain the applicable federal and state standards.

San Francisco Health Code Provisions Regarding Roadway-generated Pollutants (Article 38)

San Francisco adopted Article 38 of the *San Francisco Health Code* in 2008, requiring an Air Quality Assessment for new residential projects of 10 or more units located in proximity to high-traffic roadways, as mapped by the DPH, to determine whether residents would be exposed to unhealthy levels of PM_{2.5}. The air quality assessment evaluates the concentration of PM_{2.5} from local roadway traffic that could affect a proposed residential development site. If the DPH air quality assessment indicates that the annual average concentration of PM_{2.5} at the site would be greater than 0.2 µg/m³, Health Code Section 3807 requires development on the site to be designed or relocated to avoid exposure greater than 0.2 µg/m³, or a ventilation system to be installed that would be capable of removing 80% of ambient PM_{2.5} from habitable areas of the residential units. Article 38 of the Health Code is in the process of being revised, along with the Administrative Code. Once the revisions are adopted, there will be a statutory requirement (outside of CEQA) that requires enhanced ventilation for all new sensitive receptors within newly identified Exposure Zones and construction emissions minimization within these Exposure Zones. These revisions are expected to be considered by the Board of Supervisors in fall 2014.

4.2.3 Significance Standards

Would implementation of the 2014 LRDP:

- a) Conflict with or obstruct implementation of the applicable air quality plan?
- b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation (e.g., induce mobile source carbon monoxide (CO) emissions that would cause a violation of the CO ambient air quality standard)?

- 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)?
- d) Expose sensitive receptors to substantial pollutant concentrations?
- e) Create objectionable odors affecting a substantial number of people?

4.2.4 Analysis Methodology

Potential 2014 LRDP air quality impacts are assessed by modeling the estimated daily emissions generated by LRDP construction activities and operations using the CalEEMod land use emissions model version 2013.2.2. Emissions are then compared to the significance criteria in the BAAQMD 2011 *CEQA Air Quality Guidelines*, which include the following:

- Result in total construction emissions of Reactive Organic Gases (ROG), NO_x, or PM_{2.5} (exhaust) of 10 tons per year or greater or 54 pounds per day or greater.
- Exceed a construction emission threshold for PM₁₀ (exhaust) of 15 tons per year or greater, or 82 pounds per day or greater.
- For PM₁₀ and PM_{2.5} as part of fugitive dust generated during construction, the BAAQMD Guidelines specify compliance with Best Management Practices as the threshold.
- Result in total operational emissions of ROG, NO_x, or PM_{2.5} of 10 tons per year or greater, or 54 pounds per day or greater.
- Exceed an operational emission threshold for PM₁₀ of 15 tons per year or greater, or 82 pounds per day.
- Result in CO concentrations of 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average) as estimated by roadway vehicle volumes exceeding 44,000 vehicles per hour at any intersection.
- Exposure of people to a single source of Toxic Air Contaminants (TACs) that results in (a) a cancer risk level greater than 10 in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average PM_{2.5} of greater than 0.3 micrograms per cubic meter, where the exposure results from siting a new single source or siting a new sensitive receptor.

A project's contribution to cumulative impacts for criteria pollutants are considered significant if the project's impact individually would be significant (i.e., if it exceeds the BAAQMD's quantitative thresholds).

According to the BAAQMD 2012 *CEQA Air Quality Guidelines*, a project's contribution to cumulative impacts for criteria pollutants should be considered significant if the project's impact individually would be significant (i.e. exceeds the BAAQMD's quantitative thresholds). While the significance thresholds adopted by BAAQMD in 2010 and 2011 have been set aside due to judicial action currently pending before the California Supreme Court, these thresholds are based

on substantial evidence identified in Appendix D of the 2011 BAAQMD CEQA Guidelines and its 2009 Justification Report and are therefore used within this document.

For cumulative impacts from TACs, a project would be considered significant if siting a new sensitive receptor would result in exposure of people to substantial levels of TACs resulting from all cumulative sources within 1,000 feet in (a) a cumulative cancer risk level greater than 100 in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10, or (c) an increase of annual average PM_{2.5} of greater than 0.8 micrograms per cubic meter.

4.2.5 References

Bay Area Air Quality Management District (BAAQMD), *2010 Clean Air Plan*. Available online at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx> Accessed on February 19, 2014.

BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2011, page 12.

BAAQMD, *CEQA Air Quality Guidelines*, May 2012, www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx; p. C-16.

BAAQMD, *2012 Air Monitoring Network Plan*, July 2013, www.baaqmd.gov/Divisions/Technical-Services/Ambient-Air-Monitoring/AAMN-Plan.aspx; p. 30.

BAAQMD, *Improving Air Quality & Health in Bay Area Communities, Community Air Risk Evaluation Program Retrospective & Path Forward (2004-2013)*, March 2014.

California Air Resources, Board (CARB), *Air Quality and Land Use Handbook: A community Health Perspective*, April, 2005.

CARB, "Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution," November 2007.

CARB, *California Almanac of Emissions and Air Quality - 2009 Edition*, Table 5-44 and Figure 5-12, <http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm>, accessed February 19, 2014.

CARB, *Recommended Area Designations for the 2010 Nitrogen Dioxide Standards*, Technical Support Document, January 2011, http://www.airquality.org/plans/federal/no2/NO2Enclosure_1.pdf

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San Francisco Planning Department, *Air Quality Element of the San Francisco General Plan*, July 1997, updated in 2000.

San Francisco Department of Public Health, Assessment and Mitigation of Air Pollutant Health Effect from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review, May 2008, p. 7. Available online at <https://www.sfdph.org/dph/EH/Air/MitRoadway111907.pdf>. Accessed February 19, 2014.

U.S. EPA, 2010a, *Fact Sheet: Revisions to the Primary National Ambient Air Quality Standard, Monitoring Network, and Data Reporting Requirements for Sulfur Dioxide*, June 2, 2010; <http://www.epa.gov/air/sulfurdioxide/pdfs/20100602fs.pdf>

U.S. EPA, 2010b, *Fact Sheet Revisions to Lead Ambient Air Quality Monitoring Requirements*, http://www.epa.gov/air/lead/pdfs/Leadmonitoring_FS.pdf, accessed February 19, 2014.

4.3 Biological Resources

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Biological Resource impacts. 2014 LRDP Biological Resources effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Biological Resource effects resulting from 2014 LRDP proposals at the Parnassus Heights campus site is discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*. The Initial Study prepared for the 2014 LRDP concluded that LRDP proposals would result in no impact or less-than-significant impacts to biological resources at the Mission Bay, Mount Zion and Mission Center campus sites. Therefore, no additional analysis of biological resources effects at these campus sites is required.

4.3.1 Regional Setting

The 2014 LRDP planning area⁵ is located in the Bay Area–Delta Bioregion,⁶ as defined by the State of California’s Natural Communities Conservation Program. This bioregion supports a variety of natural communities that range from the open waters of San Francisco Bay and Delta to salt and brackish marshes to grassland, chaparral, and oak woodlands. The temperate climate is Mediterranean in nature, with relatively mild, wet winters and warm, dry summers. The high diversity of vegetation and wildlife found in the region is a result of soil, topographic, and microclimate variations that combine to promote relatively high levels of endemism.⁷ This, in combination with a long history of uses that have altered the natural environment and the increasingly rapid pace of development in the region, has endangered some local flora and fauna.

4.3.1.1 Project Area Vegetation Communities and Wildlife Habitats

Urban

Wildlife species utilizing urban areas are often well adapted to the presence of humans and their activities. They are typically generalists, capable of utilizing the limited food sources available, such as garbage and horticultural plants and their fruit. Urban wildlife species expected in the 2014 LRDP area include common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*),

⁵ The information on natural communities, plant and animal species, and sensitive biological resources used in the preparation of this section was obtained from: the California Natural Diversity Database (CNDDB) (CDFW, 2014), California Native Plant Society (CNPS) Electronic Inventory (CNPS, 2013), the U.S. Fish and Wildlife Service (USFWS, 2014), and standard biological literature. In addition, the following documents were reviewed and referenced to support the analysis of potential environmental impacts on the project:

- UCSF Long Range Development Plan Final EIR, 1997
- UCSF Long Range Development Plan Initial Study, 2013
- Draft EIR for the UCSF Mount Sutro Management Project, 2013

⁶ A *bioregion* is an area defined by a combination of ecological, geographic, and social criteria and consists of a system of related, interconnected ecosystems. The Bay-Delta Bioregion is considered the immediate watershed of the Bay Area and the Delta, not including the major rivers that flow into the Delta. It is bounded on the north by the northern edge of Sonoma and Napa Counties and the Delta, and extends east to the edge of the valley floor; on the south, it is bounded by the southern edge of San Joaquin County, the eastern edge of the Diablo Range, and the southern edge of Santa Clara and San Mateo Counties.

⁷ *Endemism* refers to the degree to which organisms or taxa are restricted to a geographical region or locality and thus are individually characterized as endemic to that area.

raccoon (*Procyon lotor*), Norway rat (*Rattus norvegicus*), Virginia opossum (*Didelphis virginiana*), and feral cats. Several exceptions to the generalist rule are red-tailed hawk (*Buteo jamaicensis*), which prey on rodents, and Cooper's hawk (*Accipiter cooperii*) and peregrine falcon (*Falco peregrinus anatum*), which prey almost exclusively on small to medium sized birds and are known to nest within San Francisco. Bats may colonize abandoned buildings within the vicinity of the 2014 LRDP planning area.

Landscaped

Landscaped areas supporting a variety of ornamental trees, shrubs and maintained non-native vegetation are present on the UCSF campus sites within the 2014 LRDP area. Landscaped areas in an otherwise urban environment can provide cover, foraging, and nesting habitat for a variety of bird species as well as reptiles and small mammals, especially those that are tolerant of disturbance and human presence. Birds commonly found in such areas include non-native birds such as English sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*), as well as birds native to the area such as American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), dark-eyed junco (*Junco hyemalis*), western scrub jay (*Aphelocoma californica*), mourning dove (*Zenaida macroura*), and Anna's hummingbird (*Calypte anna*). Reptiles using this type of habitat, particularly in areas bordering natural lands, may include native species such as western terrestrial garter snake (*Thamnophis elegans*) and western fence lizard (*Sceloporus occidentalis*). Other wildlife present in these urban landscaped areas include striped skunk (*Mephitis mephitis*), raccoon, Virginia opossum, roosting bats as well as Botta's pocket gopher (*Thomomys bottae*) and other small rodents. Coyotes (*Canis latrans*) have been sighted occasionally in Golden Gate Park and Presidio areas of San Francisco and could appear within the 2014 LRDP planning area.

Non-native Forest

Non-native forest habitat occurs throughout the Mount Sutro Open Space Reserve (Reserve) on the Parnassus Heights campus site. Dominant tree species are blue gum eucalyptus and Monterey cypress (Monterey cypress are native to California but not to the San Francisco area). Special-status species that could be present in these areas include overwintering monarch butterflies (*Danaus plexippus*), nesting raptors such as red-shouldered hawk (*Buteo lineatus*) and red-tailed hawk, and special-status and common bats. Several avian species are common to eucalyptus and cypress forest, including native species such as American robin, chestnut-backed chickadee (*Poecile rufescens*), pygmy nuthatch (*Sitta pygmaea*), Anna's hummingbird, and California towhee (*Pipilo crissalis*). The non-native eastern gray squirrel (*Sciurus carolinensis*) is also prevalent.

Sensitive Natural Communities, Including Wetlands

The California Natural Diversity Database (CNDDDB) reports no sensitive natural community occurrences for the two-quadrangle area containing and surrounding the LRDP planning area (CDFW, 2014). No potentially jurisdictional wetlands are located in area that would be affected by the proposed 2014 LRDP activities.

Wildlife Movement Corridors

Rugged terrain, changes in vegetation, or areas of human disturbance or urban development can fragment wildlife habitats and impede wildlife movement between areas of suitable habitat. This fragmentation creates isolated “islands” of vegetation that may not provide sufficient area to accommodate sustainable populations, and can adversely affect genetic and species diversity. Wildlife movement corridors link habitat areas and mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, in turn allowing depleted populations to be replenished and promoting genetic exchange between separate populations. Due to urban development of the San Francisco peninsula, remaining wildlife habitat is largely isolated to disconnected small parks and open space areas.

The San Francisco Peninsula is an important migratory stopover for birds along the Pacific Flyway—one of the four major migratory routes in North America. Raptors, songbirds, shorebirds and waterfowl stop in San Francisco, including Golden Gate Park, Lake Merced, the Presidio and the Reserve during their fall and spring migrations. Both the Mission Bay and Parnassus Heights campus sites offer suitable and attractive habitat for birds to forage and rest along this migration route. While San Francisco’s location on the Pacific Flyway allows the City’s open spaces to host transient individuals, it does not constitute a wildlife movement corridor. No wildlife movement corridors are present within the 2014 LRDP planning area.

4.3.1.2 Special-Status Species

Several species in the vicinity of the 2014 LRDP planning area receive protection pursuant to federal and/or State endangered species laws, or CDFW designation as “species of special concern”. For the purpose of this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under the federal or State endangered species acts;
- Species that are candidates for listing under either federal or State law;
- Species formerly designated by the USFWS as species of concern or by the CDFW as species of special concern;⁸
- Species designated as “special animals” by the State;⁹
- Species designated as “fully protected” by the State (there are about 35, most of which are also listed as either endangered or threatened);¹⁰

⁸ A California species of special concern is one that: has been extirpated from the state; meets the state definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

⁹ Species listed on the current CDFW “special animals” list (January 2011), which includes 898 species. This list includes species that CDFW considers “those of greatest conservation need.”

¹⁰ The “fully protected” classification was California’s initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. The designation can be found in the Fish and Game Code.

- Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5, thus prohibiting the take, possession, or killing of raptors and owls, their nests, and their eggs;¹¹ and
- Species, such as candidate species, that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines.

A comprehensive list of the special-status plant and animal species that may occur or have the potential to occur within the 2014 LRDP area was developed based on data obtained from the CNDDDB, the California Native Plant Society (CNPS) Electronic Inventory, and the USFWS and other biological literature pertaining to the bioregion. It was then determined whether there is a low, moderate, or high potential for species occurrence at the LRDP activities sites based on previous special-status species record locations and current site conditions. These species lists are provided in **Tables 4.3-1** and **4.3-2**.

Special-Status Plants

Table 4.3-1 presents special-status plant species that occur in the regional vicinity (i.e., the San Francisco North and San Francisco South 7.5-minute USGS quadrangles), and their potential to occur in the LRDP planning area. Most special-status plant species are considered to have a low potential to occur at the individual LRDP proposal sites due to the developed nature of most of the 2014 LRDP project locations. This estimation is supported by the lack of native plants and supportive native vegetation communities, and based on the disturbed and heavily managed condition of the LRDP planning area.

Of the campus site locations included in the 2014 LRDP planning area, the Parnassus Heights campus site includes the Reserve; however, the potential for rare plant species in this area is still considered low because the vegetation communities that would support rare plants, such as coastal salt marsh, coastal prairie, valley and foothill grasslands, coastal dunes, and coastal scrub are not prevalent within the Reserve. Coastal triquetrella, a California Rare Plant Rank 1B.2 which occurs on shaded substrate in coastal bluff or coastal scrub communities, and San Francisco gumplant (*Grindelia hirsutula* var. *maritima*), a California Rare Plant Rank of 3.2 which occurs on sandy or serpentine slopes and coastal scrub communities, are the only special-status plants with a moderate potential to occur within the LRDP planning area, and specifically within the vicinity of the Parnassus Heights campus site. Coastal triquetrella has been documented within 0.15 mile of the Parnassus Heights campus site on Tank Hill and south east of the campus site in open spaces near the Douglas Playground, within two miles of the campus site (CDFW, 2014). San Francisco gumplant has been documented at several locations within two miles of the Parnassus Heights campus site, with the closest record on the western slope of Mount Sutro at Laguna Honda (CDFW, 2014).

¹¹ The inclusion of birds protected by Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by State and federal wildlife authorities.

**TABLE 4.3-1
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
UCSF 2014 LRDP AREA**

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Species Listed or Proposed for Listing					
Presidio Manzanita <i>Arctostaphylos montana ssp. Ravenii</i>	FE	CE	1B.1	Open, rocky, serpentine slopes in chaparral, coastal scrub, and coastal prairie. February – March	Low. No suitable habitat present.
Marsh sandwort <i>Arenaria paludicola</i>	FE	CE	1B.1	Freshwater or brackish marshes and swamps. May – August	Low. No suitable habitat present.
Presidio clarkia <i>Clarkia franciscana</i>	FE	CE	1B.1	Serpentine outcrops in coastal scrub, and valley and foothill grassland. May – July	Low. No suitable habitat present.
Beach layia <i>Layia carnosa</i>	FE	CE	1B.1	Sand dunes. March – July	Low. No suitable habitat present.
San Francisco lessingia <i>Lessingia germanorum</i>	FE	CE	1B.1	Coastal scrub, sandy soils free of competing species. July – November	Low. No suitable habitat present.
White rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE	CE	1B.1	Open, dry, rocky slopes and grassy areas, usually on serpentine. March – May	Low. No suitable habitat present.
Marin western flax <i>Hesperolinon congestum</i>	FT	CT	1B.1	Chaparral and grassland, usually on serpentine barrens. April – July	Low. No suitable habitat present.
Robust spineflower <i>Chorizanthe robusta var. robusta</i>	FE	--	1B.1	Sandy or gravelly coastal dunes, coastal scrub, cismontane woodland and maritime chaparral. April – September	Low. No suitable habitat present.
San Bruno Mountain manzanita <i>Arctostaphylos imbricada</i>	--	CE	1B.1	Chaparral and coastal scrub, usually on sandstone outcrops. February – May	Low. No suitable habitat present.
Pacific manzanita <i>Arctostaphylos pacifica</i>	--	CE	1B.2	Coastal scrub and chaparral. February – April	Low. No suitable habitat present.
San Francisco popcorn-flower <i>Plagiobothrys diffusus</i>	--	CE	1B.1	Coastal prairie, and valley and foothill grasslands. March – June	Low. No suitable habitat present.

TABLE 4.3-1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern					
Adobe sanicle <i>Sanicula maritima</i>	--	Rare	1B.1	Moist clay or ultramafic soil in chaparral, coastal prairie, meadows, seeps, and valley and foothill grassland. February – May	Low. No suitable habitat present.
Hairless popcorn-flower <i>Plagiobothrys glaber</i>	--	--	1A	Coastal salt marshes and alkaline meadows. March – May	Low. No suitable habitat present.
Franciscan manzanita <i>Arctostaphylos franciscana</i>	--	--	1B.1	Open, rocky, serpentine outcrops in chaparral. February – April	Low. No suitable habitat present. This species was believed to be extinct in the wild (although still extant through cultivation), but was rediscovered in Presidio National Park in late 2009.
Blue coast gilia <i>Gilia capitata</i> spp. <i>chamissonis</i>	--	--	1B.1	Coastal dunes and scrub. April – July	Low. No suitable habitat present. Extant population is present within the Presidio of San Francisco.
Kellogg's horkelia <i>Horkelia cuneata</i> ssp. <i>sericea</i>	--	--	1B.1	Coastal scrub, dunes, and openings of closed-cone coniferous forests. February – July	Low. No suitable habitat present.
Rose leptosiphon <i>Leptosiphon rosaceus</i>	--	--	1B.1	Coastal bluff scrub. April – July	Low. No suitable habitat present.
Fragrant fritillary <i>Fritillaria liliacea</i>	--	--	1B.2	On clay, often serpentine derived soils in coastal scrub, grassland, and coastal prairie. February – April	Low. No suitable habitat present. Extant population located at Twin Peaks.
Bent-flowered fiddleneck <i>Amsinckia lunaris</i>	--	--	1B.2	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland. March – June	Low. No suitable habitat present.
Montara manzanita <i>Arctostaphylos montaraensis</i>	--	--	1B.2	Slopes and ridges in chaparral and coastal scrub. January – March	Low. No suitable habitat present.
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	--	--	1B.2	Alkali flats, flooded grassland, playas and vernal pools. March – June	Low. No suitable habitat present; species presumed extirpated in San Francisco.

TABLE 4.3-1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Pappose tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	--	--	1B.2	Chaparral, coastal prairie, meadows, seeps, coastal salt marshes and swamps, and vernally mesic, often alkaline, valley and foothill grasslands. May – November	Low. No suitable habitat present.
Franciscan thistle <i>Cirsium andrewsii</i>	--	--	1B.2	Coastal bluff scrub, coastal prairie, coastal mesic scrub, and broadleaf upland forest; sometimes on serpentine. March – July	Low. No suitable habitat present.
San Francisco Bay spineflower <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	--	--	1B.2	Coastal scrub, dunes and grassland. April – July	Low. No suitable habitat present.
Point Reyes salty bird's- beak <i>Chloropyron maritimum</i> ssp. <i>palustre</i>	--	--	1B.2	Coastal salt marshes and swamps. June – October	Low. No suitable habitat present.
Compact cobwebby thistle <i>Cirsium occidentale</i> var. <i>compactum</i>	--	--	1B.2	Coastal scrub, grassland, and dunes. April – June	Low. No suitable habitat present.
Round-headed Chinese- houses <i>Collinsia corymbosa</i>	--	--	1B.2	Coastal dunes and coastal prairie. April – June	Low. No suitable habitat present; species has not been seen in San Francisco for more than 100 years.
San Francisco collinsia <i>Collinsia multicolor</i>	--	--	1B.2	On humus-covered soil derived from mudstone in closed-cone coniferous forest and coastal scrub. March – May	Low. No suitable habitat present.
Dark-eyed gilia <i>Gilia millefoliata</i>	--	--	1B.2	Coastal dunes. April – July	Low. No suitable habitat present; species potentially extirpated in San Francisco.
Diablo helianthella <i>Helianthella castanea</i>	--	--	1B.2	On rocky soils in broadleaf upland forest, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. March – June	Low. No suitable habitat present.
White seaside tarplant <i>Hemizonia congesta</i> ssp. <i>congesta</i>	--	--	1B.2	Grassy valleys and hills, often on fallow fields in coastal scrub. April – November	Low. No suitable habitat present.

TABLE 4.3-1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Short-leaved evax <i>Hesperivax sparsiflora</i> var. <i>brevifolia</i>	--	--	1B.2	Sandy bluffs and flats in coastal scrub and coastal dunes. March – June	Low. No suitable habitat present.
Arcuate bush mallow <i>Malacothamnus arcuatus</i>	--	--	1B.2	Gravelly alluvium in chaparral and cismontane woodland. April – September	Low. No suitable habitat present.
Marsh microseris <i>Microseris paludosa</i>	--	--	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. August – June	Low. No suitable habitat present.
Choris's popcorn-flower <i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	--	--	1B.2	Mesic sites in chaparral, coastal scrub, and coastal prairie. March – June	Low. No suitable habitat present.
San Francisco campion <i>Silene verecunda</i> ssp. <i>verecunda</i>	--	--	1B.2	Mudstone, shale, or serpentine substrates in coastal scrub, coastal prairie, chaparral and valley and foothill grassland. March – June	Low. No suitable habitat present.
Santa Cruz microseris <i>Stebbinsoseris decipiens</i>	--	--	1B.2	On sandstone, shale or serpentine derived seaward facing slopes in broadleaf upland forest, closed-cone coniferous forest, chaparral, coastal prairie, and coastal scrub. April – May	Low. No suitable habitat present.
Coastal triquetrella <i>Triquetrella californica</i>	--	--	1B.2	On shaded soil, rocks sand or gravel in dry or moist conditions or in coastal bluff and coastal scrub.	Moderate. Documented extant population within 0.1 mile of the Parnassus Heights campus on Tank Hill. Suitable habitat is present within the Mount Sutro Open Space Reserve.
San Francisco owl's clover <i>Triphysaria floribunda</i>	--	--	1B.2	Grasslands. April – June	Low. No suitable habitat present.
Bristly sedge <i>Carex comosa</i>	--	--	2B.1	Lake margins, marshes, swamps, coastal prairie, and valley and foothill grasslands. May – September	Low. No suitable habitat present.

TABLE 4.3-1 (Continued)
SPECIAL-STATUS PLANT SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Calif. Rare Plant Rank	Habitat Description / Blooming Period	Potential to Occur in the Action Area
Federal Species of Concern or State Species of Special Concern (cont.)					
Oregon polemonium <i>Polemonium carneum</i>	--	--	2B.2	Coastal prairie, coastal scrub, lower montane coniferous forest. April – September	Low. No suitable habitat present.
San Francisco gumplant <i>Grindelia hirsutula</i> var. <i>maritime</i>	--	--	3.2	On sandy or serpentine slopes of sea bluffs in coastal scrub, or valley and foothill grasslands. June – September	Moderate. Documented in 1987 on the western slope of Mount Sutro in dense coastal scrub habitat. Suitable habitat is present for this species in the Mount Sutro Open Space Reserve.

NOTES:

The "Potential for Effect" category is defined as follows:

High = Species is expected to occur and habitat meets species requirements.

Moderate = Habitat is only marginally suitable or is suitable but not within species geographic range.

Low = Habitat does not meet species requirements as currently understood in the scientific community.

STATUS CODES:**Federal:**

FE = Listed as "endangered" under the federal Endangered Species Act

FT = Listed as "threatened" under the federal Endangered Species Act

FSC = NOAA Fisheries designated "species of concern"

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State:

CE = Listed as "endangered" under the California Endangered Species Act

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CSC = California Department of Fish and Wildlife designated "species of special concern"

CFP = California Department of Fish and Wildlife designated "fully protected"

SC = California Department of Fish and Wildlife designated "candidate threatened"

WL = California Department of Fish and Wildlife designated "watch list"

3503.5 = Eggs, Nests, and Nestlings Protected under section 3503.5 of the California Department of Fish and Game Code

* = California special animal

California Rare Plant Rank:

List 1A = Plants presumed extirpated in California and either rare or extinct elsewhere

List 1B = Plants rare, threatened, or endangered in California and elsewhere

List 2A = Plants presumed extirpated in California, but more common elsewhere

List 2B = Plants rare, threatened, or endangered in California, but more common elsewhere

List 3 = Plants about which we need more information--a review list

List 4 = Plants of limited distribution--a watch list

SOURCE: USFWS (2014), CDFW (2014), CNPS (2013).

**TABLE 4.3-2
 SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
 UCSF 2014 LRDP AREA**

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Invertebrates				
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	FE	--	Coastal scrub on rocky outcrops with broadleaf stonecrop (<i>Sedum spathulifolium</i>)	Low. No suitable habitat present. Three known populations at San Bruno Mountain, Montara, and Pacifica.
Bay checkerspot butterfly <i>Euphydryas editha bayensis</i>	FT	--	Serpentine grasslands.	Low. No suitable habitat present.
Mission blue butterfly <i>Plebejus icarioides missionensis</i>	FE	--	Grassland with <i>Lupinus albifrons</i> , <i>L. Formosa</i> , and <i>L. varicolor</i> .	Low. Suitable habitat present at Twin Peaks. Species unlikely to occur within the plan area.
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE	--	Found in native grasslands with <i>Viola pedunculata</i> as larval food plant.	Low. No suitable habitat present.
Monarch butterfly <i>Danaus plexippus</i>	--	*	Eucalyptus groves (wintering sites).	Moderate. Several records of this species wintering in eucalyptus groves within San Francisco including Golden Gate Park, the Presidion, Fort Mason, and Telegraph Hill.
Tomales isopod <i>Caecuditea tomalensis</i>	--	--	Still-to slow-moving water in vegetated ponds, preferably spring-fed.	Low. No suitable habitat present.
Reptiles and Amphibians				
Western pond turtle <i>Emys marmorata</i>	--	CSC	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Low. No suitable habitat present.
San Francisco garter snake <i>Thamnophis sirtalis tetrataenia</i>	FE	SE	Densely vegetated ponds near open hillsides with abundant small mammal burrows.	Absent. Species is considered likely extirpated from San Francisco.
California red-legged frog <i>Rana draytonii</i>	FT	CSC	Freshwater ponds and slow streams with emergent vegetation for egg attachment.	Low. No suitable habitat present.
Birds				
California clapper rail <i>Rallus longirostris obsoletus</i>	FE	CE	Salt marsh wetlands along the San Francisco Bay.	Low. No suitable habitat present.
Bank swallow <i>Riparia riparia</i> (nesting)	--	CT	Vertical banks and cliffs with sandy soil, near water. Nests in holes dug in cliffs and river banks.	Low. No suitable habitat present. Known to nest at Fort Funston and forage over Lake Merced.

TABLE 4.3-2 (Continued)
SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Birds (cont.)				
Yellow warbler <i>Dendroica petechia brewsteri</i>	--	CSC	Nests in dense riparian cover and montane chaparral. Breeding distribution includes the coast ranges and western slopes of the Sierra Nevada. Rare to uncommon in lowland areas.	Low. No suitable riparian habitat present.
California black rail <i>Laterallus jamaicensis coturniculus</i>	--	CT	Salt and brackish marshes; also in freshwater marshes at low elevations.	Low. No suitable habitat present.
Salt marsh common yellowthroat <i>Geothlypis trichas sinuatus</i>	--	CSC	Forages in various marsh, riparian and upland habitats. Nests on or near the ground in concealed locations.	Low. No suitable riparian habitat present.
Alameda song sparrow <i>Melospiza melodia pusillula</i>	--	CSC	Salt marshes of eastern and south San Francisco Bay.	Low. No suitable habitat present.
San Pablo song sparrow <i>Melospiza melodia samuelis</i>	--	CSC	Salt marshes of eastern and north San Francisco Bay.	Low. No suitable habitat present.
Double-crested cormorant <i>Phalacrocorax auritus</i>	--	WL, 3503.5	Coastal areas and inland lakes in fresh, saline, and estuarine waters.	Low. No suitable habitat present. Large nesting colonies are present at Lake Merced.
Cooper's hawk <i>Accipiter cooperii</i>	--	3503.5	Nests in riparian areas and oak woodlands, forages at woodland edges.	Moderate. Large trees including eucalyptus and Monterey cypress, could support nests for this species.
Sharp-shinned hawk <i>Accipiter striatus</i>	--	3503.5	Nests in riparian areas and oak woodlands, forages in open areas	Moderate. Large trees including eucalyptus and Monterey cypress, could support nests for this species.
Great horned owl <i>Bubo virginianus</i>	--	3503.5	Riparian, coniferous, chaparral and desert habitats.	Moderate. Large trees including eucalyptus and Monterey cypress, could support nests for this species.
Red-tailed hawk <i>Buteo jamaicensis</i>	--	3503.5	Found in nearly all habitats and elevations.	Moderate. Large trees including eucalyptus and Monterey cypress, could support nests for this species.
Red-shouldered hawk <i>Buteo lineatus</i>	--	3503.5	Riparian woodlands with swamps and emergent wetlands.	Moderate. Large trees including eucalyptus and Monterey cypress, could support nests for this species.
American kestrel <i>Falco sparverius</i>	--	3503.5	Frequents generally open grasslands, pastures, and fields; primarily a cavity nester.	Moderate. Large trees, including eucalyptus and Monterey cypress, and excavations in telephone poles could support nests for this species.

**TABLE 4.3-2 (Continued)
 SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
 UCSF 2014 LRDP AREA**

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Birds (cont.)				
Osprey <i>Pandion haliaetus</i>	--	3503.5	Habitat varies greatly and usually includes adequate supply of accessible fish, shallow waters, open and elevated nest sites (10-60 feet in height), and artificial structures such as towers. Builds large platform stick nests near or in open waters such as lakes, estuaries, bays, reservoirs, and within the surf zone.	Low. No suitable habitat is present.
Great blue heron <i>Ardea herodias</i>	--	3503.5	Shallow estuaries and fresh and saline emergent wetlands.	Low. No suitable habitat present.
Green heron <i>Butorides striatus</i>	--	3503.5	Valley foothill and desert riparian habitats; freshwater emergent wetlands, lacustrine and riverine areas.	Low. No suitable habitat present.
California quail <i>Callipepla californica</i>	--	3503.5	Shrub, scrub, brush, grasslands, open coniferous and deciduous habitats.	Moderate. Suitable habitat is present in the Mount Sutro Open Space Reserve.
Marsh wren <i>Cistothorus palustris</i>	--	3503.5	Creates a domed nest of grasses and sedges suspended in dense tulle vegetation. Forages in shrubs near marshes.	Low. No suitable habitat is present.
American goldfinch <i>Carduelis tristis</i>	--	3503.5	Cismontane foothills; riparian and cropland habitats.	Present. Suitable habitat is present.
Purple finch <i>Carpodacus purpureus</i>	--	3503.5	Coastal foothills and lowlands; riparian and coniferous habitats.	Present. Suitable habitat is present.
Olive-sided flycatcher <i>Contopus cooperi</i>	--	3503.5	Forest and woodland habitats.	Present. Suitable habitat is present.
Barn swallow <i>Hirundo rustica</i>	--	3503.5	Open areas from coastal grassland and shrubland to mixed coniferous forests.	Present. Suitable habitat is present.
Cliff swallow <i>Hirundo pyrrhonota</i>	--	3503.5	Open areas, grasslands or open forests; desert riparian areas.	Present. Suitable habitat is present.
Hooded oriole <i>Icterus cucullatus</i>	--	3503.5	Lower elevation riparian areas, palm oases, urban and cropland areas.	Present. Suitable habitat is present.
Red crossbill <i>Loxia curvirostra</i>	--	3503.5	Coniferous forests.	Present. Suitable habitat is present.
Red-breasted nuthatch <i>Sitta canadensis</i>	--	3503.5	Coniferous forests.	Present. Suitable habitat is present.
Pygmy nuthatch <i>Sitta pygmaea</i>	--	3503.5	Coniferous forests and pinyon-juniper habitats.	Present. Suitable habitat is present.
Bewick's wren <i>Thyromanes bewickii</i>	--	3503.5	Chaparral; also pinyon-juniper woodlands.	Present. Suitable habitat is present.
Barn owl <i>Tyto alba</i>	--	3503.5	Open areas including chaparral, grassland, riparian, wetlands.	Present. Suitable habitat is present.

TABLE 4.3-2 (Continued)
SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE UCSF 2014 LRDP AREA

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Birds (cont.)				
Orange-crowned warbler <i>Vermivora celata</i>	--	3503.5	Chaparral, coastal scrub, foothill riparian.	Present. Suitable habitat is present.
Wilson's warbler <i>Wilsonia pusilla</i>	--	3503.5	Foothill riparian areas, thickets.	Present. Suitable habitat is present.
Mammals				
Western red bat <i>Lasiurus blossevillii</i>	--	CSC	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	Moderate. Roosting habitat is available in tree/shrub foliage at Mount Sutro Open Space Reserve. Closest occurrence is within 0.5 mile of the Parnassus Heights campus site in Golden Gate Park. In 2009 surveys, this species was found in some San Francisco parks containing water bodies (Krauel, 2009) ¹² .
Pallid bat <i>Antrozous pallidus</i>	--	CSC	Prefers caves, crevices, hollow trees, or buildings in areas adjacent to open space for foraging. Associated with lower elevations in California.	Low. Suitable roosting habitat is available in buildings within the plan area. This species was not detected during 2009 surveys in San Francisco parks (Krauel, 2009). Not expected to breed here but may be present on a transient basis.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	--	CSC SC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings of rocky areas with caves or tunnels. Roosting sites limited. Extremely sensitive to human disturbance.	Low. Suitable roosting habitat is available in buildings within the plan area. This species was not detected during 2009 surveys in San Francisco parks (Krauel, 2009).
Yuma myotis <i>Myotis yumanensis</i>	--	--	Optimal habitats are open forests and woodlands with water sources to feed over. Roosts in buildings, trees, mines, caves, bridges, and rock crevices. Maternity colonies active May through July.	Low. Roosting habitat is available in tree/shrub foliage at Mount Sutro Open Space Reserve. In 2009 surveys, this species was found in some San Francisco parks containing water bodies (Krauel, 2009).
hoary bat <i>Lasiurus cinereus</i>	--	--	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Low. Roosting habitat is available in large-diameter trees at Mount Sutro Open Space Reserve, but this species was not detected during 2009 surveys in San Francisco parks (Krauel, 2009). May be present on a transient basis.

¹² Krauel, J.K., *Foraging Ecology of Bats in San Francisco*, M.S. Thesis, San Francisco State University. Available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2001.0016E, 2009.

**TABLE 4.3-2 (Continued)
 SPECIAL-STATUS ANIMAL SPECIES REPORTED OR WITH POTENTIAL TO OCCUR NEAR THE
 UCSF 2014 LRDP AREA**

Common Name Scientific Name	Federal Status	State Status	Habitat Description	Potential to Occur in the Action Area
Mammals (cont.)				
American badger <i>Taxidea taxus</i>	--	CSC	Open grasslands with loose, friable soils.	Low. No suitable habitat present.
Point Reyes jumping mouse <i>Zapus trinotatus orarius</i>	--	CSC	Upland areas of bunch grass in marshes in Point Reyes.	Low. Project site is south of the known range for this species.

NOTES:

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High = Species is expected to occur and habitat meets species requirements.

Moderate = Habitat is only marginally suitable or is suitable but not within species geographic range.

Low = Habitat does not meet species requirements as currently understood in the scientific community.

STATUS CODES:

Federal:

FE = Listed as "endangered" under the federal Endangered Species Act

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FSC = NOAA Fisheries designated "species of concern"

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3503.5 = Eggs, Nests, and Nestlings Protected under section 3503.5 of the California Department of Fish and Game Code

* = California special animal

SOURCE: USFWS (2014), CDFW (2014), CNPS (2014).

Special-Status Animals

Table 4.3-2 presents special-status wildlife species known to occur in the regional vicinity (i.e., the San Francisco North and San Francisco South quadrangles), and their potential to occur in the LRDP planning area. Of the special-status animals listed in Table 4.3-2, only species classified as having a moderate or high potential for occurrence in the 2014 LRDP planning area were considered in the impact analysis. Species addressed in detail include the following:

- Monarch butterfly
- Special-status birds
- Special-status bats

Aside from breeding birds, special-status wildlife species are not likely to occur within the LRDP campus sites, because most of these areas are highly fragmented and paved or dominated by non-native ornamental or ruderal species, which have poor habitat attributes for wildlife. However, monarch butterflies (*Danaus plexippus*) have been known to overwinter in eucalyptus groves of

San Francisco and the foliage-roosting western red bat has been documented in Golden Gate Park. These species are described in further detail below.

Monarch butterfly. This insect is a California special animal¹³ and the butterfly's overwintering sites are tracked by the CNDDDB because they are considered vulnerable in the State due to their restricted range (overwintering sites are primarily found only near the coast) and relatively rare distribution in California. This species migrates along the Pacific Coast, and often overwinters in wind-protected groves of trees, such as eucalyptus and Monterey cypress, between October and March. CNDDDB documents this species overwintering in the Presidio, Golden Gate Park, Fort Mason, and Telegraph Hill (CDFW, 2014). Parnassus Heights is the only UCSF campus site location with suitable habitat for overwintering monarch aggregations in the 2014 LRDP planning area, however there are no records of such activity within the Mount Sutro Open Space Reserve.

Migratory and special-status birds. Several common migratory birds and native birds could nest in or adjacent to the 2014 LRDP activities sites in trees, shrubs, and buildings. Several raptors are known to nest in San Francisco, including red-tailed hawk, red-shouldered hawk, American kestrel (*Falco sparverius*), Cooper's hawk and great horned owl (*Bubo virginianus*). The federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code protect raptors and most native migratory birds and breeding birds (see Section 4.3.2.1, below).

Special-status bats. Bat surveys conducted in natural areas and parks in San Francisco found that the three most commonly encountered species are Mexican free-tailed bat (*Tadarida brasiliensis*), Yuma myotis (*Lasiurus blossevillii*), and western red bat, a California species of concern (Krauel, 2009). Mexican free-tailed bats, which have no special status, are widespread and abundant throughout the natural areas of San Francisco, while Yuma myotis and western red bat appear to be relatively less abundant and are generally restricted to parks with lakes (Krauel, 2009). The western red bat and Yuma myotis may potentially occur in forest edge habitat of the Reserve on the Parnassus Heights campus site. Suitable roosting habitat for these bats includes tree foliage, underneath the exfoliating bark of trees, and in tree cavities. The western red bat has been known to roost in the Strybing Arboretum of Golden Gate Park within 0.5 mile of the Parnassus Heights campus site.

Designated Critical Habitat

The USFWS designates critical habitat for certain species listed by the agency as threatened or endangered. "Critical habitat" is defined in Section 3(5)(A) of the federal Endangered Species Act (ESA) as those lands within a listed species' current range that contain the physical or biological features considered essential to the species' conservation, as well as areas outside the species' current range that are determined to be essential to its conservation. However, activities under the 2014 LRDP are not located within designated critical habitat for any federally listed species.

¹³ Species listed on the current CDFW "special animals" list (January 2011), which includes 898 species. This list includes species that CDFW considers "those of greatest conservation need."

4.3.1.3 Wetlands and Other Waters of the United States

There are no wetlands or other waters of the state as defined by Section 404 of the federal Clean Water Act or by the Porter-Cologne Water Quality Control Act, Section 13260 of the California Water Code, within the 2014 LRDP planning area. The East Bowl Corridor on the eastern side of the Reserve and contiguous with the City-owned Interior Greenbelt contains Woodland Creek that may be subject to U.S. Army Corps of Engineers jurisdiction as other waters of the U.S. during storm events when the channel conveys storm water flows. Disturbance to the channel bed, bank or surrounding riparian vegetation would also be subject to CDFW jurisdiction and require a Lake or Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code. Proposed 2014 LRDP activities on the Parnassus Heights campus site would not occur within the vicinity of the channel, and therefore impacts on the channel are not considered further in this analysis.

4.3.2 Regulatory Considerations

This section briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they may apply to the proposed 2014 LRDP.

4.3.2.1 Special-Status Species

Federal Endangered Species Act

The federal ESA protects the fish and wildlife species, and their habitats that have been identified by the USFWS or National Marine Fisheries Service (NMFS) as threatened or endangered. The term “endangered” refers to species, subspecies, or distinct population segments that are in danger of extinction through all or a significant portion of their range. The term “threatened” refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

The ESA is administered by the USFWS and NMFS. In general, the NMFS is responsible for the protection of ESA-listed marine species and anadromous fishes, whereas listed, proposed, and candidate wildlife, plant species, and fish species are under USFWS jurisdiction. “Take”¹⁴ of listed species can be authorized through either the Section 7 consultation process (for actions by federal agencies) or the Section 10 permit process (for actions by non-federal agencies). Federal agency actions include activities located on federal land or that are conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits and licenses).

Under Section 7 of the ESA, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult the USFWS and/or NMFS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project “may affect” a listed species or designated

¹⁴ The federal ESA defines the term “take” as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”

critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, the USFWS issues a biological opinion determining whether (1) the proposed action may either jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or (2) will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

Critical Habitat

Under the ESA, the Secretary of the Interior (or the Secretary of Commerce, as appropriate) formally designates critical habitat for certain federally listed species and publishes these designations in the Federal Register. Critical habitat is not automatically designated for all federally listed species; so many listed species have no formally designated critical habitat.

Critical habitat is defined as the specific areas that are essential to the conservation of a federally listed species, and that may require special management consideration or protection. Critical habitat is determined using the best available scientific information about the physical and biological needs of the species. These needs, or primary constituent elements, include: space for individual and population growth and for normal behavior; food, water, light, air, minerals, or other nutritional or physiological needs; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitat that is protected from disturbance or is representative of the historical geographic and ecological distribution of a species. There is no federally designated critical habitat in the LRDP planning area.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code, Section 2070). The CDFW also maintains a list of “candidate species,” which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, the CDFW maintains lists of “species of special concern,” which serve as watch lists.

The CESA prohibits the take of plant and animal species designated by the Fish and Game Commission as either threatened or endangered in the State of California. “Take” in the context of the CESA means to hunt, pursue, kill, or capture a listed species, as well as any other actions that may result in adverse impacts when attempting to take individuals of a listed species. The take prohibitions also apply to candidates for listing under the CESA. However, Section 2081 of the CESA allows the CDFW to authorize exceptions to the state’s take prohibition for educational, scientific, or management purposes.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species could be present on the project area and determine whether the proposed project could have a potentially

significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that could affect a candidate species.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed the CDFW to carry out the legislature’s intent to “preserve, protect, and enhance endangered plants in this state.” The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded on the original NPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, three listing categories for plants are employed in California: rare, threatened, and endangered.

Special-Status Natural Communities

Special-status natural communities are identified as such by the CDFW’s Natural Heritage Division and include those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The CNDDDB tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site in terms of its location, extent, habitat quality, level of disturbance, and current protection measures. The CDFW is mandated to seek the long-term perpetuation of the areas in which these communities occur. While there is no statewide law that requires protection of all special-status natural communities, CEQA requires consideration of the potential impacts of a project on biological resources of statewide or regional significance.

Federal Migratory Bird Treaty Act

The federal MBTA (United States Code, Title 16, Section 703, Supplement I, 1989) prohibits taking, killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. *Take* is defined in the federal Endangered Species Act as “. . .harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species.” Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction). Therefore, for projects that would not result in the direct mortality of birds, the MBTA is generally also interpreted in CEQA analyses as protecting active nests of all species of birds that are included in the “List of Migratory Birds” published in the Federal Register in 1995. With respect to nesting birds, while the MBTA itself does not provide specific take avoidance measures, a set of measures sufficient to demonstrate take avoidance have been developed over time by USFWS and CDFW. Since these measures are typically required as permitting conditions by these agencies, they are often incorporated as mitigation measures for projects during the environmental review process, unless the project as proposed incorporates and is consistent with these protections. These requirements include preconstruction nesting bird surveys and establishment of appropriate buffers from construction if active nests are found.

California Fish and Game Code

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code or any regulation made pursuant thereto. Section 3503.5 of the code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Code Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) allow the designation of a species as fully protected. This is a greater level of protection than is afforded by CESA. Except for take related to scientific research, all take of fully protected species is prohibited.

Wetlands and Other Waters of the United States

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. The federal government defines and regulates wetlands and other waters in Section 404 of the Clean Water Act as “areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[b] and 40 CFR 230.3).

Under normal circumstances, the federal definition of wetlands requires the presence of three identification parameters: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to other waters of the United States. Other waters of the U.S. include unvegetated waters of streams, lakes and ponds.

The Porter-Cologne Water Quality Control Act Section 13260 of the California Water Code requires “any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements).” Under the Porter-Cologne Water Quality Control Act definition, the term “waters of the state” is defined as “any surface water or groundwater, including saline waters, within the boundaries of the state.” Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—in California, waters of the United States represent a subset of waters of the state. Therefore, the State of California through each of nine Regional Water Quality Control Boards retains authority to regulate discharges of waste into any waters of the state, regardless of whether the U.S. Army Corps of Engineers has concurrent jurisdiction under Clean Water Act Section 404.

4.3.2.2 Applicable Local Plans and Policies

This section discusses plans or policies developed by UCSF pertaining to biological resources. UCSF is not subject to local land use regulation whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be generally consistent with applicable local regulations to the extent feasible. UCSF and City plans and regulations that are relevant to the biological resources impacts analysis are summarized below.

UCSF Mount Sutro Open Space Reserve Management Plan

During the development of the 1996 UCSF LRDP, the UCSF Community Advisory Group advised that the plan include recommendations for a maintenance and restoration program for the Mount Sutro Open Space Reserve's vegetation and hiking trails. This management plan was developed in 2001 to provide a framework for protecting, enhancing, and restoring the Reserve while maintaining a balance between neighborhood and University interests. Seven planning principles inform the management plan and are listed, below.

- Ensure Public Safety and Property Protection
- Improve the Health of the Forest
- Protect and Expand Native Plants
- Enhance Wildlife Habitat Values
- Maintain Scenic Quality
- Improve Public Access
- Implement Resource Management Plan

The 2001 Management Plan continues to serve as a guide for maintenance and restoration of the Reserve. In recognition of the need to maintain ongoing dialogue with the community regarding the management of the Reserve, UCSF initiated a new round of community meetings in 2009 - 2010. The process resulted in identifying demonstration project areas and specific management actions for those demonstration areas. Proposed management activities at that time included thinning the forest, native plant restoration and enhancement, conversion planting (removal of non-native trees and plants and conversion to native species) in select areas and construction of new trails. A UCSF Mount Sutro Management Draft Environmental Impact Report that analyzed the proposed management activities was prepared and published in January, 2013. Based on feedback on those proposed activities, and in light of the elevated fire danger resulting from California's periodic drought conditions, UCSF retained a professional forester to help develop a plan for the Reserve that focused on reducing the danger of wildfire. Proposed hazard reduction measures, consistent with best management practices applied throughout California in forests located near urban areas, were developed and presented to the community in November, 2013. As of this writing, UCSF is carefully considering the public feedback received to date—responding to both previous forest management proposals and to the proposed fire hazard reduction measures presented in November, 2013—to determine the best path forward. Proposed trails are now being analyzed as part of proposed activities under the 2014 LRDP and are described in this EIR in Section 3.8.1.

San Francisco Public Works Code

The San Francisco's Urban Forestry Ordinance (Article 16 of the Public Works Code) protects San Francisco's street trees, significant trees, and landmark trees regardless of species. The ordinance protects the following three categories of trees, which are defined as follows:

A **street tree** is "any tree growing within the public right-of-way, including unimproved public streets and sidewalks, and any tree growing on land under the jurisdiction of the Department [of Public Works]" as defined in Section 802 of the ordinance. Section 806b

requires entities (other than the Department of Public Works) to obtain a permit from the department prior to removing any street trees.

A **significant tree** is defined in Section 810A of the ordinance as any tree: (1) located on property under the jurisdiction of the Department of Public Works or on privately owned property with any portion of its trunk within 10 feet of the public right-of-way, and (2) that satisfies at least one of the following criteria: (a) a diameter at breast height in excess of 12 inches, (b) a height in excess of 20 feet, or (c) a canopy in excess of 15 feet. Any entity other than the Department of Public Works must obtain a permit to remove significant trees according to the process described in Section 806b.

A **landmark tree** is any tree that: (1) has been nominated as such by a member of the public, a landowner, the San Francisco Planning Commission, the Board of Supervisors, or the Historic Preservation Commission, (2) the Urban Forestry Council (within the San Francisco Department of the Environment) has subsequently recommended as a landmark tree, and (3) is designated a landmark tree by ordinance approved by the Board of Supervisors. According to Section 810 of the ordinance, nominated trees undergoing review are protected according to the same standards as designated landmark trees until the review process is completed.

Permits are required for planting or removing street trees and significant trees, and protection measures are required for these trees if construction work would occur within the trees' dripline. Activities under the 2014 LRDP are not anticipated to affect protected trees.

Standards for Bird-Safe Buildings

The San Francisco Planning Department adopted *Standards for Bird-Safe Buildings* in 2011, adding Planning Code Section 139 (San Francisco Planning Department, 2011). These standards guide the use and types of glass and façade treatments, wind generators and grates, and lighting treatments. The standards impose requirements for bird-safe glazing and lighting in structures or at sites that represent a hazard to birds and provide information on educational and voluntary programs related to bird hazards. The standards define two types of bird hazards. "Location-related hazards" are buildings located inside of, or within a clear flight path of less than 300 feet from, an Urban Bird Refuge.¹⁵ Such buildings require treatment when new buildings are constructed; additions are made to existing buildings; or existing buildings replace 50 percent or more of the glazing within the "bird collision zone."¹⁶ The standards require implementation of the following treatments for façades facing, or located within, an Urban Bird Refuge:

- No more than 10 percent untreated glazing is allowed on building façades within the bird collision zone.
- Lighting must be shielded, and no uplighting is permitted. No event searchlights are permitted.

¹⁵ An Urban Bird Refuge is defined in the Standards for Bird-Safe Buildings as: any area of open space two acres or larger that is dominated by vegetation, including vegetated landscaping, forest, meadows, grassland, water features, or wetlands; open water; and some green rooftops.

¹⁶ The "bird collision zone" is that portion of the building that begins at grade and extends upward for 60 feet.

- Sites are not permitted to use horizontal access windmills or vertical access wind generators that do not appear solid.

“Feature-related hazards” include building- or structure-related features that are considered potential “bird traps” regardless of location (e.g., glass courtyards, transparent building corners, or clear glass walls on rooftops or balconies). Structures that include these elements must treat 100 percent of these elements in the building with bird safe glazing.

Pursuant to the University of California’s constitutional autonomy, development and uses on property owned or leased by the University that are in furtherance of the University’s educational purposes are not subject to local land use regulation, including City of San Francisco General Plan policies regarding protection of biological resources. 2014 LRDP activities would not be subject to the above standards, although UCSF could voluntarily consider such policies in the design of campus buildings.

4.3.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- 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 Wildlife or U.S. Fish and Wildlife Service?
- 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 Wildlife or U.S. Fish and Wildlife Service?
- 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?
- 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?
- e) Conflict with any applicable policies protecting biological resources?
- f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan?
- g) Exceed the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance?

After evaluation of the activities proposed by the 2014 LRDP, the Initial Study concluded that all LRDP proposals would clearly result in no impact or a less-than-significant impact at the Mission Bay, Mount Zion and Mission Center campus sites. At the Parnassus Heights campus site the Initial Study concluded that all LRDP proposals would result in no impact or a less-than-significant impact, with the exception of criteria a) and d).

For the purposes of this EIR, the word “substantial” as used in the significance criteria above is defined by the following three principal components:

- Magnitude and duration of the impact (e.g., substantial/not substantial)
- Uniqueness of the affected resource (rarity)
- Susceptibility of the affected resource to disturbance

4.3.4 Analysis Methodology

Impacts on biological resources are evaluated based on the likelihood that special-status species, sensitive habitats, wildlife corridors, and protected trees are present within the 2014 LRDP planning area (as described in Section 4.7.1, *Setting*), and the likely effects that activities under the 2014 LRDP including construction, operation, and maintenance might have on these resources. Special-status resources that have no or low potential to occur in the 2014 LRDP planning area (as presented in Tables 4.7-1 and 4.7-2) are not considered in the impact analysis.

4.3.5 References

- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDDB) species occurrences for the *San Francisco North* and *San Francisco South* U.S. Geographical Survey (USGS) 7.5-minute topographic quadrangles, Commercial Version, accessed February 2014.
- California Native Plant Society (CNPS), Inventory of Rare and Endangered Plants for *San Francisco North* and *San Francisco South* USGS 7.5-minute topographic quadrangles. Available online at <http://www.rareplants.cnps.org/>. Accessed July, 2013.
- Krauel, J.K., *Foraging Ecology of Bats in San Francisco*, M.S. Thesis, San Francisco State University. Available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2001.0016E, 2009.
- Mayer, K.E. and W.F. Laundenslayer, eds., *A Guide to Wildlife Habitats of California*, California Department of Fish and Wildlife, Sacramento, CA, 1988.
- University of California San Francisco (UCSF), *UCSF Long Range Development Plan Final EIR*, City of San Francisco, prepared by EIP Associates, January 1997.
- UCSFa, *Draft EIR for the UCSF Mount Sutro Management Project*, City of San Francisco, prepared by UCSF Financial and Administrative Services Planning, January 2013.
- UCSFb, *UCSF 2014 Long Range Development Plan Initial Study*. City of San Francisco, prepared by Environmental Science Associates (ESA), September 2013.
- United States Fish and Wildlife Service (USFWS), Federally Endangered and Threatened Species List for the *San Francisco North* and *San Francisco South* USGS 7.5-minute topographic quadrangles, February 2014.

4.4 Cultural Resources

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Cultural Resources impacts. 2014 LRDP Cultural Resources effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*. Cultural Resources effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.4.1 Regional Setting

The prehistoric (2500 BC to 1500 AD) occupation and use of the San Francisco Bay Area is complex, and understanding it is complicated by the rapid development of the Bay Area during the California Gold Rush that likely contributed to the destruction of many archaeological sites that may have existed or rendered those sites inaccessible due to surface cover. On the basis of archaeological data from Bay Area sites that have survived to the present and from ethnographic sources, archaeologists know that prehistoric life-ways in the Bay Area involved subsistence hunting and gathering. Seasonally, parties went out from villages to temporary camps within their territory to hunt and gather mussels, shellfish, salmon, seals, land mammals, and plant foods, typically acorns. Protohistoric (1550s to 1770s) and historic (1770s to present-day) land uses by native peoples is better understood, but still complicated by displacement of the native peoples, and European American development of the region.

“Costanoan” is a term originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that references to a larger language family spoken by distinct sociopolitical groups that spoke at least eight languages (as different as Spanish is from French) of the same Penutian language group. This group refers to themselves as “Ohlone.” While traditional anthropological literature portrayed the Ohlone peoples as having a static culture, today it is better understood that many variations of culture and ideology existed within and between villages. Static descriptions of separations between native cultures of California made it an easier task for ethnographers to describe past behaviors, but this masks Native adaptability and self-identity. California’s Native Americans never saw themselves as members of larger “cultural groups,” as described by anthropologists. Instead, they saw themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. All of UCSF’s existing sites are within Ohlone territory.

Initial European exploration of the San Francisco peninsula began in 1769 and lasted until 1810. During this period, a number of Spanish expeditions penetrated the territory occupied by the Ohlone peoples. Between 1769 and 1776, forays led by Portola, Ortega, Fages, Fages and Crespi,

Anza (two expeditions), Rivera, and Moraga were carried out. Favorable reports led to the founding of seven missions in the region between 1770 and 1797.

In the spring of 1776, the site of San Francisco was chosen by Juan Batista Anza for the establishment of a mission and military post. Later that same year, the Mission San Francisco de Asís (also known as Mission Dolores) and Presidio de San Francisco were officially dedicated and Jose Joaquin Moraga (Anza's lieutenant) took formal possession in the name of King Carlos III.

The Spanish annexation and colonization of Alta California, as manifested in the religious-military mission system, produced profound changes in the cultures of the indigenous population. The missions resettled and concentrated the aboriginal hunter-gatherer population into agricultural communities. The concentration of population, coupled with the indigenous people's lack of immunity to European diseases, caused the tribes to be decimated by common diseases which were generally not fatal to Europeans. It has been estimated that the Ohlone population declined from 10,000 or more in 1770 to less than 2,000 in 1832. Today, the Ohlone still have a strong presence in the San Francisco Bay Area, and are highly interested in their historic and prehistoric past.

Mexico established jurisdiction over Alta California in April of 1822. During the Mexican Period (1822–1848), control over this remote area by the central and local Mexican authorities was never strong. California became part of the United States as a consequence of the U.S. victory over Mexico in the Mexican War. The territory was formally ceded in the treaty of Guadalupe Hidalgo in 1848, and was admitted as a state in 1850.

Prior to the discovery of gold at Sutter's Mill on January 24, 1848, development in San Francisco consisted of the Spanish/Mexican facilities (i.e., the Presidio and Mission) and a small settlement known as Yerba Buena situated on the shores of the cove by the same name. The inhabitants of Yerba Buena were predominantly non-Spanish, English-speaking immigrants (e.g., U.S. or British citizens). Sometime before the Gold Rush, the inhabitants of Yerba Buena officially changed the name of their settlement to San Francisco. Following the discovery of gold, San Francisco transformed quickly from an isolated hamlet into a bustling center of commerce. After the discovery of gold, the population of San Francisco grew from 375 people in 1847 to 2,000 by February 1849, and by the end of 1849, there may have been as many as 20,000 people living in the City (CCSF, 2011).

Silver discoveries, including the Comstock Lode in 1859, further drove rapid population growth. Entrepreneurs sought to capitalize on the wealth generated by the Gold Rush by founding Wells Fargo in 1852 and the Bank of California in 1864. Development of the Port of San Francisco and the establishment in 1869 of overland access to the Eastern U.S. rail system via the newly completed Pacific Railroad helped make San Francisco and the Bay Area a center for trade. The first cable cars carried San Franciscans up Clay Street in 1873. As rows of Victorian houses began to take shape throughout the city, civic leaders campaigned for a spacious public park, resulting in plans for Golden Gate Park. San Franciscans built schools, churches, theaters, and all the hallmarks of civic life. The Presidio developed into the most important American military

installation on the Pacific coast. By 1890, San Francisco's population approached 300,000, making it the eighth largest city in the U.S. at the time.

The great earthquake and fire of 1906 destroyed nearly all of downtown San Francisco, killed approximately 3,000 people, and left more than half of the city's population of 400,000 homeless. Refugees settled temporarily in makeshift tent villages in Golden Gate Park, the Presidio, on the beaches, and elsewhere. Many fled permanently to the East Bay. Rebuilding after the earthquake was rapid and by the time the city hosted the Panama-Pacific International Exposition in 1915, the city had been reborn. Development of the western portions of San Francisco accelerated during this period, with the establishment of the Western Addition, the Ingleside, Richmond, and Sunset Districts.

It was also during this period San Francisco built some of its most important infrastructure. Civil Engineer Michael O'Shaughnessy was hired by San Francisco Mayor James Rolph as chief engineer for the city in September 1912 to supervise the construction of the Twin Peaks Reservoir, the Stockton Street Tunnel, the Twin Peaks Tunnel, the San Francisco Municipal Railway, the Auxiliary Water Supply System, and new sewers. San Francisco's streetcar system, of which the J, K, L, M, and N lines survive today, was pushed to completion by O'Shaughnessy between 1915 and 1927. It was the O'Shaughnessy Dam, Hetch Hetchy Reservoir, and Hetch Hetchy Aqueduct that would have the largest effect on San Francisco. An abundant water supply enabled San Francisco to develop into the city it has become today.

San Francisco also undertook two great civil engineering projects, simultaneously constructing the San Francisco – Oakland Bay Bridge and the Golden Gate Bridge, completing them in 1936 and 1937 respectively.

During World War II, the Hunters Point Naval Shipyard became a hub of activity, and Fort Mason became the primary port of embarkation for service members shipping out to the Pacific Theater of Operations. The explosion of jobs drew many people to the area, especially African Americans from the South. After the end of the war, many military personnel returning from service abroad and civilians who had originally come to work decided to stay. Numerous physical and demographic changes occurred to San Francisco after the war to accommodate the huge post-war population increase. Today, the city has a population of over 800,000 people.

With thousands of buildings and structures in San Francisco, some of which date to the earliest days of the Mission Period and the Gold Rush, there are numerous historic sites and districts which convey the city's historic significance as the West Coast's preeminent city. Currently, San Francisco contains approximately 175 properties listed in the National Register of Historic Places, well over a thousand buildings and structures listed in or eligible for listing in the California Register of Historical Resources, approximately 50 California State Historical Landmarks, approximately 260 locally-designated historical landmarks, and 11 locally-designated historic districts (NoeHill, 2014).

4.4.1.1 University of California, San Francisco

One of the world's leading health sciences universities, the University of California, San Francisco (UCSF), dates its founding to 1864, when South Carolina surgeon Hugh Toland founded a private medical school in San Francisco.

The college prospered, and Toland sought to affiliate with the University of California, which had opened its campus in Berkeley in 1868. UC President Daniel Coit Gilman, who strongly supported science education, set a precedent for the young university by affiliating in 1873 with both Toland Medical College and the California College of Pharmacy. Eight years later, the UC Regents added a dental college.

The three Affiliated Colleges — also called UC departments — were located at various sites in San Francisco, and after several years there was strong interest in bringing them together. San Francisco Mayor Adolph Sutro donated 13 acres on a site overlooking Golden Gate Park — known today as Parnassus Heights — and the new Affiliated Colleges buildings opened in fall 1898.

When the great San Francisco earthquake destroyed much of San Francisco and the city's medical facilities in April 1906, more than 40,000 people took shelter and sought treatment in a tent city in Golden Gate Park, where makeshift outdoor hospitals were set up. The Affiliated Colleges, located on the hill above the encampment in what was then the far western section of the city, suddenly were situated close to a significant population. Faculty sprung into action treating those injured from the earthquake and subsequent fire.

One of the Affiliated Colleges buildings at Parnassus Heights was renovated as a facility for inpatients, outpatients and dental services, and opened in April 1907 with 75 beds.

With this new facility came the need to recruit nurses and the opportunity to train nursing students. In 1907, the UC Training School for Nurses was established, adding a fourth professional school to the Affiliated Colleges. To make room for expanded clinical services and instruction on Parnassus, the medical college basic science departments — pathology, anatomy and physiology — moved to the Berkeley campus.

Over the next 50 years, leaders of the Affiliated Colleges and UC moved forward with an eye to establishing an institution with a national reputation. They improved the curriculum, upgraded admission requirements, expanded research and clinical programs, and built new facilities.

In 1964, the institution, operating under the name University of California, San Francisco Medical Center, was given full administrative independence, becoming the ninth campus in the UC system and the only one devoted exclusively to the health sciences (UCSF, 2014).

4.4.2 Regulatory Considerations

4.4.2.1 Federal

The National Register of Historic Places (National Register) is the official U.S. government list of properties that have architectural, historical, or cultural significance at the national, state, or local level. The National Register is administered by the National Park Service, an agency of the U.S. Department of the Interior. The National Register lists sites, buildings, structures, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the local, regional, state, or national level. Listing of a property in the National Register does not prohibit demolition or alteration of that property, but does denote that the property is a resource worthy of recognition and protection. The National Register includes four criteria under which a structure, site, building, district, or object can be considered significant for listing. These include:

- **Criterion A (Event):** Resources that are associated with events that have made a significant contribution to the broad patterns of our history
- **Criterion B (Person):** Resources that are associated with the lives of persons significant in our past
- **Criterion C (Design/Construction):** Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master
- **Criterion D (Information Potential):** Resources that have yielded, or may be likely to yield, information important in prehistory or history

4.4.2.2 State

The Office of Historic Preservation (OHP) maintains the California Register of Historical Resources (California Register). The California Register includes properties that are listed or are formally determined eligible for listing in the National Register of Historic Places; State Historical Landmarks; and eligible Points of Historical Interest. Other resources that may be eligible for the California Register, and which require nomination and approval for listing by the State Historic Resources Commission, include resources contributing to the significance of a local historic district, individual historical resources, historical resources identified in historic resources surveys conducted in accordance with OHP procedures, historic resources or districts designated under a local ordinance consistent with the procedures of the State Historic Resources Commission, and local landmarks or historic properties designated under local ordinance. Under CEQA, a cultural resource is considered significant if it is at least 45 years old and meets any of the criteria described below:

- **Criterion A:** Resources that are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
- **Criterion B:** Resources that are associated with the lives of persons important in our past
- **Criterion C:** Resources that embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possess high artistic values

- **Criterion D:** Resources that have yielded or may be likely to yield information important in prehistory or history

The fact that a resource is not listed in, or determined to be eligible for listing the California Register, not included in a local register of historic resources, or identified in a historical resources survey does not preclude a lead agency from determining that the resources may be an historical resource (CEQA Guidelines Section 15064.5(a)(4)).

The OHP maintains the Historical Resources Information System (formerly known as the California Archaeological Inventory) through 11 information centers throughout the state. The Northwest Information Center (NIC), which includes San Francisco County within its jurisdiction, is a repository for archaeological site records and other information on cultural resources, including the National Register and the California Inventory of Historical Resources and Points of Historic Interest lists. Upon request, the NIC conducts searches of its records to determine whether any cultural resources are known to exist in or near the subject property.

4.4.2.3 Local

Article 10 of the San Francisco Planning Code contains measures to identify structures or landmarks that have historical, architectural, or aesthetic merit. These structures are recorded in a list that is approved by the San Francisco Historic Preservation Commission and the San Francisco Board of Supervisors, and includes all structures on federal and state lists. Applications to construct, alter, or demolish structures that have been deemed to have significant merit require approval by the Historic Preservation Commission and in the case of applications involving multiple approvals such as a conditional use authorization, the Planning Commission before issuance of a permit.

The San Francisco General Plan contains policies governing the preservation of historic architectural resources that are considered to be locally significant. The General Plan Urban Design Element addresses: (1) preservation of landmarks designated by the City; (2) enhancement of the original character of older buildings when remodeling; and (3) respecting the character of older nearby development in the design of new buildings.

4.4.3 Significance Standards

This EIR assesses environmental impacts based on the significance criteria contained in Appendix G of the CEQA Guidelines as well as from the criteria in the University of California CEQA Handbook, including LRDP or Program EIR criteria to incorporate local and regional standards. For purposes of this EIR, the 2014 LRDP would have a significant effect on the environment if it would exceed the criteria listed below:

- a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?
- b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

- c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
- d) Disturb any human remains, including those interred outside of formal cemeteries?

The significance standards for the first two impact criteria are further explained and defined below. CEQA Guidelines Section 15064.5(b)(1) defines a significant effect as one that would materially impair the significance of a historical resource. According to CEQA Guidelines Section 15064.5(b)(2), material impairment of a resource's historic significance could result if the project would:

- Demolish or materially alter in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources;
- Demolish or materially alter in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to local ordinance or resolution (PRC Section 5020.1[k]), or its identification in a historical resources survey meeting the requirements of PRC Section 5024.1(g) unless a preponderance of evidence establishes that the resource is not historically or culturally significant; or
- Demolish or materially alter in an adverse manner those physical characteristics of a resource that convey its historical significance and that justify its eligibility for its inclusion in the California Register, as determined by the lead agency. Generally, a project that follows the Secretary of the Interior's guidelines will be considered mitigated to a less than significant level, according to CEQA Guidelines Section 15064.5(b)(3).

Generally, a project that follows the Secretary of the Interior's guidelines will be considered mitigated to a less than significant level, according to CEQA Guidelines Section 15064.5(b)(3).

CEQA Guidelines Section 15064.5(c) applies to effects on archaeological sites. Effects on non-unique archaeological resources are not considered significant. Regarding unique archaeological resources, lead agencies may require that reasonable efforts be made to permit such resources to be preserved in place or left in an undisturbed state. To the extent that unique archaeological resources are not preserved in place or not left undisturbed, mitigation measures to protect such resources are required (PRC Section 21083.2 [c]). Additionally, mitigation measures may be imposed to make provisions for archaeological sites accidentally discovered during construction. Generally, with the imposition of mitigation measures, effects on archaeological resources would be reduced to an insignificant level.

4.4.4 Analysis Methodology

The UCSF campus sites have undergone cultural resources analyses in the form of archival research by qualified archaeologists and architectural historians. The historic architectural resource analysis was completed by qualified architectural historians who visited the four affected UCSF campus sites in this EIR to take photographs and review historical documentation on the buildings and structures (including previous environmental reviews), and complete archival

research. The information gathered was used to evaluate whether impacts would occur to historic or cultural resources due to the proposed 2014 LRDP activities. For each potential impact, the analysis compares the net impact to the standards of significance and determines the impact's level of significance under CEQA. If the impact would be significant, the analysis identifies feasible mitigation measures that would eliminate the impact or reduce it to a less-than-significant level. If the impact cannot be reduced to a less-than-significant level after implementation of feasible mitigation measures, then the impact would remain significant and unavoidable.

4.4.5 References

City and County of San Francisco (CCSF), *34th America's Cup Draft EIR*, 2011.

NoeHill.com, www.noehill.com, accessed January 22, 2014.

UCSF, UCSF History, www.ucsf.edu/about/history-1, accessed January 28, 2014.

4.5 Geology, Soils and Seismicity

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Geology, Soils and Seismicity impacts. 2014 LRDP Geology, Soils and Seismicity effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*. Geology, Soils and Seismicity effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.5.1 Regional Setting

The LRDP planning area is located on the northern tip of the San Francisco Peninsula, within the Coast Ranges geologic province. The Coast Ranges is a northwest-trending series of mountain ranges and valleys that was created through tectonic forces associated with the plate margin. San Francisco Bay, which was formed within a shallow, regional structural depression, is the predominant feature, separating smaller northern and southern mountain ranges. Much of the Coast Range province is composed of marine sedimentary and volcanic rocks that form the Franciscan Complex, located east of the San Andreas Fault. The general geologic setting of the city is characterized by bedrock hills bounded by broad valleys and underlain by unconsolidated deposits. The Franciscan Complex generally consists of graywacke (sandstone), shale, chert, greenstone, and melange; in certain places, serpentinite, an asbestos-containing rock-type, is found within the shale matrix. Bedrock outcrops in hilly areas account for approximately 24% of the land surface in San Francisco. The region west of the San Andreas Fault is underlain by a mass of basement rock known as the “Salinian Block.” This block contains igneous rocks,¹⁷ Tertiary-age (up to 65 million years old) marine sandstone, and various metamorphic rocks¹⁸ believed to have originated some 350 miles to the south. The Salinian Block has been moving northward along the west side of the San Andreas Fault.

4.5.1.1 Local Soils

Soils at the Parnassus Heights, Mission Bay, Mount Zion and Mission Center campus sites vary among the sites but very generally include a combination of fill, silty clays, clays, sands, and loams with the upland soils tending to be shallower and richer in clay (Helley and Lajoie, 1979). For example, soils at the Mission Center site were characterized as 13 to 20 feet of artificial fill underlain by 20 to 50 feet of soft Bay Mud materials (Shannon & Wilson, 1970). Soils at the Mission Bay campus contain varying thicknesses of artificial fill and bay mud (Harding ESE, 2001). The Parnassus campus soils, similar to the soils at Mount Zion are in general shallower and also include dune sand deposits (Rutherford & Chekene, 2006). Fill material is variable in its soil properties and especially within the Mission Bay campus which includes rubble from the 1906 earthquake.

¹⁷ Igneous rocks are those that form from molten magma, such as granite.

¹⁸ Metamorphic rocks are sedimentary or volcanic rocks altered by prolonged heating and deformation.

4.5.1.2 Geologic Hazards

Expansive Soils

Expansive soils possess a “shrink-swell” behavior. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage may occur over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Expansive soils occur in the upper 5 feet of undisturbed soil. Campus sites that have undergone development have reworked or removed any expansive soils that were previously present. Similarly, development of large structures proposed under the 2014 LRDP would necessarily require that any shallow expansive soils be reworked or removed during excavation, grading, and construction. Furthermore, previous geotechnical investigations did not identify expansive soils as a geologic hazard for the Mission Bay, Parnassus Heights or Mount Zion campus sites.

Soil Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of waves, wind, and underground water. Soils containing high amounts of silt or clay can be easily erodible, while sandy soils are less susceptible. Excessive soil erosion can eventually damage building foundations and roadways. In developed urban areas, erosion potential is highest during construction and typically reduced once the soil is graded and covered with concrete, structures, asphalt or well established landscaping. Vegetated areas in non-developed areas such as the Mt. Sutro Open Space Reserve can be made more susceptible to erosion through the creation of trails.

Differential Settlement

Loose, soft soils composed of sand, silt, and clay have the potential, if not properly engineered, to settle after a building or other load is placed on the surface. Differential settlement of the loose soils generally occurs slowly, but over time may amount to more than most structures can tolerate. The weak and compressible nature of the underlying soils and the unpredictable performance of artificial fill provide poor support for structure and infrastructure. Differential settlement can damage buildings and their foundations, roads, and rail lines and result in breakage of underground pipes.

Landslide Hazards

The susceptibility of land (slope) failure is dependent on the slope and geology as well as the amount of rainfall, excavation, or seismic activities. A landslide is a mass of rock, soil, and debris displaced down-slope by sliding, flowing, or falling. In San Francisco, a major earthquake could cause movement of active slides or could trigger new slides in the same general areas of previous slides. This potential exists only at the Parnassus Heights campus site, which is located on steep hills underlain by Franciscan rocks, a type of rock that is susceptible to landslides. However, according to a previous geotechnical investigation, the deposits at the Parnassus Heights campus

site are from the Merced and Colma Formations, which consist of unconsolidated sand, silt, and clay. These soils have fair to good stability under seismic conditions (URS Consultants, 1974). More recently, a slope stability assessment conducted in 2006 provided a qualitative assessment of the slope stability potential of upland deposits on Mt. Sutro showing some isolated areas of instability.

4.5.1.3 Regional Faults

The San Francisco Bay Area contains both active and potentially active faults and is considered a region of high seismic activity (**Table 4.5-1** and **Figure 4.5-1**).¹⁹ The USGS Working Group on California Earthquake Probabilities determined that there is a 63% likelihood of one or more earthquakes of Richter magnitude (M) 6.7 or higher in the San Francisco Bay Area between now and 2037 (USGS, 2008). While the Richter magnitude is a measure of the energy released in an earthquake, intensity is a measure of the ground-shaking effects at a particular location. The estimated maximum moment magnitudes²⁰ shown in Table 4.5-1 represent *characteristic* earthquakes on particular faults. Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking.

The Modified Mercalli (MM) intensity scale (**Table 4.5-2**) is commonly used to measure earthquake effects due to ground shaking. The Modified Mercalli values for intensity range from MM-I (earthquake not felt) to MM-XII (damage nearly total); intensities ranging from MM-IV to X could cause moderate to significant structural damage.²¹ In the City and County of San Francisco, maximum ground-shaking intensity resulting from an earthquake generated on the San Andreas fault, discussed below, is anticipated to range between strong (MM-VII) to violent (MM-IX), depending upon specific location. A small southwest portion of the county could experience very violent (MM-X) ground-shaking intensities (ABAG, 2003a).

San Andreas

The San Andreas Fault Zone is a major structural feature in the region and forms a boundary between the North American and Pacific tectonic plates, extending from the Salton Sea in Southern California near the border with Mexico to north of Point Arena, where the fault trace

¹⁹ An “active” fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A “potentially active” fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. “Sufficiently active” is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 2007).

²⁰ Moment magnitude is related to the physical size of a fault rupture and movement across a fault. The Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a meaningful physical measure of the size of a faulting event. The concept of “characteristic” earthquake means that we can anticipate, with reasonable certainty, the actual earthquake that can occur on a fault.

²¹ The damage level represents the estimated overall level that will occur for various MM intensity levels. However, the damage will not be uniform. Some buildings will experience substantially more damage, and others will experience substantially less damage. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance.

**TABLE 4.5-1
 ACTIVE FAULTS IN THE VICINITY OF SAN FRANCISCO**

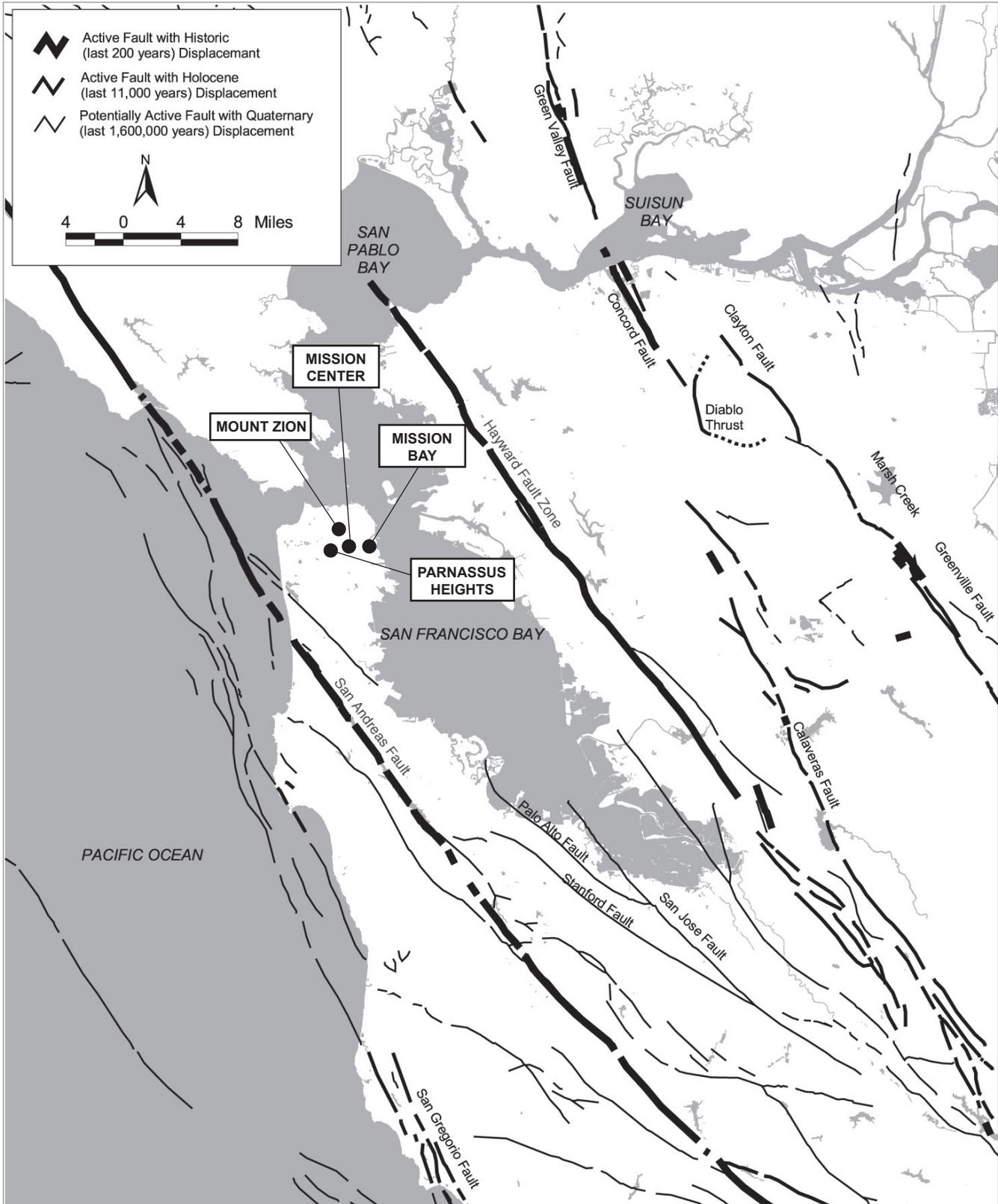
Fault	Distance and Direction from San Francisco County^a	Recency of Movement	Fault Classification^b	Historical Seismicity, Richter Magnitude^c	Maximum Moment^d Magnitude Earthquake
San Andreas	<1 mile west	Historic (1906; 1989 ruptures) Holocene	Active	M 7.1, 1989 M 8.25, 1906 M 7.0, 1838 Many <M 6	7.9
Hayward	10 miles east	Historic (1836; 1868 ruptures) Holocene	Active	M 6.8, 1868 Many <M 4.5	7.1
San Gregorio–Hosgri	12 miles southwest	Holocene – Late Quaternary	Active	Many M 3–M 6.4	7.3
Rodgers Creek	25 miles northeast	Historic Holocene	Active	M 6.7, 1898 M 5.6, M 5.7, 1969	7.0
Calaveras	25 miles east	Historic (1861 rupture) Holocene	Active	M 5.6–M 6.4, 1861 M 4–M 4.5 swarms 1970, 1990	6.8
Concord–Green Valley	25 miles east	Historic (1955) Holocene	Active	Historic active creep	6.9

^a Fault distance is referenced from the fault's closest point to the county of San Francisco (excluding Treasure Island). Actual fault distance from specific project locations may therefore vary from those listed.
^b Refer to footnote 3 of this section, previous.
^c Richter magnitude (M) and year for recent and/or large events. The Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.
^d Refer to footnote 4, previous, for a definition of moment magnitude. The maximum moment magnitude earthquake, derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. CGS OFR 96-08 and USGS OFR 96-706).

SOURCES: Hart (2007); Jennings (2010); and Peterson et al. (1996)

extends out into the Pacific Ocean. The main trace of the San Andreas fault through the Bay Area trends northwest through the Santa Cruz Mountains and the eastern side of the San Francisco Peninsula. Near San Francisco, the San Andreas fault trace is located immediately offshore north of Colma, and continues northwest through the Pacific Ocean approximately six miles due west of the Golden Gate Bridge.

The San Andreas Fault Zone was the source of two major seismic events in recent history that resulted in widespread damage through the San Francisco region: the 1906 San Francisco earthquake (M 8.25), and the more recent 1989 Loma Prieta earthquake (M 7.1). The Loma Prieta earthquake caused serious damage to elevated freeway structures in San Francisco and resulted in the collapse of a panel on the upper deck of the Bay Bridge. The Loma Prieta earthquake was considerably smaller than the postulated maximum earthquake for the region, yet caused serious damage, demonstrating the tremendous impact that earthquakes can have on transportation systems in the city.



SOURCE: Jennings, 2010

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Figure 4.5-1
Active and Potentially Active
Bay Area Earthquake Faults

**TABLE 4.5-2
 MODIFIED MERCALLI INTENSITY SCALE**

Intensity Value	Intensity Description	Average Peak Acceleration^a, g
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.0017 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.014 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck.	< 0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014–0.039 g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	0.039–0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	0.092–0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18–0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	0.34–0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65–1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

^a One "g," the acceleration due to gravity, is 980 centimeters per second. Any object undergoing a 1.0 g acceleration would move from rest to a speed of 9.8 meters per second (32.2 feet per second) in 1.0 second, by which time it would have traveled 4.9 meters (16.1 feet).

SOURCES: CGS (2003)

4.5.1.4 Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude, sense, and nature of fault rupture can vary for different faults or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in Table 4.5-1. None of the UCSF campus sites are located on or immediately adjacent to a known active or potentially active fault. Parnassus Heights, the closest campus site to an active fault is approximately four miles east of the San Andreas fault.

Ground Shaking

Strong ground shaking from a major earthquake could affect San Francisco during the next 30 years. Earthquakes on the active faults (listed in Table 4.5-1) are expected to produce a range of ground-shaking intensities. Ground shaking may affect areas hundreds of miles distant from an earthquake's epicenter. Historic earthquakes have caused strong ground shaking and damage in the San Francisco Bay Area, the most recent being the M 7.1 Loma Prieta earthquake. The epicenter was approximately 50 miles southeast of San Francisco, but this earthquake nevertheless caused strong ground shaking for about 20 seconds and resulted in varying degrees of structural damage throughout the Bay Area.

The 1906 San Francisco earthquake, with a Richter magnitude of 8.25 and an estimated moment magnitude of 7.9, produced strong (MM-VIII) to violent (MM-IX) shaking intensities (ABAG, 2003b). The 1989 Loma Prieta earthquake, with a Richter magnitude of 7.1 and an estimated moment magnitude of 6.9, produced very strong (MM-VIII) shaking intensities (ABAG, 2003b).

Liquefaction

Liquefaction is a phenomenon whereby unconsolidated and/or near saturated soils lose cohesion as a result of severe shaking. The rapid loss of soil shear strength during strong earthquake shaking results in a temporary fluid-like behavior of the soil. Four kinds of ground failure commonly result from liquefaction: lateral spread, flow failure, ground oscillation, and loss of bearing strength. A *lateral spread* is a horizontal displacement of surficial blocks of sediments resulting from liquefaction in a subsurface layer that occurs on slopes ranging between 0.3% and 3% and commonly displaces the surface by several meters to tens of meters. *Flow failures*, occurring on slopes greater than 3% are primarily liquefied soil or blocks of intact material riding on a liquefied subsurface zone. *Ground oscillation* occurs on gentle slopes when there is liquefaction at depth and no lateral displacement. Soil units that are not liquefied may pull apart from each other and oscillate on the liquefied zone. The *loss of bearing strength* can occur when the underlying soil loses strength and liquefies. Liquefaction and associated failures can damage foundations, disrupt utility service, and cause damage to roadways and buildings with shallow foundations. Structures can settle, tip, or even become buoyant and "float" upwards.

Liquefaction can occur in areas characterized by water-saturated, cohesionless, granular materials at depths less than 50 feet. The depth to groundwater influences the potential for liquefaction along the margin of San Francisco Bay, in that sediments need to be saturated to have a potential for liquefaction (Helley and LaJoie, 1979). Hazard maps compiled by ABAG depict liquefaction hazards for areas throughout the Bay Area (ABAG, 2003b). According to these maps based on California Geologic Survey data, the Mission Bay and Mission Center campus sites are in an area with a high potential to experience liquefaction. The Parnassus Heights and Mount Zion campus sites are not underlain by liquefiable sediments and are not located within the Seismic Hazard Zones for potential liquefaction.

Earthquake-Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the rapid compaction and settling of subsurface materials (particularly loose, noncompacted, and variable sandy sediments) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill or Bay Mud. Given the geologic setting of the Mission Bay campus site and to some extent the Mission Center campus site, these areas could be subjected to earthquake-induced settlement. Due to the shallow depth of bedrock and coarse nature of sediments, The Parnassus Heights and Mount Zion campus sites are unlikely to experience as great of earthquake induced settlement.

Earthquake-Induced Landslides

A major earthquake could cause movement of active slides or could trigger new slides in the same general areas of previous slides at the Parnassus Heights campus site. Due to the gently sloping to relatively flat topography, earthquake-induced landslides would not be a hazard at the Mission Bay, Mount Zion, or Mission Center campus sites.

4.5.2 Regulatory Considerations

4.5.2.1 Federal

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1997 to “reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program.” To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by NEHRP, which refined the description of agency responsibilities, program goals, and objectives.

NEHRP’s mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through

post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide planning and building code requirements such as emergency evacuation responsibilities and seismic code standards such as those to which the proposed project would be required to adhere.

4.5.2.2 State

California Building Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The 2013 CBC is based on the 2012 International Building Code (IBC) published by the International Code Conference. In addition, the CBC contains necessary California amendments, which are based on reference standards obtained from various technical committees and organizations such as the American Society of Civil Engineers (ASCE), the American Institute of Steel Construction (AISC), and the American Concrete Institute (ACI). ASCE Minimum Design Standards 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients which are used to determine a Seismic Design Category (SDC) for a project as described in Chapter 16 of the CBC. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 16, Section 1613 provides earthquake loading specifications for every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, which shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-05. Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load-bearing of soils (1805), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). Chapter 18 also describes analysis of expansive soils and the

determination of the depth to groundwater table. For Seismic Design Categories D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses mitigation measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design. The CGS has completed seismic hazard mapping for portions of California most susceptible to liquefaction, ground shaking, and landslides, including San Francisco.

Office of Statewide Health Planning and Development

UCSF's hospitals fall under the jurisdiction of the *Alfred E. Alquist Hospital Facilities Seismic Safety Act (Alquist Seismic Safety Act)* and Senate Bill 1953 (SB 1953), an amendment of the *Alquist Seismic Safety Act*, passed in 1994. The *Alquist Seismic Safety Act* and subsequent bill require all hospital facilities to comply with seismic safety building standards as defined by the Office of Statewide Health Planning and Development (OSHPD).

OSHPD is responsible for carrying out the provisions of SB 1953. A department of the California Health and Human Services Agency, OSHPD's primary goals include assessing California's healthcare infrastructure, managing the healthcare workforce, providing healthcare outcomes information to the public, insuring healthcare facilities development loans, and running the Hospital Seismic Safety Program, which enforces building seismic safety. The Hospital Building Safety Board further advises the director of the OSHPD on the administration of SB 1953 and acts as a board of appeals for hospital seismic safety issues.

SB 1953 was adopted in part so that, after a major earthquake or disaster, hospital facilities can continue to provide care to their current occupants as well as any new patients that might arrive after the event. During and after the 1994 Northridge earthquake, hospitals that were compliant with SB 1953 sustained minimal structural damage and continued to function. Hospitals that were not compliant sustained major damage and had to be abandoned (OSHPD, 2001).

All of UCSF's hospital buildings must meet certain OSHPD standards. If a building is to remain classified as an acute-care hospital facility²² and thus be compliant with SB 1953, the owner of the building must do the following:

- Complete seismic evaluations with in accordance with the Seismic Evaluation Procedures as specified in SB 1953
- Prepare a comprehensive plan and schedule for how each building will become compliant with SB 1953, within three years of the evaluation
- Submit the report and a compliance plan to OSHPD for review and approval (California State Senate, 1994).

In the process of compliance, OSHPD and a hospital building owner evaluate both nonstructural components (communications, medical gas, etc.) and structural components (actual building structure) of acute-care hospital facilities that might sustain damage during a seismic event. Nonstructural components are put into a Nonstructural Performance Category (NPC), and structural components are put into a Structural Performance Category (SPC). Thus, each acute-care facility is assigned a NPC rating and an SPC rating. The hospital building owner must first submit a hospital evaluation report to OSHPD indicating preliminary SPC and NPC ratings that the owner believes represent the seismic safety of each building.

OSHPD then inputs the ratings into its database for review. SPC and NPC ratings are separately evaluated. In the SPC/NPC evaluation process, OSHPD and affiliated engineers examine structural drawings and submitted reports of any necessary hospital. These evaluations may include an onsite visit by the area compliance officer and/or the district structural engineer. After the evaluation process, OSHPD either confirms or changes the rating. The hospital then receives guidance from OSHPD on how upgrades can continue.

SPC and NPC ratings are defined as follows:

- **Structural Ratings**

SPC-0: No rating was reported to OSHPD.

SPC-1: These buildings have a high risk of collapse in an earthquake, and are a significant safety hazard to the public. These buildings had to be retrofitted, replaced, or removed from acute care classification by January 1, 2008.

SPC-2: These buildings are in compliance with pre-1973 California Building Code, but are not in compliance with the Alquist Act. These buildings do not pose a significant safety hazard, but might not be functional after a strong earthquake. These buildings must be compliant with the Alquist Act by January 1, 2030 or removed from acute care classification.

²² An acute-care hospital provides emergency services and general medical and surgical treatment for acute disorders rather than long-term residential care for chronic illness.

SPC-3: These buildings are compliant with the Alquist Act. These buildings might sustain structural damage and might not be able to provide care after an event, but they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.

SPC-4: These buildings are compliant with the Alquist Act. These buildings may sustain structural damage and might not be able to provide care after an event, but they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.

SPC-5: These buildings are compliant with the Alquist Hospital Facilities Seismic Safety Act. These buildings are reasonably capable of providing care after an event, and they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.

- **Nonstructural Ratings**

NPC-0: No rating was reported to OSHPD.

NPC-1: Basic systems used in life safety and care are not properly anchored, and will not survive an earthquake event. Communications, emergency power, medical gas, and fire alarm systems must be anchored by January 1, 2002.

NPC-2: Communications systems, emergency power supplies, bulk medical gas systems, fire alarm systems, and emergency lighting and exit signs are properly anchored.

NPC-3: Basic systems used in life safety and care are properly anchored in critical areas of the hospital. If there is not significant structural damage, basic emergency medical care should be able to continue.

NPC-4: All architectural, mechanical, electrical systems, components and equipment, and hospital equipment are properly anchored. If there is not significant structural damage and problems with water and sewer systems, basic emergency medical care should be able to continue.

NPC-5: All basic systems used in life safety and care are properly anchored. In addition, the building has water and wastewater holding tanks (integrated into the plumbing system) and an on-site fuel supply that will last through 72 hours of acute care operations. Radiological service can also continue.

In general, low scores mean hospital building systems are not prepared for a disaster, and high scores mean hospital building systems are prepared. Both of these scores are considered when the building is determined to be in compliance with SB 1953. If the building is not in compliance with SB 1953 based on these scores, seismic retrofit regulations (Division III-R) are applied to the building to help in its retrofit. Replacing older hospitals with modern hospitals is intended to increase the score of UCSF's medical facilities.

OSHPD has established a timeframe that hospital building owners can use to schedule upgrades on their facilities. If this timeframe is followed, all buildings can be brought into compliance with SB 1953 by the deadline of January 1, 2030. A schematic of this timeframe is found in **Table 4.5-3**.

**TABLE 4.5-3
TIMEFRAME FOR COMPLIANCE WITH SB 1953**

Timeframes	Structural/Nonstructural Performance Category
January 1, 2002	SPC-1 / NPC-2 or greater
January 1, 2020	SPC-2 / NPC-3 or greater
January 1, 2030 deadline (this is considered full compliance)	SPC-3 / NPC-5

SOURCE: OSHPD (2013)

University of California Policy on Seismic Safety

The University of California's *Seismic Safety Policy* originally developed in 1975 and last updated August 26, 2011²³ requires that all buildings and facilities where University operations and activities occur be acquired, built, maintained, and rehabilitated to an acceptable level of earthquake safety. The purpose of this policy is to incorporate current earthquake engineering practices to provide an acceptable level of earthquake safety for students, employees, and the public who occupy University buildings and other facilities, at all locations of University operations and activities to the maximum extent feasible.

This policy requires the University to lease, license, acquire, build, maintain, repair and rehabilitate buildings and other facilities to provide an acceptable level of earthquake safety for students, employees, and the public who occupy those buildings and other facilities, to the maximum extent feasible using present earthquake engineering practices and University resources, at all locations where University operations and activities occur within the United States. Feasibility shall be determined by weighing practicality and the cost of protective measures against severity and probability of injury resulting from seismic occurrences.

This policy thus addresses the following topics:

- A. Survey of Existing Buildings and Other Facilities;
- B. Interim Use Plans;
- C. Program for Abatement of Seismic Hazards of Existing Buildings and Other Facilities;
- D. Seismic Rehabilitation Standards;
- E. Post Earthquake Response;
- F. Standards for New Construction and Renovation;
- G. Independent Seismic Peer Review;
- H. Special Considerations; and
- I. Standards for Lease, License, Acquisition by Purchase or other Title Transfer.

²³ This policy is periodically updated and the most recent version can be found at <http://ucop.edu/real-estate-services/resources/seismic-safety-policy/index.html>.

4.5.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a.i) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving 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 known fault? Refer to Division of Mines and Geology Special Publication 42.
- a.ii) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?
- a.iii) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?
- a.iv) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?
- b) Result in substantial soil erosion or the loss of topsoil?
- 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?
- d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) (California Building Code), creating substantial risks to life or property?
- e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?
- f) Exceed the LRDP EIR standard of significance by exposing people to structural hazards in an existing building rated Level V (Poor), or Level VI (Very Poor), under the University's seismic performance rating system, or substantial nonstructural hazards?

4.5.4 Analysis Methodology

This analysis evaluates the potential effects related to geology, soils, and seismicity from implementation of the 2014 LRDP. Construction-related effects that could potentially occur during construction activities, would generally be limited to the potential for erosion or causing slope instability. Geologic conditions vary across the UCSF campus sites and therefore all proposed construction must be able to overcome site specific hazards in order to reduce potential impacts. Overall, compliance with regulatory requirements (primarily the California Building Code) and the *UC Seismic Safety Policy* for these activities would ensure that impacts would be less than significant.

4.5.5 References

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4.6 Greenhouse Gas Emissions

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Greenhouse Gas (GHG) Emissions impacts. 2014 LRDP GHG Emissions effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. GHG Emissions effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.6.1 Regional Setting

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the earth, similar to a greenhouse. The accumulation of GHGs has been implicated as a driving force for global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities (i.e., activities relating to, or resulting from the influence of, human beings) that alter the composition of the global atmosphere.

“Global warming” and “global climate change” are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal (IPCC, 2007), with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

Natural processes and human actions have been identified as the causes of this warming. The International Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, however, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries.

Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. Most GHGs occur naturally and are necessary for keeping the earth's surface inhabitable.²⁴ However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar

²⁴ www.ipcc.ch/report/ar5/

radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

4.6.1.1 Sources of Greenhouse Gas Emissions

Individual projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. The primary GHGs associated with land use development projects are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Although the presence of the primary GHGs in the atmosphere is naturally occurring, CO₂, CH₄, and N₂O are largely emitted from human activities, accelerating the rate at which these compounds accumulate in the earth's atmosphere.

CO₂ is the “reference gas” for GHG emissions, meaning that emissions of total GHGs are typically reported in “carbon dioxide equivalent” (CO₂e). Emissions of CO₂ are largely byproducts of fossil fuel combustion, whereas methane results from offgassing associated with agricultural practices and landfills. Other GHGs, with much greater heat-absorption potential than CO₂, include hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

There is international scientific consensus that human-caused increases in GHGs have contributed, and will continue to contribute, to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include a decrease in snowpack, sea level rise, more extreme heat days per year, more high ozone days, increased frequency and intensity of wildfires, and more drought years (CNRA, 2009). Secondary effects may include impacts on agriculture, water resources, changes in disease vectors, and changes in habitat and biodiversity.

The California Air Resources Board (CARB) estimated that in 2011 California produced about 448 million gross metric tons (about 494 million U.S. tons) of CO₂e. The CARB found that transportation is the source of 38% of the state's GHG emissions, followed by industrial sources at 21% and electricity generation (both in-state and out-of-state) at 19%. Commercial and residential fuel use (primarily for heating) accounted for about 10% of GHG emissions (CARB, 2013).

In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) and the industrial/ commercial sector were the two largest sources of GHG emissions, each accounting for about 36% of the Bay Area's 95.8 million metric tons of CO₂e (105.4 million U.S. tons) emissions in 2007. Industrial and commercial electricity and fossil fuel consumption (including office and retail) were the second largest contributors of GHG emissions with about 34% of total emissions. Electricity generation accounts for approximately 16% of the Bay Area's GHG emissions, followed by residential fuel usage (e.g., home water heaters, furnaces) at 7%, off-road equipment at 3%, and agriculture at 12%. Among industrial sources, oil refining currently accounts for more than 40% of GHG emissions, or approximately 15% of the total Bay Area GHG emissions (BAAQMD, 2010).

4.6.1.2 Effects of Human Activity on GHG Emissions

Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO₂ emissions (and thus substantial increases in atmospheric concentrations). In 1994, atmospheric CO₂ concentrations were found to have increased by nearly 30 percent above pre-industrial (c. 1860) concentrations.

There is international scientific consensus that human-caused increases in GHGs have contributed and will continue to contribute to global warming. Global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include the displacement of thousands of coastal businesses and residences, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity. As CARB's *Climate Change Scoping Plan* noted, the legislature in enacting Assembly Bill (AB) 32 found that global warming would cause detrimental effects to some of the state's largest industries, including agriculture, winemaking, tourism, skiing, commercial and recreational fishing, forestry, and the adequacy of electrical power generation. The *Climate Change Scoping Plan* states as follows (CARB, 2011): "The impacts of global warming are already being felt in California. The Sierra snowpack, an important source of water supply for the state, has shrunk 10 percent in the last 100 years. It is expected to continue to decrease by as much as 25 percent by 2050.

4.6.1.3 Impacts of Climate Change

Ecosystem and Biodiversity Impacts

Climate change is expected to have effects on diverse types of ecosystems, from alpine to deep-sea habitat (U.S. EPA, 2008a). As temperatures and precipitation change, seasonal shifts in vegetation would occur; this could affect the distribution of associated flora and fauna species. As the range of species shifts, habitat fragmentation could occur, with acute impacts on the distribution of certain sensitive species. The IPCC states that "20 percent to 30 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 3.6 to 5.4°F relative to pre-industrial levels" (IPCC, 2007). Shifts in existing biomes could also make ecosystems vulnerable to encroachment by invasive species. Wildfires, which are an important control mechanism in many ecosystems, may become more severe and more frequent, making it difficult for native plant species to repeatedly re-germinate. In general terms, climate change is expected to put a number of stressors on ecosystems, with potentially catastrophic effects on biodiversity.

Human Health Impacts

Climate change may increase the risk of vector-borne infectious diseases, particularly those found in tropical areas and spread by insects such as malaria, dengue fever, yellow fever, and encephalitis (U.S. EPA, 2008b). Cholera, which is associated with algal blooms, could also increase. While these health impacts would largely affect tropical areas in other parts of the world, effects would also be felt in California. Warming of the atmosphere would be expected to increase smog and particulate pollution, which could adversely affect individuals with heart and respiratory problems,

such as asthma. Extreme heat events would also be expected to occur with more frequency and could adversely affect sensitive receptors. Finally, the water supply impacts and seasonal temperature variations expected as a result of climate change could affect the viability of existing agricultural operations, making the food supply more vulnerable.

4.6.2 Regulatory Considerations

4.6.2.1 Federal Regulations

Supreme Court Ruling on California Clean Air Act Waiver

The United States Environmental Protection Agency (U.S. EPA) is the federal agency responsible for implementing the Clean Air Act (CAA). The U.S. Supreme Court ruled on April 2, 2007 that CO₂ is an air pollutant as defined under the CAA, and that the U.S. EPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the proposed 2014 LRDP. (See discussion of Assembly Bill [AB] 1493 in Section 4.9.2.2, State Regulations, below, for more information on the California Clean Air Act [CCAA] waiver.)

United States Environmental Protection Agency Actions

In response to the issue of climate change, the U.S. EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions. The U.S. EPA and the National Highway Traffic Safety Administration have taken coordinated steps to enable the production of a new generation of clean vehicles, through reduced GHG emissions and improved fuel use from on-road vehicles and engines.

Final Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

On December 9, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA, which states that the U.S. EPA Administrator should regulate and develop standards for “emission[s] of air pollution from any class or classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The final rule was effective January 14, 2010. The rule addresses two distinct findings: Endangerment Finding and Cause or Contribute Finding.

Under the Endangerment Finding, the Administrator found that the current and projected concentrations of the six key GHGs (i.e., CO₂, CH₄, N₂O, HFCs, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations. Under the Cause or Contribute Finding, the Administrator found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to GHG pollution which threatens public health and welfare.

4.6.2.2 State Regulations

The CARB is the state agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), adopted in 1988. With the passage of AB 32, the CARB was also given broad responsibility for promulgating regulations designed to achieve the general goals of AB 32. (For a discussion of AB 32, see “Assembly Bill 32 and the California Climate Change Scoping Plan” below.)

Various statewide and local initiatives have been introduced to reduce the state’s contribution to GHG emissions. However, because every nation emits GHGs and thus makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can effectively slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed AB 1493, which required that the CARB develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

To meet the requirements of AB 1493, the CARB approved amendments to the California Code of Regulations (CCR) in 2004, adding GHG emissions standards to California’s existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1), require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight [GVW] rating of less than 10,000 pounds and which is designed primarily for the transportation of persons), beginning with model year 2009. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for model year 2016 are approximately 37% lower than the limits for the first year of the regulations, model year 2009. For light-duty trucks with an LVW of 3,751 pounds to a GVW of 8,500 pounds, as well as for medium-duty passenger vehicles, GHG emissions will be reduced approximately 24% between 2009 and 2016.

Because the Pavley standards (named for the bill’s author, state Senator Fran Pavley) would impose stricter standards than those under the federal CAA, California applied to the U.S. EPA for a waiver under the CAA; this waiver was initially denied by the Bush administration in 2008, but as noted above, in 2009 the U.S. EPA granted the waiver. California has agreed to cooperate with the federal GHG and Corporate Average Fuel Economy standards under development so that there will be a single national standard.

Executive Order S-3-05

In 2005, in recognition of California’s vulnerability to the effects of climate change, then-Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by

which statewide GHGs emissions would be progressively reduced: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80% below 1990 levels (CARB, 2008).

Assembly Bill 32 and the California Climate Change Scoping Plan

In 2006, the California legislature passed AB 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq.), also known as the Global Warming Solutions Act. AB 32 requires CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008, outlining measures to meet the 2020 GHG emissions target. In order to meet the target, California must reduce its GHG emissions by 30% below projected 2020 business –as-usual emissions levels, or about 15% from 2008 levels (CARB, 2010). The Scoping Plan estimates a reduction of 174 million metric tons of CO₂e (about 191 million U.S. tons) from state measures that address the transportation, energy, agriculture, forestry, and high global warming potential sectors (see **Table 4.6-1**). CARB has identified an implementation timeline for the GHG reduction strategies in the Scoping Plan (CARB, 2008). Some measures may require new legislation to implement, some will require subsidies, some have already been developed, and some will require additional effort to evaluate and quantify. Additionally, some emissions reductions strategies may require their own environmental review under CEQA or the National Environmental Policy Act (NEPA).

The AB 32 Scoping Plan anticipates that local government actions will also result in reduced GHG emissions. CARB recommends a GHG reduction target of 15% below “current” levels (2008) for local jurisdictions and notes that success in reducing emissions relies on local governments’ land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions.

The Scoping Plan relies on the requirements of Senate Bill (SB) 375 (discussed below) to implement the carbon emission reductions anticipated from land use decisions. SB 375 was enacted to align local land use and transportation planning to further achieve the state’s GHG reduction goals. SB 375 requires regional transportation plans (RTPs), developed by Metropolitan Planning Organizations (MPOs), to incorporate a “sustainable communities strategy” that would achieve GHG emission reduction targets set by CARB. SB 375 also includes provisions for streamlined CEQA review for some infill projects, such as transit-oriented development. SB 375 would be implemented over the next several years. The Metropolitan Transportation Commission (MTC) is responsible for developing RTPs for the Bay Area. MTC’s 2013 RTP will be its first plan subject to SB 375.

Executive Order S-1-07

Executive Order S-1-07, signed by then-Governor Schwarzenegger in 2007, proclaimed that the transportation sector is the main source of GHG emissions in California, at over 40% of statewide

**TABLE 4.6-1
 GREENHOUSE GAS REDUCTIONS FROM AB 32 SCOPING PLAN SECTORS**

GHG Reduction Measures By Sector	GHG Reductions (in million metric tons of CO₂e)	
Transportation		62.3
Electricity and Natural Gas		49.7
Industry		1.4
Landfill Methane Control Measure (Discrete Early Action)		1.0
Forestry		5.0
High Global Warming Potential GHGs		20.2
Additional Reductions Needed to Achieve the GHG Cap		34.4
	Total	174.0
<i>Other Recommended Measures</i>		
Government Operations		1.0 - 2.0
Agriculture- Methane Capture at Large Dairies		1.0
Methane Capture at Large Dairies		1.0
<i>Additional GHG Reduction Measures</i>		
Water		4.8
Green Buildings		26.0
High Recycling/ Zero Waste		
• Commercial Recycling		
• Composting		9.0
• Anaerobic Digestion		
• Extended Producer Responsibility		
• Environmentally Preferable Purchasing		
	Total	42.8 - 43.8

NOTES:

CO₂e = carbon dioxide equivalent

SOURCE: California Air Resources Board, AB 32 Scoping Plan, available at http://www.arb.ca.gov/cc/scopingplan/sp_measures_implementation_timeline.pdf, accessed February 19, 2014.

emissions. The order established a goal of reducing the carbon intensity of transportation fuels sold in California by a minimum of 10% by 2020. It also directed CARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete, early-action measure after meeting the mandates in AB 32. CARB adopted the Low Carbon Fuel Standard on April 23, 2009.

Senate Bills 1078 and 107 and Executive Orders S-14-08, S-21-09 and S-13-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then-Governor Schwarzenegger signed Executive Order (EO) S-14-08, which expands the state’s Renewable Portfolio Standard to 33% renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California’s commitment to the Renewable Portfolio Standard by signing EO S-21-09, which directs CARB under its AB 32

authority to enact regulations to help the state meet its Renewable Portfolio Standard goal of 33% renewable energy by 2020.

Governor Arnold Schwarzenegger signed EO S-13-08 on November 14, 2008. The order called on state agencies to develop California's first strategy to identify and prepare for expected climate impacts. As a result the *2009 California Climate Adaptation Strategy (CAS)* report was developed to summarize the best known science on climate change impacts in the State to assess vulnerability and outline possible solutions that can be implemented within and across State agencies to promote resiliency. The State is also developing an Adaptation Planning Guide (APG) to provide a decision-making framework intended for use by local and regional stakeholders to aid in the interpretation of climate science and to develop a systematic rationale for reducing risks caused or exacerbated by climate change. The State's third major assessment on climate change explores local and statewide vulnerabilities to climate change, highlighting opportunities for taking concrete actions to reduce climate-change impacts.

Senate Bill 1368

SB 1368 (September 2006) is a companion bill of AB 32 that required the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for baseload generation from investor-owned utilities. The California Energy Commission (CEC) was required to establish a similar standard for local publicly owned utilities. These regulations (20 CCR 2900) established in 2007 prohibit utilities from entering into long-term contracts with any baseload power plant that would emit more than the equivalent GHG performance of a typical combined cycle natural-gas-fired plant. The legislation ensures that all new contracts for electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and the CEC.

Senate Bill 97

SB 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue requiring analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, no later than July 1, 2009. The California Natural Resources Agency was required to certify or adopt those guidelines by January 1, 2010. On December 30, 2009, the Natural Resources Agency adopted the state CEQA Guidelines amendments, as required by SB 97. These state CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments were reviewed by the Office of Administrative Law and became effective March 18, 2010.

Senate Bill 375

In addition to policy directly guided by AB 32, the legislature in October 2008 passed SB 375, which provides for regional coordination in land use and transportation planning and funding to help meet the AB 32 GHG reduction goals. SB 375 aligns regional transportation planning efforts, regional GHG emissions reduction targets, and land use and housing allocations. SB 375

requires RTPs developed by the state's 18 MPOs to incorporate a "sustainable communities strategy" (SCS) that will achieve GHG emission reduction targets set by the CARB. In the Bay Area, the MTC is the MPO. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development.

The Association of Bay Area Governments (ABAG), the MTC, BAAQMD, and San Francisco Bay Conservation and Development Commission (BCDC) have developed the "Plan Bay Area" as the region's long-range plan for sustainable land use, transportation, and housing pursuant to SB 375. Plan Bay Area is intended to respond to requirements of SB 375, which requires the regional transportation plan to contain a SCS that integrates land use planning and transportation planning and identifies where the region's population will be housed. Plan Bay Area was adopted on July 18, 2013 and is the first published plan subject to SB 375.

CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or alternative planning strategy (APS) for consistency with its assigned targets. If MPOs do not meet the GHG emissions reduction targets, transportation projects would not be eligible for funding.

This bill also extends the minimum time period for the Regional Housing Needs Allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City and county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA and the CEQA Guidelines create incentives for qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

4.6.2.3 Local Regulations

Bay Area Air Quality Management District Climate Protection Program

The BAAQMD is the primary agency responsible for air quality regulation in the 9-county San Francisco Bay Area Air Basin (SFBAAB). The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHGs and in reducing air pollutants that affect the health of residents. The BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders. In June 2010, the BAAQMD adopted revised CEQA significance thresholds for GHG emissions. These recently adopted GHG significance thresholds are discussed in detail in Section 5.9.4.2, Approach to Analysis, below.

BAAQMD CEQA Guidelines and Thresholds

In June 2010, the BAAQMD issued its CEQA Air Quality Guidelines, replacing former guidelines adopted in December 1999, and adopted new thresholds of significance to assist lead agencies in determining when potential air quality impacts would be considered significant under CEQA. Updated in May 2011, these guidelines include recommendations for analytical methodologies to determine air quality impacts and identify mitigation measures that can be used to avoid or reduce air quality impacts, including for GHGs (BAAQMD, 2011).

The *BAAQMD CEQA Guidelines* is an advisory document and local jurisdictions are not required to utilize the methodology outlined therein. The document describes the criteria that BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for use in determining whether projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. BAAQMD adopted new thresholds of significance (BAAQMD thresholds) on June 2, 2010, to assist lead agencies in determining when potential air quality impacts would be considered significant under CEQA. BAAQMD also released new *CEQA Guidelines* in May 2011, which advise lead agencies on how to evaluate potential air quality impacts with the adopted new thresholds of significance.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted its 2010 thresholds of significance. However, in August 2013 the First District Court of Appeal issued a full reversal of the Superior Court ruling, upholding the 2010 thresholds of significance. In November 2013, the California Supreme Court granted limited review of the Court of Appeal's decision, and the matter is currently pending there. Nonetheless, the 2011 thresholds are based on substantial evidence provided by BAAQMD (BAAQMD, 2009), and have been accepted by the Regents of the University of California for use in this EIR.

The threshold for stationary sources is 10,000 metric tons of CO₂e per year (i.e., emissions above this level may be considered significant). For non-stationary sources, four separate thresholds have been established:

- Compliance with a Qualified Greenhouse Gas Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified Greenhouse Gas Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 metric tons of CO₂e per year (i.e., emissions above this level may be considered significant); or
- 4.6 metric tons of CO₂e per service population (SP) per year (i.e., emissions above this level may be considered significant). "Service population" is the sum of residents plus employees expected for a development project.; or
- For General Plans, 6.6 metric tons of CO₂e per service population (SP) per year (i.e., emissions above this level may be considered significant). This threshold should only be applied to general plans. Other plans, e.g. specific plans, congestion management plans, etc., should use the project-level threshold of 4.6 CO₂e/SP/year.

For quantifying a project's GHG emissions, BAAQMD recommends that all GHG emissions from a project be estimated, including a project's direct and indirect GHG emissions from operations. Direct emissions refer to emissions produced from onsite combustion of energy, such as natural gas used in furnaces and boilers, emissions from industrial processes, and fuel combustion from mobile sources. Indirect emissions are emissions produced offsite from energy production and water conveyance due to a project's energy use and water consumption. BAAQMD has provided guidance on detailed methods for modeling GHG emissions from proposed projects (BAAQMD, 2012). The above stated thresholds apply only to operational emissions. To date, the BAAQMD has not adopted numeric thresholds for the assessment of construction-related emissions. Nonetheless, construction-related GHG emissions resulting from 2014 LRDP proposals are estimated and disclosed in this EIR.

University of California

Policies and Plans of the UC Regents and University of California Office of the President (UCOP)

In 2007, the Chancellor of UCSF signed the *American College and University President's Climate Commitment* (ACUPCC) to complete an emissions inventory, set target dates and interim milestones for becoming climate-neutral,²⁵ take steps to reduce GHG emissions, and prepare public progress reports (American College, 2007). As an intermediate target, UCOP established the goals of reducing GHG emissions to 2000 levels by 2014; 1990 levels by 2020; and achieving climate neutrality as soon as possible after reaching the 2014 and 2020 reduction targets. More recently, UCSF committed to achieving climate neutrality by the year 2047.²⁶ These goals pertain to Scope 1 and Scope 2 emissions of the six Kyoto greenhouse gases originating from sources specified in the ACUPCC,²⁷ as well as Scope 3 emissions from business airline travel and commuting by UCSF staff and students. The Regents' policy specifies that these goals will be pursued while maintaining the primary research and education mission of the University.

As outlined in UCSF's *Climate Action Plan* of December 2009, the UC President adopted the *Policy on Sustainable Practices* in 2007, which committed UC to implementing actions intended to minimize the University's impact on the environment and reduce the University's dependence on non-renewable energy. The policy was most recently revised in November 2013, and now covers the areas of green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, and sustainable water systems. The *UC Policy on Sustainable Practices* will continue to be updated over time.²⁸

²⁵ Climate neutrality for UCSF is defined as the University having a net-zero impact on the Earth's climate; it will be achieved by minimizing GHG emissions as much as possible and using other measures to mitigate the remaining GHG emissions (*UCSF Climate Action Plan*, December 2009).

²⁶ This is the current commitment made under the ACUPCC and the goal that is referenced in UCSF's Annual Progress Report to the UC Regents.

²⁷ The six greenhouse gases identified in the Kyoto Protocol/ACUPCC are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

²⁸ The current version of the Policy is available at: <http://sustainability.universityofcalifornia.edu/policy.html>

In addition the *Policy on Sustainable Practices* sets the following requirements and goals relevant to GHG emissions reduction:

- Requires each campus to develop a long-term strategy for voluntarily meeting the requirements of California's Global Warming Solutions Act of 2006 (AB 32);
- Instructs campuses to aim for climate neutrality as soon as possible after achieving 2014 and 2020 reduction targets;
- Requires 20 percent better energy performance than Title 24 (policy maintained as Title 24 is revised) for new construction and renovations, and strives to achieve 30%;
- Requires new laboratory buildings to meet Labs21 Environmental Performance Criteria (EPC);
- All new construction and major renovations projects must meet a minimum standard of LEED-NC Silver and strive for LEED NC Gold when possible;
- The University will use energy efficiency retrofits to reduce system-wide energy consumption by 10% or more, from 2000 baseline, by 2014;
- Renovation projects greater than \$5 million that do not qualify for LEED-NC must be certified under LEED-CI;
- Renovation projects that require 100% equipment replacement, and 50% non-shell areas, must achieve LEED Silver at a minimum and strive for Gold;
- Each campus will submit one pilot LEED-EBOM building for certification by July 1, 2014;
- University system will provide up to 10 MW capacity of on-site renewable energy by 2014 (approximately 1 MW per UC campus);
- Develop goals for reducing transportation related GHG's and report on progress annually;
- Expand Transportation Demand Management (TDM) programs and projects;
- Divert 50% solid waste by 2008, 75% by 2012, and achieve zero waste by 2020 (defined as diverting 95% or more of municipal solid waste);
- Develop a Water Action Plan and reduce water consumption by 20% by 2020;
- All new buildings achieve at least two points in LEED NC Water Efficiency category;
- Maximize procurement of environmentally preferable products and services; and
- Purchase 20% sustainable food products by 2020.

The UC President has set a goal for UC to become carbon neutral by 2025 and purchase only clean energy (UCOP, 2013). This goal has not been formally adopted by the Regents, but UC is actively working on the President's initiative to be the first major research university to achieve carbon neutrality, involving four efforts:

- Create a shared service center, which both owns electricity-generation resources and purchases long-term forward contracts, and which will manage the supply of wholesale electricity to campuses eligible for direct access.

- Continue energy-efficient projects and expand them to include small- to medium-scale renewable energy sources at all campus sites, and seek additional funding sources for these projects.
- Effectively manage the purchase of natural gas to mitigate risk tolerance to price changes, develop renewable natural gas (biogas) and purchase biogas contracts through outside producers.
- Manage allowances and offsets; comply with California's cap-and-trade program and other environmental attribute programs; and generate new funds to support projects resulting in GHG emission reductions.

University of California San Francisco

UCSF has a robust sustainability program covering sustainability activities across the entire campus and medical center. Through its Office of Sustainability, UCSF has created work groups addressing sustainability in the following areas, most of which have direct implications for GHG emissions: Carbon Neutrality, Zero Waste, Water Conservation, Sustainable Food, Toxics Reduction, Green Procurement, Green Buildings, and Sustainable Operations.

UCSF's Sustainability Governance consists of the Academic Senate Sustainability Committee and the Chancellor's Advisory Committee on Sustainability (CACS). The Academic Senate Sustainability Committee identifies faculty recommendations on improving sustainability at UCSF. The charge of the CACS is to:

- Annually examine UCSF's effect on the environment from a comprehensive perspective;
- Evaluate existing UCSF policies, procedures, and programs that affect the environment;
- Serve as a coordinating body for groups or individuals concerned with sustainability issues;
- Advise selected work groups in the development and implementation of UCSF's sustainability initiatives and goals; and
- Support reduction of greenhouse gas emissions to 1990 levels by 2020.

UCSF includes a Sustainability Dashboard on its Living Green web site that includes performance metrics for multiple issue areas including GHG emissions. UCSF also publishes an annual sustainability report on its web site.²⁹

UCSF Climate Action Plan (2009)

As part of implementing the *UC Sustainable Practices Policy*, UCSF has developed a Climate Action Plan, a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to AB 32. The Climate Action Plan also addresses the UCOP goals of reducing GHG emissions to 2000 levels by 2014; and attaining

²⁹ Annual Sustainability Reports are available on the UCSF LivingGreen web site: <http://sustainability.ucsf.edu/>

climate neutrality³⁰ as soon as possible after achieving the 2014 and 2020 reduction targets. GHG emissions inventories are included for the years 1990, 2000, 2008, and 2011. The Climate Action Plan forecasts future emissions and assesses the impact of UCSF sustainability policies and programs on future GHG emissions and the prospects for achieving GHG reduction goals. The Climate Action Plan concludes that UCSF is expected to meet the goal of reducing GHG emissions to 2000 levels by 2014, but that the goal of reducing 1990 levels by 2020 would not likely be met without the use of additional reduction measures or carbon offsets.

UC Strategic Energy Plan

The UC Strategic Energy Plan (SEP) was prepared in 2008 for all UC campuses, to fulfill a goal of UC's Policy on Sustainable Practices to implement energy efficiency projects in existing buildings. The UCSF portion of the SEP analyzes energy use and GHG trends, and identifies potential energy efficiency retrofit projects at all buildings over 50,000 square feet at UCSF (primarily lighting, HVAC, commissioning and central plant measures). Energy savings, GHG emissions savings, and financial returns are estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The SEP project list is intended to be regularly updated by each campus to evaluate the feasibility of additional energy-saving measures.

Transportation Demand Management

UCSF employs an aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities. Based on UCSF's 2013 employee commute survey, 66 percent of the campus population commutes by means other than driving alone. In 2011, UCSF received the Gold level award for the Best Workplace for Commuters. Key features of UCSF's existing TDM program include the following:

- 60 shuttles serving 17 locations, with over 2.3 million passengers per year
- 33 vanpools that travel as far as Sacramento and operate using the Green Road Safety System, which improves fuel consumption and safety
- 62 reserved carpool stalls at various sites
- Marin Commute Club buses with about 55 daily riders who live in Marin and Sonoma Counties to the north of San Francisco
- 18 City CarShare vehicles with dedicated parking spaces, along with 1,500 UCSF members who can use these vehicles by scheduling their use on-line
- A fleet of 43 low-emitting alternative-fuel and hybrid vehicles, including cars, shuttles, golf carts, and trucks
- 18 electric-vehicle charging stations at Parnassus Heights, Mount Zion, and Mission Bay, with plans for another 20 at Mission Bay in the Owens Street Garage and 10 at other locations

³⁰ The Climate Action Plan defines climate neutrality as having a net zero impact on the Earth's climate, to be achieved by minimizing GHG emissions as much as possible and using carbon offsets or other measures to mitigate the remaining GHG emissions.

- Over 1,900 UCSF users of the ZimRide online carpool matching program
- 972 bicycle parking spaces with another 100 planned at Mission Bay, as well as bike racks on shuttles, a cyclist shower program that allows bicyclists to use UCSF showers at a discount, and other bicycle-related benefits
- Bay Area Bike Share station at Mission Bay (due to begin construction in late 2014), where members will have access to bicycles (and a regional network of stations) provided by the Bay Area Air Quality Management District
- More than 400 off-street motorcycle parking stalls in garages and surface parking lots
- An “emergency ride home” program to encourage use of alternative modes of transportation
- Clipper Card (public transit pass) sales at easily accessible locations, including through UCSF’s website
- Close to 1,800 UCSF employees that participate in a pretax transit program, which saved UCSF employees over \$700,000 on public transit commute costs in 2013

Annual GHG Inventory Reporting

UC *Sustainability Practices Policy* requires each campus to report a GHG emissions inventory to an independent reporting organization. UCSF reported calendar year 2008 Scope 1 and Scope 2 emissions³¹ to the California Climate Action Registry (CCAR). UCSF currently reports its annual Scope 1 and Scope 2 GHG emissions inventory to The Climate Registry (TCR). The most recent inventory reported to TCR was for calendar year 2012. UCSF emissions inventories reported to outside agencies are verified by accredited independent auditors.

Since 2008 UCSF has also been required to report its annual Scope 1 emissions from the Parnassus Heights Central Utility Plant (PCUP) to the California Air Resources Board (CARB) under the AB 32 Reporting Rule. UCSF tracks and reports its progress towards meeting its GHG emissions goals in its Annual Sustainability Report. UCSF also reports to the UC Regents annually on its progress in meeting the goals in the *UC Sustainable Practices Policy*.³²

4.6.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

³¹ For more information on UCSF’s Scope 1, Scope 2 and Scope 3 GHG emissions, see “UCSF GHG Emissions Inventory and Forecasts” later in this document.

³² The University of California system-wide Annual Sustainability Reports are available at: <http://sustainability.universityofcalifornia.edu/reports.html>

4.6.4 Analysis Methodology

4.6.4.1 Approach

This analysis uses both a quantitative and a qualitative approach. The quantitative approach is used to address the first significance criterion: Would the 2014 LRDP proposals generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment? The quantitative efficiency threshold proposed by BAAQMD in its 2009 document *Revised Draft Options and Justification Report for California Environmental Quality Act Thresholds of Significance* is 4.6 metric tons of CO₂e per service population annually for projects or Plans, other than a General Plan. If the 2014 LRDP activities would exceed this threshold then it would be considered to have a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact on climate change.

Because the quantifiable thresholds developed by BAAQMD in its Justification Report were formulated based on AB 32 and California Climate Change Scoping Plan reduction targets for which its set of strategies were developed to reduce GHG emissions statewide, a project cannot exceed the numeric BAAQMD efficiency threshold of 4.6 metric tons of CO₂e per service population annually without also conflicting with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (The state Climate Change Scoping Plan). Thus, if the 2014 LRDP proposals exceed the numeric threshold and results in a significant cumulative impact, it would also result in a significant cumulative impact with respect to plan, policy, or regulation consistency, even though the 2014 LRDP proposals may incorporate measures and have features that would reduce its contribution to cumulative GHG emissions.

4.6.4.2 Methods

Potential impacts are assessed by modeling the estimated CO₂ emissions generated by the 2014 LRDP construction activities and operations, using the CalEEMod version 2013.2.2 land use emissions model, and comparing modeled emissions to the significance thresholds. Model data and additional assumptions are included in Appendix E of this EIR.

Area and indirect sources (as opposed to transportation sources) associated with the 2014 LRDP proposals would primarily result from electrical usage, water and wastewater transport (the energy used to pump water and wastewater to and from the 2014 LRDP development), and solid waste generation. GHG emissions from electrical usage are generated when energy consumed on the campus sites is generated by fuel combustion. GHG emissions from water and wastewater treatment and transport are also indirect emissions resulting from the energy required to transport water from its source and the energy required to treat wastewater and transport it to its treated discharge point. Solid waste emissions are generated when the increased waste generated by a project are taken to a landfill to decompose. GHG emissions from electrical usage, water and wastewater conveyance, and solid waste were also estimated using CalEEMod.

4.6.4.3 Cumulative Approach

Both BAAQMD and the California Air Pollution Control Officers Association consider GHG impacts to be exclusively cumulative impacts (BAAQMD, 2011; CAPCOA, 2008); as such, assessment of significance is based on a determination of whether the GHG emissions from a project represent a cumulatively considerable contribution to the global atmosphere.

4.6.5 References

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4.7 Hazards and Hazardous Materials

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Hazards and Hazardous Materials impacts. 2014 LRDP Hazards and Hazardous Materials effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*. Hazards and Hazardous Materials effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.7.1 Regional Setting

4.7.1.1 Introduction

Materials and waste may be considered hazardous if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode or generate vapors when mixed with water (reactivity). The term “hazardous material” is defined in law as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.³³ In some cases, past industrial or commercial uses on a site can result in spills or leaks of hazardous materials and petroleum causing contamination of underlying soil and groundwater. Federal and state laws require that soils and groundwater having concentrations of contaminants such as lead, gasoline, or industrial solvents that are higher than certain acceptable levels must be handled and disposed as hazardous waste during excavation, transportation, and disposal. The California Code of Regulations (CCR), Title 22, Sections 66261.20–24 contains technical descriptions of characteristics that would cause a soil to be classified as a hazardous waste.

Medical waste can also be considered a hazardous waste and is generated or produced as a result of diagnosis, treatment, or immunization of human beings or animals and the production or testing of biological materials. Generally, medical waste can be classified as either a biohazardous waste or a sharps waste.^{34,35} Cultures, blood and blood products, tissues, and body parts are all considered medical waste. The transportation and disposal of medical waste is closely regulated under Section 118215 of the California Medical Waste Management Program.³⁶ In addition, operation of airborne medical transport can also pose a risk to human health and safety. The use of hazardous materials and disposal of hazardous wastes are subject to numerous laws and regulations at all levels of government (see Regulatory Setting below).

³³ California, Health and Safety Code, Chapter 6.95, Section 25501(o).

³⁴ The term “biological materials” means medicinal preparations made from living organisms and their products, including but not limited to, serums, vaccines, antigens and anti-toxins.

³⁵ The term “sharps waste” refers to any device having acute rigid corners, edges, or proturbences capable of cutting or piercing, including, but not limited to, hypodermic needles and broken glass items (such as pipettes and vials) contaminated with biohazardous waste.

³⁶ California Medical Waste Management Act, California Health and Safety Code Sections 117600-118360.

4.7.1.2 Generation and Disposal of Hazardous Materials and Waste

Various hazardous materials are commonly transported, stored, used, and disposed of in activities such as construction, industry (both light and heavy), dry cleaning, film processing, landscaping, automotive maintenance and repair, and common residential/commercial maintenance activities. The use, transport, storage and disposal of hazardous materials is regulated by the United States Environmental Protection Agency (EPA), California EPA (Cal/EPA) including five boards, departments and offices: Air Resources Board, Department of Pesticide Regulation, Department of Toxic Substances Control (DTSC), Office of Environmental Health Hazard Assessment (OEHHA), and State Water Resources Control Board (SWRCB). In addition, the Department of Public Health Center for Environmental Health and other local regulatory agencies closely monitor businesses and industry in the control of hazardous materials. Hazardous materials require special methods of disposal, storage, and treatment, and any unintentional release of hazardous materials requires an immediate response to protect human health and safety, and/or the environment. Improper disposal can harm the environment and people who work in the waste management industry.

Generators of hazardous waste fall into two categories: large-quantity generators (LQGs) and small-quantity generators (SQGs). An LQG is defined as a person or facility generating more than 1,000 kilograms (kg) (2,200 pounds) of hazardous waste per month. An SQG is defined as generating greater than 100 kilograms and less than 1,000 kg of hazardous waste per month. LQGs include industrial and commercial facilities, such as manufacturing companies, petroleum refining facilities, and other heavy industrial businesses.

LQGs must comply with general federal and state requirements for managing hazardous waste. LQGs need an EPA identification number that is used to monitor and track hazardous waste activities. SQGs include facilities such as service stations, automotive repair, dry cleaners, and medical offices. The regulatory requirements for SQGs are less stringent than the requirements for LQGs. However, SQGs must also obtain an EPA identification number, which must be used for traceability on all hazardous waste documentation.

Pursuant to federal law, all such generators must register with EPA for record-keeping and recording. The EPA Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs related to hazardous materials and hazardous waste. The state agencies responsible for these programs set the standards for their program while local governments implement the standards. (Cal/EPA) oversees the implementation of the program as a whole. The Unified Program is implemented at the local level by 84 government agencies certified by the Secretary of Cal/EPA. These Certified Unified Program Agencies (CUPAs) have typically been established as a function of a local environmental health or fire department.

The CUPA is the local administrative agency that coordinates the following six programs regulating hazardous materials and hazardous wastes:

- Hazardous Materials Release Response Plans and Inventories (Business Plans)

- California Accidental Release Prevention (CalARP) Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act (APSA) Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

For the City of San Francisco the local CUPA is the San Francisco Department of Public Health.

4.7.1.3 Transportation of Hazardous Materials and Waste

Transportation of hazardous materials and hazardous waste is carried out by individuals or entities that move hazardous materials and waste from one site to another by highway, rail, water, or air (see 40 CFR 260.10). This includes transporting hazardous waste from a generator's site to a facility that can recycle, treat, store, or dispose of the waste. It can also include transporting treated hazardous waste to a site for further treatment or disposal. Transportation of hazardous materials is required by law to occur in accordance with the Hazardous Waste Manifest System which is a set of forms, reports, and procedures that track hazardous waste from the time it leaves the generator facility until it reaches the waste management facility that receives it.

Transportation of hazardous materials by truck and rail is regulated by the United States Department of Transportation (USDOT). The USDOT regulations establish criteria for safe handling procedures. Federal safety standards are also included in the California Administrative Code. The California Health Services Department regulates the haulers of hazardous waste. According to the USDOT, Office of Hazardous Materials Safety's (OHMS) most recent Biennial Report on Hazardous Materials Transportation, highway transportation accounts for the largest share of incidents, deaths, and injuries associated with hazardous materials transportation. Rail accounts for the next largest portion, followed by air and water modes of transport. Highway incidents also account for the largest share of economic damage among modes of transport. While hazardous waste incidents account for a small percentage of overall highway incidents, the impact of those incidents can be more significant due to the nature of the material(s) involved. Specific programs have been developed by various responsible agencies to limit or prevent the impact to human health and the environment when hazardous materials/waste incidents occur.

In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by the DTSC. The DTSC maintains a list of active registered hazardous waste transporters throughout California. Shipments of hazardous materials and wastes include a wide variety of chemicals, such as petroleum products, medical waste, and radioactive materials. Each movement of hazardous materials/wastes implies a degree of risk, depending on the material being moved, the mode of transport, and numerous other factors. On a tonnage basis, petroleum products make up the majority—more than 80 percent—of hazardous material moved around the state.

Aside from rail and pipeline, hazardous materials transported within the San Francisco Bay Area region use many of the same freeways, arterials, and local streets as other traffic. This creates a risk of accidents and associated release of hazardous materials for other drivers and for people along these routes, as does the use of rail modes for hazardous materials shipments.

4.7.1.4 Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred or where artificial fill has been placed. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Board GeoTracker online database, the Cal/EPA DTSC Envirostor online database, and several other federal, State and local regulatory agency databases.

4.7.1.5 Naturally Occurring Asbestos

Asbestos is not a formal mineralogical term, but rather a commercial and industrial term historically applied to a group of silica-containing minerals that form long, very thin mineral fibers, which generally form in bundles, and were once widely used in commercial products.³⁷ Commercial-grade asbestos was highly regarded for its high tensile strength, flexibility, and resistance to heat, chemicals, and electricity. However, mounting evidence in the 20th century indicated that inhalation of asbestos fibers caused respiratory diseases that have seriously affected many workers who were working closely with asbestos. Once disturbed, microscopic fibers can become airborne and then lodged in the lungs. Exposure to asbestos has been linked to numerous serious health problems and diseases, including asbestosis, lung cancer, and mesothelioma.

Naturally occurring asbestos (NOA) includes minerals described as asbestos that are found in place in their natural state, such as in bedrock or soils. Natural occurrences of asbestos are of concern due to potential exposures to the tiny fibers that can become airborne if asbestos-bearing rocks are disturbed by natural erosion or human activities such as road building, excavations, and other ground disturbing activities. In California, concern over potential public exposure to NOA has led to guidance documents and various regulations for NOA. In 1986, asbestos was identified as a toxic air contaminant by the California Air Resources Board (ARB). In 1990, the ARB issued an

³⁷ United States Geological Survey, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California, Open File Report 2011-1188, 2011.

Airborne Toxic Control Measure (ATCM), which prohibited the use of serpentine aggregate for surfacing if the asbestos content was 5 percent or more.

Government agency and general public concerns about public health resulting from exposure to asbestos led to new regulations and guidance regarding NOA:

- In July 2000, the ARB adopted amendments to the existing ATCM prohibiting the use or application of serpentine, serpentine-bearing materials and asbestos-containing ultramafic rock for covering unpaved surfaces unless it has been tested using an approved asbestos bulk test method and determined to have an asbestos content that is less than 0.25 percent. These amendments took effect on November 13, 2001.
- In July 2001, the ARB adopted a new ATCM for construction, grading, quarrying, and surface mining operations in areas with serpentine or ultramafic rocks. This ATCM became effective on November 19, 2002.
- In October 2000, the Governor's Office of Planning and Research issued a memorandum providing guidance to Lead Agencies in analyzing the impacts of naturally occurring asbestos on the environment through the California Environmental Quality Act (CEQA) review process.
- In November 2000, the California Department of Real Estate added a section to subdivision forms that included questions related to NOA on property proposed for development.
- In 2004, as part of its school-site review program, the California Department of Toxic Substances Control's School Property Evaluation and Cleanup Division released interim guidance on evaluating NOA at school sites.

Overall, 53 of the 58 California counties, including San Francisco County, contain reported asbestos occurrences and/or ultramafic rocks such as serpentinite that can contain asbestos fibers.³⁸ In general, NOA fibers do not pose a threat unless disturbed and/or introduced into the air as fugitive dust.

4.7.1.6 Schools

CEQA Guidelines require EIRs to assess whether a project would emit hazardous air emissions or involve the handling of extremely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (see CEQA Sections 21151.2 and 21151.4; Appendix G of the CEQA Guidelines). Children are particularly susceptible to long-term impacts from emissions of hazardous materials from roadways near schools as well as high-volume motor vehicle travel on roadways through residential areas. There are numerous schools located throughout San Francisco and DTSC has created the School Property Evaluation and Cleanup Division that is responsible for assessing, investigating, and cleaning up proposed school sites. The Division ensures that selected properties are free of potential exposure to contamination either as a result of past land uses or current neighboring uses. Through the environmental review process, DTSC ensures protection of children, staff and the environment from the potential effects of exposure to hazardous materials.

³⁸ Ibid.

4.7.1.7 Emergency Services

The California Emergency Management Agency (Cal EMA) was established as part of the Governor's Office on January 1, 2009, merging the duties, powers, purposes, and responsibilities of the former Governor's Office of Emergency Services with those of the Governor's Office of Homeland Security. Cal EMA is responsible for the coordination of overall State agency response to major disasters in support of local government. The Agency is responsible for assuring the State's readiness to respond to, and recover from, all hazards—natural, man-made, and war-caused emergencies and disasters—and for assisting local governments with emergency preparedness, response, recovery, and hazard mitigation efforts (California Emergency Management Agency, 2011).

Each county has a local Office of Emergency Services (OES), which coordinates with the State during emergency situations. When local and mutual aid resources are exhausted, the State coordinates its emergency resources through its State Operations Center in Sacramento and its multiple Emergency Operations Centers (EOC) throughout the region.

In coordination with the local OES, jurisdictions house EOCs, which are command centers where emergency service providers (many from the local OES) meet and coordinate response, recovery, and resources during disasters. The following functions are performed in the EOC, as necessary:

- Receiving and disseminating warnings;
- Managing emergency operations;
- Developing emergency response and recovery policies;
- Collecting intelligence from, and disseminating information to, the various EOC representatives, and assuring coordination between the Field Operations Center locations, building managers, and departmental safety representatives throughout the regional system;
- Coordinating information with Cal EMA, the Federal Emergency Management Agency, and other appropriate outside agencies;
- Preparing intelligence/information summaries, situation reports, operation progress reports and other reports as required;
- Preparing incident action plans;
- Maintaining general and specific maps, information display boards, and other data pertaining to emergency operations;
- Continuing analysis and evaluation of all data pertaining to emergency operations; and
- Controlling and coordinating, within established policy, the operations and logistical support of resources committed to the EOC.

4.7.1.8 Wildland Fire

The California Department of Forestry and Fire Protection has identified urban areas considered at risk as a fire-threatened community as part of the Wildland Urban Interface program. With

California's extensive urban Wildland-Urban Interface situation, the list of communities extends beyond just those adjacent to Federal lands. There are 874 communities currently on the Communities at Risk List, including San Francisco.

While all of California is subject to some degree of fire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (Public Resources Code 4201-4204 and Government Code 51175-89). CAL FIRE has developed a fuel ranking assessment methodology that assigns ranks (moderate, high, and very high) based on expected fire behavior for unique combinations of topography and vegetative fuels under a given severe weather condition (including wind speed, humidity, and temperature). In general, the susceptibility for high and very high wildfires dramatically increases in the late summer and early autumn as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel (URS, 2008). Common causes of wildfires include arson and negligence. According to mapping for the City of San Francisco's Hazard Mitigation Plan, only the Parnassus Heights campus site is located in an area considered to be a high to very high potential for wildfire (URS, 2008). This determination is based on expected fire behavior for unique combinations of topography and vegetative fuels under a given severe weather condition and is initially based on an assigned fuel model combined with topography. Final rankings are based on the amount of fuel present (URS, 2008).

4.7.2 Regulatory Considerations

4.7.2.1 Federal

The primary federal agencies with responsibility for hazardous materials management include the EPA, U.S. Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the USDOT. Federal laws, regulations, and responsible agencies are summarized in **Table 4.7-1** and are discussed in detail in this section.

State and local agencies often have either parallel or more stringent rules than federal agencies. In most cases, state law mirrors or overlaps federal law and enforcement of these laws is the responsibility of the state or of a local agency to which enforcement powers are delegated. For these reasons, the requirements of the law and its enforcement are discussed under either the state or local agency section.

Federal Aviation Administration

The Federal Aviation Administration (FAA) is the USDOT agency charged with (1) regulating air commerce to promote its safety and development; (2) achieving the efficient use of navigable airspace of the United States; (3) promoting, encouraging, and developing civil aviation; (4) developing and operating a common system of air traffic control and air navigation for both civilian and military aircraft; and (5) promoting the development of a national system of airports.

**TABLE 4.7-1
 FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT**

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA))	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA) Hazardous and Solid Waste Act	Under RCRA, the USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave." Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	U.S. Department of Transportation (DOT) U.S. Postal Service (USPS)	DOT has the regulatory responsibility for the safe transportation of hazardous materials. The DOT regulations govern all means of transportation except packages shipped by mail (49 CFR). USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR).
Radioactive Materials ^a	Atomic Energy Act	Administered by the Nuclear Regulatory Commission, the act regulates the use and control of radioactive material. ^b
Biosafety Standards ^c	The National Institutes of Health, and the Centers for Disease Control and Prevention (CDC)	Operated under the U.S. Department of Health and Human Services, these agencies establish standards for working with biohazardous materials.
Structural and Building Components (Lead-based paint, PCBs, and asbestos)	Toxic Substances Control Act (TSCA) U.S. EPA	Regulates the use and management of PCBs in electrical equipment, and sets forth detailed safeguards to be followed during the disposal of such items. The USEPA monitors and regulates hazardous materials used structural and building components and affects on human health.

^a U.S. Nuclear Regulatory Commission, Atomic Energy Act of 1954, as amended, <http://www.nrc.gov/about-nrc/governing-laws.html>, accessed January 7, 2009.

^b Radioactive material is any material or combination of materials that spontaneously emit ionizing radiation.

^c A hazardous biologic material is any potentially harmful biologic material (including infectious agents, oncogenic viruses, and recombinant DNA) or any material contaminated with a potentially harmful biologic material.

SOURCE: ESA, 2009

The FAA's Heliport Design Advisory Circular (AC 150/53990-2A) and Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace, define the final approach and takeoff area (FATO) and safety areas for helipads. Clear approach and takeoff areas that extend well beyond the landing pad must exist in order to permit the establishment of the helipad; and these areas must be maintained clear of obstructions for operations to continue.

4.7.2.2 State

In January 1996, Cal/EPA adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The program has six elements: hazardous waste generators and hazardous waste on-site treatment; underground storage tanks; aboveground storage tanks; hazardous materials release response plans and inventories; risk management and prevention programs; and Unified Fire Code hazardous materials management plans and inventories. The plan is implemented at the local level. The Certified Unified Program Agency (CUPA) is the local agency that is responsible for the implementation of the Unified Program (CA EPA, 2009). In San Francisco, the San Francisco Department of Public Health is the designated CUPA for all businesses.

Hazardous Materials Management

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that any business that handles hazardous materials prepare a Hazardous Materials Business Plan, which must include the following:³⁹

- Details, including floor plans, of the facility and business conducted at the site;
- An inventory of hazardous materials that are handled or stored on site;
- An emergency response plan; and
- A safety and emergency response training program for new employees with annual refresher courses

Hazardous Waste Handling

DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. Laws and regulations require hazardous materials users to store these materials appropriately and to train employees to manage them safely.

Under the federal Resource Conservation and Recovery Act of 1976 (RCRA), whose responsibilities are described in Table 4.7-1, individual states may implement their own hazardous waste programs in lieu of RCRA, as long as the state program is at least as stringent as federal RCRA requirements. In California, the DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; prescribe management standards for hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

³⁹ “Hazardous Materials Release Response Plans and Inventory Law,” California Health and Safety Code, Chapter 6.95.

Hazardous Materials Transportation

The State of California has adopted USDOT regulations for the intrastate movement of hazardous materials. State regulations are contained in Title 26 of the California Code of Regulations (CCR). In addition, the State of California regulates the transportation of hazardous waste originating in the state and passing through the state (26 CCR). Both regulatory programs apply in California (State of California, 2007).

The two state agencies that have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans).

The CHP enforces hazardous material and hazardous waste labeling and packing regulations to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at as many as 72 locations throughout the state that can respond quickly in the event of a spill.

Common carriers of hazardous waste are licensed by the CHP, pursuant to California Vehicle Code Section 32000. Every type of hazardous waste package used by a hazardous materials shipper must undergo tests that imitate some of the possible rigors of travel. While not every package must be put through every test, most packages must be able to be: kept under running water for a time without leaking; dropped, fully loaded, onto a concrete floor; compressed from both sides for a period of time; subjected to low and high pressure; and frozen and heated alternately.

Medical Waste

Within the regulatory framework of the Medical Waste Management Act, the Medical Waste Management Program of the California Department of Health Services (CDHS) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste offsite treatment facilities and transfer stations throughout the state. The CDHS also oversees all medical waste transporters. UCSF, as a state agency, works with San Francisco Department of Public Health to ensure the Medical Waste Management Program is enforced.

Occupational Safety

The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations.

Cal/OSHA regulations (8 CCR) concerning the use of hazardous materials in the workplace require employee safety training, safety equipment, accident and illness prevention programs, hazardous

substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances, and communicating hazard information relating to hazardous substances and their handling. The hazard communication program also requires that Materials Safety Data Sheets (MSDSs) be available to employees, and that employee information and training programs be documented. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

State laws, like federal laws, include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. Specific, more detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in 29 CFR. Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must also be provided and maintained in accessible places.

Cal/OSHA (8 CCR), like Fed/OSHA (29 CFR) includes extensive, detailed requirements for worker protection applicable to any activity that could disturb asbestos-containing materials, including maintenance, renovation, and demolition. These regulations are also designed to ensure that persons working near maintenance, renovation, or demolition activity are not exposed to asbestos.

Radioactive Materials

Pursuant to the federal Atomic Energy Act, which requires states to assume responsibility for the use, transportation, and disposal of low-level radioactive material and for the protection of the public from radiation hazards, the Radiologic Health Branch (RHB) of the CDHS administers the state's Radiation Control Law, which governs the storage, use, transportation, and disposal of sources of ionizing radiation (radioactive material and radiation-producing equipment). Radioactive material regulations require registration of sources of ionizing radiation, licensing of radioactive material, and protection against radiation exposure. The RHB also regulates the transportation of radioactive materials and disposal of radioactive waste. Users of radioactive materials must maintain detailed records regarding the receipt, storage, transfer, and disposal of such materials (RHB, 2009). State regulations concerning radioactive substances are included in 17 CCR. The regulations specify appropriate use and disposal methods for radioactive substances, as well as worker safety precautions and worker health monitoring programs. Radioactive materials at WHHS are regulated under its Radioactive Material License issued by the RHB.

Biosafety Standards

Similar to federal laws, state laws establish standards for working with biohazardous materials. A hazardous biologic material is any potentially harmful biologic material (including infectious agents, oncogenic viruses, and recombinant DNA) or any material contaminated with a potentially harmful biologic material. The National Institutes of Health and the Centers for Disease Control and Prevention operate under the U.S. Department of Health and Human Services and establish standards for working with biohazardous materials.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services, which coordinates the responses of other agencies, including Cal EPA, CHP, the Department of Fish and Game, the San Francisco Bay Regional Water Quality Control Board, and the San Francisco Fire Department (SFFD). The SFFD provides first response capabilities, if needed, for hazardous materials emergencies within the 2014 LRDP area.

Structural and Building Components

Asbestos

State laws and regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local governmental agencies prior to beginning renovation or demolition that could disturb asbestos. Asbestos represents a human health risk when asbestos fibers become airborne (friable) and are inhaled into the lungs.

The Bay Area Air Management District (BAAQMD) is vested by the California legislature with authority to regulate airborne pollutants, including asbestos, through both inspection and law enforcement, and is to be notified ten days in advance of any proposed demolition or abatement work. Notification includes the names and addresses of operations and persons responsible; description and location of the structure to be demolished/altered including size, age, and prior use, and the approximate amount of friable asbestos; scheduled starting and completion dates of demolition or abatement; nature of planned work and methods to be employed; procedures to be employed to meet BAAQMD requirements; and the name and location of the waste disposal site to be used. The BAAQMD randomly inspects asbestos removal operations and will inspect any removal operation about which a complaint has been received. Cal/OSHA regulates asbestos removal to ensure the health and safety of workers removing asbestos containing materials (ACM) and also must be notified of asbestos abatement activities.

Section 19827.5 of the California Health and Safety Code requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos.

Asbestos abatement contractors must follow state regulations contained in 8 CCR 1529 and 8 CCR 341.6 through 341.14 where there is asbestos-related work involving 100 square feet or more of ACMs. Asbestos removal contractors must be certified by the Contractors Licensing Board of the State of California. The owner of the property where abatement is to occur must have a hazardous waste generator number assigned by and registered with the DTSC in Sacramento. The applicant and the transporter of the waste are required to file a hazardous waste manifest that details the transportation of the material from the site and its disposal.

Polychlorinated Biphenyls (PCBs)

As previously discussed, PCBs are organic oils formerly used in many types of electrical equipment and in fluorescent lighting ballasts. PCBs are highly persistent in the environment and are toxic. In 1979, the USEPA banned the use of PCBs in most new electrical equipment and began a program to phase out certain existing PCB-containing equipment. The use and management of PCBs in electrical equipment is regulated pursuant to the Toxic Substances Control Act (40 CFR). Fluorescent lighting ballasts that contain PCBs, regardless of size and quantity, are regulated as hazardous waste and must be transported and disposed of as hazardous waste.

Lead and Lead-Based Paint

The California Code of Regulations, Title 22, considers waste soil with concentrations of lead to be hazardous if it exceeds a total concentration of 1,000 parts per million (ppm) and a soluble concentration of 5 ppm.⁴⁰ Both the federal and California OSHAs regulate all worker exposure during construction activities that involve lead-based paint. The Interim Final Rule found in 29 CFR Part 1926.62 covers construction work where employees may be exposed to lead during such activities as demolition, removal, surface preparation for re-painting, renovation, clean up and routine maintenance. The OSHA-specified method of compliance includes, among other things, respiratory protection, protective clothing, housekeeping, hygiene facilities, medical surveillance, and training.

Aboveground and Underground Storage Tanks

The State Water Resources Control Board (SWRCB) administers the Aboveground storage tank (AST) program. Facilities that store petroleum in a single tank greater than 1,320 gallons or facilities that store petroleum in ASTs or containers with a cumulative storage capacity of greater than 1,320 gallons are subject to SWRCB regulations. The AST Program requires that the owners or operators file a storage statement, pay a facility fee, and prepare and implement a federal Spill Prevention Control and Countermeasure (SPCC) Plan. The SPCC Plan must discuss the procedures, methods, and equipment in place at the facility to prevent discharges of petroleum from reaching navigable waters. AST oversight is provided by the San Francisco Department of Public Health, in accordance with the CUPA Program.

State laws governing underground storage tanks (UST) specify requirements for permitting, construction, installation, leak detection monitoring, repairs, release monitoring, corrective actions, cleanup, and closure. The San Francisco Department of Public Health and the SFFD are the local agencies designated to permit and inspect USTs and to implement applicable regulations.

Heliports and Helipads

Caltrans' Division of Aeronautics (DOA) issues permits for all heliports in the State of California. Heliports must meet the FAA's FATO standards in order to obtain a Caltrans operating permit, in addition to complying with Title 21 CCR, Airports and Heliports, which is based upon the FAA's Advisory Circular on Heliport Design.

⁴⁰ Susceptible of being dissolved, especially in water.

California Office of Statewide Health Planning and Development

The Office of Statewide Health Planning and Development (OSHPD) is a department of the California Health and Human Services Agency. OSHPD serves as the regulatory building agency for all hospitals and nursing homes in California (OSHPD, 2009). Its primary goal in this regard is to ensure that patients in these facilities are safe in the event of an earthquake or other disaster, and to ensure that the facilities remain functional after such an event in order to meet the needs of the community affected by the disaster.

4.7.2.3 Local

San Francisco

The City and County of San Francisco has enacted local regulations to address the potential to encounter hazardous materials in the soil and hazardous building materials, and to ensure the safe handling of hazardous materials and hazardous wastes. The following sections of the San Francisco Health Code, implemented by the San Francisco Department of Public Health (DPH) as the Hazardous Materials Unified Program Agency and briefly summarized below, would apply to the potential to encounter hazardous materials in the soil, and the use of hazardous materials under project sites:

- Article 22A (Analyzing the Soils for Hazardous Waste, known as the Maher Ordinance) requires that projects located in certain specified areas that would involve disturbance of more than 50 cubic yards of soil prepare a site history report to identify whether past site uses may have caused contamination, conduct soil testing for the presence of the potentially hazardous constituents, prepare a soils analysis report, and prepare a Site Mitigation Plan (if contamination is identified). The specified areas included land located bayward of the historic high tide line, areas currently or previously zoned industrial, areas currently or previously with industrial land uses, areas within 150 feet of Highway 101, Interstate 80, or Interstate 280, areas of Bay fill, areas within 100 feet of know hazardous waste site (Geotracker/Envirostor), and areas within 100 feet of an underground storage tank. If hazardous materials remain in the soil or groundwater, approval of the Site Mitigation Plan by the DPH may be conditioned upon submittal of a Risk Management Plan, Health and Safety Plan, and possibly a Cap Maintenance Plan to prevent exposure to hazardous materials in soil or groundwater after construction of the project. Upon completion of site mitigation, the site owner must submit certification that the project has received certification or verification from the appropriate state or federal agency that mitigation is complete. As master developer for the former redevelopment area, the Mission Bay Development Group (MBDG) is responsible for obtaining Maher site clearance from SFPDH for the University's Mission Bay parcels. The entire waterfront from Aquatic Park to Pier 80 is located bayward of the historic high tide line, and the DPH may also require compliance with Article 22A at sites westward of the historic high tide line if the DPH has reason to believe that hazardous materials may be present in the soil at the property.
- Article 21 (Hazardous Materials) provides for safe handling of hazardous materials in the city. It requires any person or business that handles, sells, stores, or otherwise uses specified quantities of hazardous materials to keep a current certificate of registration and to implement a hazardous materials business plan (HMBP). Threshold quantities are 500 pounds for solids, 55 gallons for liquids, and 200 cubic feet for compressed gases.

Every business that must implement an HMBP must also obtain a certificate of registration certifying that the HMBP meets the requirements of Article 21. This article also specifies requirements for the installation and operation of underground storage tanks, reporting of unauthorized releases, and closure of permitted facilities.

- Article 21A (Risk Management Plan) requires any business that handles, sells, stores, or otherwise uses regulated substances⁴¹ in quantities exceeding specified threshold amounts to register with the DPH and prepare a Risk Management Plan. The Risk Management Plan must be submitted to the DPH before a Certificate of Occupancy can be issued.
- Article 22 (Hazardous Waste) provides for safe handling of hazardous wastes in the City. It authorizes the DPH to implement the state hazardous waste regulations, including authority to conduct inspections and document compliance.

Lead-Based Paint

Work that could result in the disturbance of lead-based paint must comply with Section 3425 of the San Francisco Building Code, Work Practices for Lead-Based Paint on pre-1979 Buildings and Steel Structures. Where there is any work that may disturb or remove lead-based paint on the exterior of any building built prior to December 31, 1978, Section 3425 requires specific notification and work standards and identifies prohibited work methods and penalties.

Section 3425 applies to the exterior of all buildings or steel structures on which original construction was completed prior to 1979 (which are assumed to have lead-based paint on their surfaces, unless demonstrated otherwise through laboratory analysis), and to the interior of residential buildings, hotels, and child care centers. The ordinance contains performance standards, including establishment of containment barriers, at least as effective at protecting human health and the environment as those in the U.S. Department of Housing and Urban Development Guidelines (the most recent Guidelines for Evaluation and Control of Lead-Based Paint Hazards) and identifies prohibited practices that may not be used in disturbances or removal of lead-based paint. Any person performing work subject to the ordinance shall, to the maximum extent possible, protect the ground from contamination during exterior work; protect floors and other horizontal surfaces from work debris during interior work; and make all reasonable efforts to prevent migration of lead paint contaminants beyond containment barriers during the course of the work. Cleanup standards require the removal of visible work debris, including the use of a High Efficiency Particulate Air Filter (HEPA) vacuum following interior work.

The ordinance also includes notification and signage requirements. Prior to the commencement of work, the responsible party must provide written notice to the director of the San Francisco Department of Building Inspection (DBI) indicating the address and location of the project; the scope of work, including specific location; methods and tools to be used; the approximate age of the structure; anticipated job start and completion dates for the work; whether the building is residential or nonresidential, owner-occupied or rental property; the dates by which the responsible party has or will fulfill any tenant or adjacent property notification requirements; and the name, address,

⁴¹ Regulated substances include those regulated under Section 68.130 of Title 40 of the Code of Federal Regulations, or those identified as an extremely hazardous substance in Appendix A of Part 355 of Title 40 of the Code of Federal Regulations, and those identified in Chapter 6.95, Article 2 of the California Health and Safety Code.

telephone number, and pager number of the party who will perform the work. Further notice requirements include signage when containment is required, requirements for signage when containment is required, notice to occupants, availability of pamphlet related to protection from lead in the home, and Early Commencement of Work (Requested by Tenant). The ordinance contains provisions regarding inspection and sampling for compliance by the DBI and enforcement, and describes penalties for non-compliance with the requirements of the ordinance.

4.7.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- 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?
- c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- 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?
- 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 result in a safety hazard for people residing or working in the project area?
- 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?
- g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
- 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 wildlands?

Regarding the criterion e), after evaluation of the activities proposed by the LRDP, the Initial Study concluded that implementation of the 2014 LRDP would clearly result in no impact or a less-than-significant impact at all campus sites. Therefore, this criterion is not discussed further in the EIR.

4.7.4 Analysis Methodology

This analysis evaluates the potential effects related to hazards and hazardous materials from implementation of the 2014 LRDP, including impacts from operation and construction related effects. Construction-related effects would be impacts that could occur during construction activities, including the potential for a release of hazardous materials during relocation of existing

tenants, the potential for a release of hazardous materials during construction, potential exposure to hazardous materials in soil, and potential exposure to hazardous building materials. Overall, compliance with regulatory requirements for these activities would ensure that hazardous materials impacts would be less than significant, as described.

4.7.5 References

URS Corporation, *San Francisco Hazard Mitigation Plan, Wildfire Hazard Area*, September 2008.

4.8 Hydrology and Water Quality

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Hydrology and Water Quality impacts. 2014 LRDP Hydrology and Water Quality effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*. Hydrology and Water Quality effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures*, and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.8.1 Regional Setting

4.8.1.1 Fluvial Hydrology and Stormwater Management

With the primary exception of parklands, much of the City of San Francisco is urbanized and covered in impermeable surfaces. There are few daylighted streams within the City, though topographic drainages in some park areas may have ephemeral surface flows during storms. Rainfalls rapidly produce surface runoff that is routed into a combined sewer system (CSS).

The CSS is a network of pipes and tunnels that convey combined stormwater and sanitary sewage flows, referred to as combined sewer discharge, to City wastewater treatment plants. During non-storm conditions, the City's CSS collects and treats up to 80 million gallons per day (MGD) of wastewater, primarily municipal sewage. The CSS routes flows to two treatment plants: the Southeast Treatment Plant in the Bayview/Hunters Point neighborhood, and the Oceanside Treatment Plant east of the Great Highway near the San Francisco Zoo. The Southeast plant receives approximately 80% of the combined wastewater and stormwater flows, including flows from the Mount Zion and Mission Center campus sites, and discharges them to San Francisco Bay. The Oceanside plant treats the remaining 20% of flows from the west side of the city, including wastewater from the Parnassus Heights campus site⁴², and discharges them to the Pacific Ocean. During rainstorms, these facilities can collect and treat more than 500 million gallons per day (MGD) of combined inflows. These plants normally employ a minimum of secondary treatment to the combined inflows, before discharging the effluent. However, depending on individual storm characteristics and timing, the treatment plants can be overwhelmed, which results in discharge of minimally treated flows to the Bay and/or Ocean. Such overflows are expected to occur one to ten times per year (Gresgson, 2011).

The Mission Bay area, including the Mission Bay campus site, was formerly connected to the combined storm drain / sewer system. This system was separated in 2011 and stormwater flows are now discharged to San Francisco Bay.

⁴² Due to campus topography, about half of the overland stormflow from the Parnassus Heights campus site goes to the Southeast plant.

Flooding

Mean annual rainfall for north central San Francisco (Richmond District gage) is 20.0 inches (WRCC, 2014). The rainy season for San Francisco's Mediterranean-type climate normally extends from October through March. Substantial floods occur in response to Pacific frontal-system storms of 3-5 days duration, with nested bursts of high-intensity rainfall. For the higher elevation zones of the City, such as Mount Sutro above Parnassus Heights, flooding is localized and occurs periodically due to obstructed storm drains, plugged catch basin inlets or undersized drain segments.

The Federal Emergency Management Agency (FEMA) is in the process of preparing Flood Insurance Rate Maps (FIRMs) for the City and County of San Francisco (CCSF).⁴³ FIRMs identify areas that are subject to inundation during a flood having a 1-percent chance of occurrence in a given year (also known as a "base flood," "100-year flood," or "1 percent annual chance flood"). FEMA refers to an area that is at risk from a 100-year flood as a special flood hazard area.

FEMA has delayed publication of a final FIRM until a more detailed analysis of flood hazards is completed. In 2008, the City agreed to join the National Flood Insurance Program (POSF, 2008). FEMA approved San Francisco's application for participation in the National Flood Insurance Program in April 2010, meaning that homeowners, renters, and business owners in the City are now eligible to purchase federally subsidized flood insurance for their property. The City Administrator's Office and the San Francisco Department of Emergency Management are also working to identify potential hazard mitigation projects that may be eligible for FEMA grants.

4.8.1.2 Water Quality

Central San Francisco Bay

Various contaminants are transported into the San Francisco Bay by sources that include urban uses, industrial outfalls, municipal wastewater outfalls, municipal stormwater, upstream farming, upstream historic and current mining discharges, legacy pollutants,⁴⁴ and various other sources.

Water depths along the San Francisco waterfront and piers are relatively shallow and suspended sediment loads are strongly influenced by nearshore discharges and wind- and wave-generated sediment disruption; they likely are similar to the higher sediment concentrations typically found near the bottom of the Bay or in other shallow environments.

⁴³ In September 2007, FEMA issued a preliminary FIRM of San Francisco for review and comment by the City. The City submitted comments that year, and FEMA anticipated publishing a revised preliminary FIRM by 2012, after completing a more detailed analysis of flood hazards associated with San Francisco Bay as requested by Port and City staff. FEMA will finalize the FIRM and publish it for flood insurance and floodplain management purposes after reviewing comments and appeals related to the revised preliminary FIRM. As of August 2014, final FIRM maps for San Francisco are still not available on the FEMA web page. <https://msc.fema.gov/webapp/wcs/stores/servlet/mapstore/homepage/MapSearch.html>

⁴⁴ Legacy pollutants are water quality constituents that are considered harmful to human health or the environment, that were historically emitted by industry or other human activities, and that are in general banned or significantly restricted from current usage. Examples include mercury, lead, PCBs, and DDT.

Pollutants enter the Central San Francisco Bay primarily through runoff, combined sewer overflows, stormwater discharges, spills and leaks, and remobilization of contaminants from sediment into the overlying water column. The San Francisco Bay Regional Water Quality Control Board (RWQCB) listed the Central Bay as an impaired water body, as defined under Section 303(d) of the Clean Water Act (discussed in Section 4.8.2, Regulatory Considerations, below), that does not meet water quality standards, implementation of pollution control technology at point sources of pollution.

Central San Francisco Bay and Mission Creek at China Basin near the Mission Bay campus site are identified as impaired water bodies under Section 303(d) of the Clean Water Act (see Section 4.8.2.2 below).

4.8.2 Regulatory Considerations

4.8.2.1 Federal Regulations

Clean Water Act – Water Quality

In 1972, the Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gave the U.S. Environmental Protection Agency (U.S. EPA) the authority to implement pollution control programs such as setting wastewater standards for industries. The CWA sets water quality standards for contaminants in surface waters. The statute employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The U.S. EPA has delegated responsibility for implementation of portions of the CWA, including water quality control planning and programs, in California to the State Water Resources Control Board and the nine RWQCBs. Water quality standards applicable to the project are listed in the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan), discussed further below under State Regulations in Section 4.8.2.2.

Executive Order 11988 and National Flood Insurance Program

Under Executive Order 11988, FEMA is responsible for management of floodplain areas, which are defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year. Also, FEMA administers the National Flood Insurance Program, which requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the one percent annual chance flood zone. FEMA prepares FIRMs that are used to identify areas prone to flooding.

4.8.2.2 State Regulations

California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides for protection of the quality of all waters of the State of California for use and

enjoyment by the people of California. The act also establishes provisions for a statewide program for the control of water quality, recognizing that waters of the State are increasingly influenced by interbasin water development projects and other statewide considerations, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally within the State. The statewide program for water quality control is therefore administered most effectively on a local level with statewide oversight. Within this framework, the act authorizes the SWRCB and regional boards to oversee the coordination and control of water quality within California.

San Francisco Bay Water Quality Control Plan (Basin Plan)

San Francisco Bay waters are under the jurisdiction of the San Francisco Bay RWQCB which established regulatory standards and objectives for water quality in the Bay in the *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the Basin Plan (RWQCB, 2010). The Basin Plan identifies existing and potential beneficial uses for surface waters and provides numerical and narrative water quality objectives designed to protect those uses. The preparation and adoption of water quality control plans is required by the California Water Code (Section 13240) and supported by the federal CWA. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plan is a regulatory reference for meeting the State and federal requirements for water quality control. Adoption or revision of surface water standards is subject to the approval of the USEPA.

Total Maximum Daily Loads

Under Section 303(d) of the Federal CWA, states must present the USEPA with a list of “impaired water bodies,” defined as those water bodies that do not meet water quality standards. As discussed in the Setting section above under Water Quality, the San Francisco RWQCB has listed the Central Bay portion of the San Francisco Bay as well as Mission Creek as impaired water bodies (RWQCB, 2007), and as required by the CWA requires the development of Total Maximum Daily Loads (TMDLs) to improve water quality of impaired water bodies.

NPDES Waste Discharge Regulations

Section 402 of the federal CWA established the National Pollutant Discharge Elimination System (NPDES) program to protect the water quality of receiving Federal waters. The NPDES program requires all facilities that discharge pollutants into waters of the United States to obtain a permit. The permit provides two levels of control – technology-based limits and water-quality-based limits – to control discharge of pollutants for the protection of water quality. Technology-based limits are based on the ability of dischargers in the same category of industry to treat wastewater, while water quality-based limits are required if technology-based limits are not sufficient to provide protection of the water body. Water quality-based effluent limitations required to meet water quality criteria in the receiving water are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and the Basin Plan. NPDES permits must also incorporate TMDL wasteload allocations when they are developed.

The regulations initially focused on municipal and industrial wastewater discharges in 1972, followed by stormwater discharge regulations, which became effective in November 1990. NPDES permits for wastewater and industrial discharges specify discharge prohibitions and effluent limitations and also include other provisions (such as monitoring and reporting programs) deemed necessary to protect water quality. In California, the SWRCB and the RWQCBs implement and enforce the NPDES program.

Construction General Stormwater Permit (SWRCB Order No. 2009-09-DWQ)

For stormwater discharges associated with construction activity in the state of California, the SWRCB has adopted the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit) in order to avoid and minimize water quality impacts attributable to construction activities. The Construction General Stormwater Permit became effective on July 1, 2010 and expires on September 2, 2014; it applies to all projects where construction activity disturbs one or more acres of soil. Construction activities subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. The Construction General Stormwater Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which includes and specifies best management practices (BMPs) designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving offsite into receiving waters. Routine inspection of all BMPs is required under the provisions of the Construction General Stormwater Permit. In addition, the SWPPP must contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges pollutants directly into a water body listed as impaired under the CWA's Section 303(d) list for sediment.

The Construction General Stormwater Permit is implemented and enforced by the San Francisco Bay RWQCB, which administers the stormwater permitting program for the program area. Dischargers are required to submit a notice of intent (NOI) and permit registration documents (PRDs) in order to, at the discretion of the SWRCB, obtain coverage under this Construction General Stormwater Permit. Dischargers are responsible for notifying the relevant RWQCB of violations or incidents of non-compliance, as well as for submitting annual reports identifying deficiencies of the BMPs and how the deficiencies were corrected.

Phase II General Stormwater Permit (SWRCB Order No. 2003-0005-DWQ)

In 2003 the SWRCB adopted the General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer System (MS4s), SWRCB Order No. 2003-0005-DWQ (Phase II General Stormwater Permit). A revised permit applying to the MS4 at UCSF was approved in 2013. The revised Phase II General Permit requires UCSF to develop, implement and enforce a Storm Water Management Plan/Program (SWMP) by July 2016 that is designed to minimize the discharge of pollutants into receiving waters; identify appropriate stormwater treatment practices with measurable performance criteria; and ensure that the program includes provisions to address six minimum measures to promote pollutant load reduction. These measures are public education, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and pollution prevention and good housekeeping.

The revised Phase II permit also requires that by July 2015, plans for UCSF projects that create and/or replace (including projects with no net increase in impervious footprint) more than 2,500 square feet of impervious surface include the following:

- Site design measures such as porous pavement, setbacks, and impervious area disconnections to reduce project site runoff
- Low-Impact Design (LID) standards to effectively reduce runoff and pollutants from the project site, including:
 - Source control measures such as permanent and/or operational source control measures at loading docks, fuel dispensing areas, pools, and other areas;
 - Numeric sizing criteria for stormwater retention and treatment; and
 - Stormwater treatment measures and baseline hydromodification management measures

Oceanside and Southeast Plant Permits

The City and County of San Francisco operates the Oceanside and Southeast Water Treatment Plants and their related transport and outfall facilities under the regulatory provisions in NPDES Permits No. CA0037681 and CA0037664, and the Waste Discharge Requirements (WDRs) cited in Orders No. R2-2009-0062 and R2-2008-0007, respectively (RWQCB, 2008 and 2009). These Orders stipulate protocols for the monitoring of dry and wet weather Water Treatment Plant influent and effluent and limitations on sampled constituents of concern. The Southeast Water Treatment Plant also maintains a pretreatment program for CSS flows.

4.8.2.3 Local Regulations

In 2013, UCSF was designated by the SWRCB as a Phase 2 non-traditional MS4 (State Water Quality Board Order 2013-0001-DWQ) because its campus facilities (with the exception of the Mission Bay campus site) feed into the City's CSS. Elsewhere in the City, stormwater discharges to the CSS are governed by the SFPUC *Stormwater Design Guidelines* (SFPUC, 2010). Practically speaking, UCSF manages its stormwater in a way that is consistent with the guidelines (Franke, 2014), but the guidelines are not enforceable on UCSF campus sites due to their coverage under the Phase 2 MS4.

San Francisco Floodplain Management Ordinance

As noted above in Section 4.8.1, *Regional Setting*, in 2008 the City agreed to join the National Flood Insurance Program (NFIP). As a condition for joining the NFIP, the City adopted the Floodplain Management Ordinance, which requires new or substantially improved structures in designated flood hazard areas be protected against flood damage, and prohibits uses that would increase flood risks. In general, the Floodplain Management Ordinance requires the first floor of structures in flood zones to be constructed above the floodplain or to be flood-proofed. (CCSF, 2011)

4.8.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Violate any water quality standards or waste discharge requirements?
- 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)?
- 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 which would result in substantial erosion or siltation on or off site?
- 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 which would result in flooding on or off site?
- 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?
- f) Otherwise substantially degrade water quality?
- 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?
- h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- 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?
- j) Inundate by seiche, tsunami, or mudflow?

4.8.4 Analysis Methodology

This analysis evaluates the potential effects on hydrology and water quality from implementation of the 2014 LRDP, including effects from construction and operation. Construction-related effects on hydrology and water quality include direct impacts that could occur during demolition, renovation, and construction activities, including contributions to combined sewer flows. In addition, indirect impacts on water quality could occur as a result of increased campus growth and the conversion of undeveloped areas to developed areas.

Overall, compliance with regulatory requirements for these activities and implementation of project-specific plans prepared for the 2014 LRDP would ensure that both direct and indirect water quality-related effects would be minimized. Operational impacts of the 2014 LRDP are related to stormwater runoff at the campus sites and similarly, compliance with regulatory requirements would ensure that water quality effects related to stormwater runoff would be reduced.

4.8.5 References

- City and County of San Francisco (CCSF), Office of the City Administrator, *San Francisco Floodplain Management Program Fact Sheet*, Revised January 25, 2011.
- Franke, Paul, UCSF, personal communication, February 28, 2014.
- Gregson, John, San Francisco Water Department, personal communication to Clearwater Hydrology, 8/1/11; museumca.org/creeks/1690-OBSFSewers.htm
- Port of San Francisco (POSF), Memo from Monique Moyer, Executive Director, to Members of the Port Commission, Informational Presentation Regarding the National Flood Insurance Program, June 4, 2008.
- San Francisco Bay Public Utilities Commission (SFPUC), 2010. Stormwater Design Guidelines. January. <http://www.sfwater.org/index.aspx?page=446>
- San Francisco Bay Regional Water Quality Control Board (RWQCB), 2006 *CWA 303(d) List of Water Quality Segments Requiring TMDLs*, approved by the United States Environmental Protection Agency on June 28, 2007.
- RWQCB, 2008, Order R2-2008-007 Waste Discharge Requirements for the City and County of San Francisco: Southeast Water Pollution Control Plant (Southeast Plant), the North Point Wet Weather Facility, the Bayside Wet Weather Facilities, and the Wastewater Collection System within the City and adjoining service areas. SF Bay Regional Water Quality Control Board (Region 2), Oakland, CA. Effective date: April 1, 2008. http://www.swrcb.ca.gov/rwqcb2/board_decisions/adopted_orders/2009/R2-2009-0062.pdf.
- RWQCB, 2009, Order R2-2009-0062 Waste Discharge Requirements for the City and County of San Francisco: Oceanside Water Pollution Control Plant (Southwest Ocean Outfall) and Collection System, including the Westside Wet Weather Facilities. SF Bay Regional Water Quality Control Board (Region 2), Oakland, CA. Effective date: Oct. 1, 2009. http://www.swrcb.ca.gov/rwqcb2/board_decisions/adopted_orders/2009/R2-2009-0062.pdf
- RWQCB, 2010, *Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)*, www.swrcb.ca.gov/rwqcb2/water_issues/programs/planningtmdls/basinplan/web/docs/BP_all_chapters.pdf, December 31, 2010.
- Western Regional Climate Center (WRCC), www.wrcc.dri.edu

4.9 Land Use and Planning

This section presents the Regional Setting, Regulatory Considerations, Significance Standards, and Analysis Methodology for the evaluation of Land Use and Planning impacts. 2014 LRDP Land Use effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Land Use effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.9.1 Regional Setting

While the regional setting for the 2014 LRDP is the San Francisco Bay Area, the changes proposed by the LRDP would occur at campus sites located entirely within the City of San Francisco, a relatively dense urban environment that is built out in most areas. Few large tracts of vacant or underused land are available for new development. San Francisco consists of a number of neighborhoods, each with its own unique physical characteristics and mix of land uses.

4.9.2 Regulatory Considerations

The 2014 LRDP is a comprehensive land use plan intended to guide growth and other physical changes at UCSF in order to achieve its academic, research and clinical missions through 2035. The 2014 LRDP will establish general types of campus development and land uses to support projected on-campus population and research growth at UCSF, and to facilitate expanded and new program initiatives. It provides objectives to guide decisions for future facilities to meet needs over the next 20 years and projects the quantities and uses of new building space needed during this time frame. The 2014 LRDP includes land use or “functional zone” maps for its major campus sites, Parnassus Heights, Mission Bay, and Mount Zion, which will guide the location of future capital construction and infrastructure development. Following public review, the EIR and 2014 LRDP will be submitted to the Regents for their approval. Upon adoption by the Regents, this 2014 LRDP will replace UCSF’s 1996 LRDP, as amended.

The LRDP also references community planning principles that formalize UCSF’s commitment to communicate with neighbors regarding its space needs and potential future development, in order to identify potential community concerns that may arise from UCSF’s physical development prior to the time that individual projects are brought forward for approval.

Pursuant to the University of California’s constitutional autonomy, development and uses on property owned or leased by the University that are in furtherance of the University’s educational purposes are not subject to local land use regulation. However, UCSF reviews local land use policies as planning guidelines and includes those policies that are germane to the analysis of land use impacts in this EIR.

In 1987, the City and UCSF entered into a *Memorandum of Understanding* (MOU) to foster harmonious relations between the City and UCSF regarding the growth and development of UCSF facilities within the City's boundaries. The MOU describes the responsibilities of the City and UCSF for the oversight of their respective land uses and the development, maintenance and use of physical facilities, including methods of communication and consultation regarding UCSF's proposed development.

UCSF consults with the City when planning new development, especially if improvements are being proposed within City rights-of-way adjacent to campus sites. In addition, it is UCSF's intent to adhere substantially, to the extent practicable, to City zoning codes related to building use, height, and bulk limitations; floor area ratios; and parking requirements or restrictions for the purpose of ensuring compatibility with surrounding areas. At the Mission Bay campus site, UCSF development is subject to agreements that were negotiated by UCSF with the City, the City's former Redevelopment Agency and other developers in Mission Bay as part of the *Mission Bay Redevelopment Area North and South Plans* and the subsequent implementation of those Plans.

The major land use planning documents of the City are summarized below.

4.9.2.1 San Francisco General Plan

The *San Francisco General Plan* provides general policies and objectives to guide land use decisions and includes policies that relate to environmental issues. Although the University is constitutionally exempt from land use regulation by local agencies when using its properties to further its educational mission, the University strives to be substantially consistent with local policies where feasible. The General Plan contains 10 elements (Commerce and Industry, Recreation and Open Space, Housing, Community Facilities, Urban Design, Environmental Protection, Transportation, Air Quality, Community Safety and Arts) that set forth goals, policies and objectives for the physical development of the City.

4.9.2.2 San Francisco Planning Code

The San Francisco Planning Code regulates development in the City by prescribing the permitted uses and development standards consistent with the land use designations and policies in the *San Francisco General Plan*. The San Francisco Zoning Map defines the locations and boundaries of zoning use, building height and bulk limit districts. Zoning in San Francisco generally consists of multiple layers of districts. Use Districts are the base zoning districts that prescribe permitted land uses and most development standards (except height and bulk). Height and Bulk Districts are mapped separately from Use Districts and prescribe the permitted height and bulk of buildings. In some instances, on top of the Use Districts and Height and Bulk Districts, Special Use Districts (SUDs) are mapped to address particular issues for targeted areas; SUDs provide controls that supersede some or all of the underlying Use Districts to meet certain goals.

4.9.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Physically divide an established community?
- b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect?
- c) Conflict with any applicable habitat conservation plan or natural community conservation plan?
- d) Conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses?⁴⁵

Regarding criteria a) and c), after evaluation of the activities proposed by the 2014 LRDP, the Initial Study concluded that implementation of the 2014 LRDP would clearly result in no impact or a less-than-significant impact at all campus sites. Therefore, these criteria are not discussed further in the EIR.

4.9.4 Analysis Methodology

The examination of land use impacts is based on information obtained from the 2014 LRDP; review of published environmental documentation and land use studies of the UCSF campus sites; and review of documents pertaining to land use published by the City of San Francisco, including applicable elements of the General Plan. The analysis discusses whether the 2014 LRDP would be consistent with applicable land use plans and policies that were adopted for the purpose of avoiding or mitigating an environmental effect. Land use policies are policies that pertain to the type, location and physical form of new development. For this analysis, policies “adopted for the purpose of avoiding or mitigating an environmental effect” are considered those that, if implemented and adhered to, would avoid or mitigate physical impacts on the environment. For each potential impact, the analysis compares the impact to the standards of significance listed above and determines the impact’s level of significance under CEQA.

⁴⁵ Although the standard of significance previously adopted in the 1996 LRDP EIR focused on whether implementation of the 1996 LRDP would “substantially conflict with the use designations, height and bulk, and density restrictions of local zoning,” this EIR adopts a different standard of significance that focuses on compatibility with adjacent uses. Given the University’s constitutional exemption from local land use regulations and the fact that 2014 LRDP proposals will be implemented on UCSF’s four main campus sites, this new standard of significance will provide a more context-sensitive evaluation of land use impacts that takes into account the purpose of the local use, height and bulk, and density restrictions, which is to ensure compatibility with adjacent land uses. This new standard of significance will therefore provide a more informed and accurate analysis of the 2014 LRDP’s land use impacts. For example, while the proposed new office/research building at the Mount Zion campus site would exceed the bulk restrictions of the Planning Code, the proposed building would be designed to align with the existing hospital building and located in a setting already built out with other UCSF facilities. Accordingly, although it would technically exceed the local bulk restrictions, it would be compatible with adjacent land uses and would not therefore create a significant land use impact.

4.10 Noise and Vibration

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Noise and Vibration impacts. 2014 LRDP Noise and Vibration effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Noise effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures*, and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.10.1 Setting

4.10.1.1 Noise Background

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 4.10-1** shows some representative noise sources and their corresponding noise levels in dBA (HUD, 1985).

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines are as follows: sleep disturbance can occur at levels above 35 dBA; interference with human speech begins at about 60 dBA; and hearing damage can result from prolonged exposure to noise levels in excess of 85 to 90 dBA (USEPA, 1974).

Attenuation of Noise

Sound from line sources of noise, such as roadway traffic, attenuates (lessens) at a rate of 3.0 to 4.5 dBA per doubling of distance from the source, based on the inverse square law and the equation for cylindrical spreading of noise waves over hard and soft surfaces.

**TABLE 4.10-1
 TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT**

Examples of Common, Easily Recognized Sounds	Decibels (dBA)	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very Loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	Very Faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

NOTE: Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.

SOURCE: United States Department of Housing and Urban Development, *The Noise Guidebook*, 1985.

Sound from point sources of noise,⁴⁶ including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance from the source, based on the inverse square law and the equations for spherical spreading of noise waves over hard and soft surfaces. For the purposes of this analysis, it is assumed that noise from line and point sources to a distance of 200 feet attenuates at rates of between 3.0 and 6.0 dBA per doubling of distance, and the noise from line and point sources at a distance greater than 200 feet attenuates at a rate of 4.5 to 7.5 dBA per doubling of distance, to account for the absorption of noise waves due to ground surfaces such as soft dirt, grass, bushes, and intervening structures (Caltrans, 2013).

Noise Descriptors

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (L_{eq}) that represents the acoustical energy of a given measurement. Successive additions of sound

⁴⁶ Point sources and line sources are further defined by the California Department of Transportation (Caltrans) as follows:

Sound from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops off at a rate of 6 dBA for each doubling of the distance (6 dBA/DD). This decrease, due to the geometric spreading of the energy over an ever increasing area, is referred to as the inverse square law. However, highway traffic noise is not a single, stationary point source of sound. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. This results in cylindrical spreading rather than the spherical spreading of a point source. (Source: Caltrans, 2013.)

to the community noise environment varies from instant to instant requiring the measurement of noise exposure over a period of time to accurately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

- L_{eq} The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level, which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
- L_{max} The instantaneous maximum noise level for a specified period of time.
- L_{50} The noise level that is equaled or exceeded 50 percent of the specified time. This is the median noise level during the specified time.
- L_{90} The noise level that is equaled or exceeded 90 percent of the specified time. The L_{90} is often considered the background noise level averaged over the specified time.
- DNL Sometimes referred to as Ldn, the Day/Night Average Sound Level is the 24-hour day and night A-weighted noise exposure level, which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night. Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance from nighttime noise.
- CNEL Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5 dBA “penalty” for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10 dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the United States Environmental Protection Agency all but eliminated its noise investigation and control program in the 1970s. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria suggest that exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability of people to initially fall asleep (WHO, 1999).

Other potential health effects of noise identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels, for example,

exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, car doors slamming, and engines revving outside a nightclub, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and severe annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

4.10.1.2 Vibration Background

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts on buildings. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick people), and vibration-sensitive equipment.

Another useful vibration descriptor is known as vibration decibels or VdBs. VdBs are generally used when evaluating human response to vibration, as opposed to structural damage (for which PPV is the more commonly used descriptor). Vibration decibels are established relative to a reference quantity, typically 1×10^{-6} inches per second (FTA, 2006).

Sources of vibration in the proposed 2014 LRDP area primarily consist of Muni streetcars traveling along Third Street in the vicinity of the Mission Bay campus site. Most motor vehicles and trucks have independent suspension systems that substantially reduce if not eliminate vibration generation, barring discontinuities in the roadway.

4.10.2 Regulatory Considerations

4.10.2.1 Federal Regulations

Federal Aviation Administration

The Federal Aviation Administration (FAA) develops noise exposure maps that use average annual L_{dn} noise contours around the airport as the primary noise descriptor. The FAA states that all land uses are considered compatible when aircraft noise effects are less than 65 decibels (dB) CNEL. San Francisco International Airport is approximately seven miles south, and Oakland International Airport is approximately nine miles east, of the City of San Francisco. The entirety of the City of

San Francisco is outside the 65 dB CNEL noise contour of both airports (SFIA, 2008; OIA, 2008). The Phase 1 Medical Center at Mission Bay currently under construction will have an operational helipad that will generate operational noise. Noise contours for helicopter operations at the Phase 1 Medical Center were developed for the *UCSF Medical Center at Mission Bay EIR* and the *Final Supplemental EIR, UCSF Medical Center at Mission Bay—Residential Sound Reduction Program for Helicopter Operations Supplemental EIR* (UCSF, 2008 and 2009).

4.10.2.2 State Regulations

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations.

For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior sources, the noise insulation standards set forth an interior standard of 45 dBA (L_{dn}) in any habitable room. Where dwelling units are proposed in areas subject to noise levels greater than 60 dBA (L_{dn}) a demonstration of how the units have been designed to meet this interior standard is required. If the interior noise level depends upon windows being closed, the design for the structure must also specify a ventilation or air-conditioning system that provides a habitable interior environment.

4.10.2.3 Local Regulations

UCSF is not subject to local plans, policies, or ordinances whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be consistent with such plans, policies or ordinances to the extent feasible. City plans, policies and ordinances that are relevant to noise are summarized below.

San Francisco General Plan

Land Use Compatibility Guidelines for Community Noise

The Environmental Protection Element of the *San Francisco General Plan* contains Land Use Compatibility Guidelines for Community Noise (CCSF, 1996). The City's guidelines indicate exterior noise levels that might be inappropriate for sensitive land uses and would therefore require additional noise insulation considerations beyond standard practices. Though this figure presents a range of noise levels that are considered compatible or incompatible with various land uses, the maximum "satisfactory" noise level is 60 dBA (L_{dn}) for residential and hotel uses; 65 dBA (L_{dn}) for school classrooms, libraries, churches, and hospitals; 70 dBA (L_{dn}) for playgrounds, parks, office buildings, retail commercial uses, and noise-sensitive manufacturing/communications uses; and 77 dBA for other commercial uses such as wholesale, some retail, industrial/manufacturing, transportation, communications, and utilities. If these uses are proposed to be located in areas with noise levels that exceed these guidelines, a detailed analysis of noise reduction requirements will normally be necessary prior to final review and approval.

Noise-Related Policies

The following policies of the *San Francisco General Plan* Environmental Protection Element that relate to noise issues are relevant to the proposed 2014 LRDP:

Policy 10.1: Promote site planning, building orientation and design and interior layout that will lessen noise intrusion.

Policy 10.2: Promote the incorporation of noise insulation materials in new construction. State-imposed noise insulation standards apply to all new residential structures except detached single-family dwellings.

Policy 11.1: Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use. New development should be examined to determine whether background and/or thoroughfare noise level of the site is consistent with the guidelines for the proposed use

Policy 11.3: Locate new noise-generating development so that the noise impact is reduced.

San Francisco Noise Ordinance

In San Francisco, regulation of noise is stipulated in Article 29 of the Police Code (Regulation of Noise), which states that the City's policy is to prohibit unnecessary, excessive, and offensive noises from all sources subject to police power. Sections 2907 and 2908 of Article 29 regulate construction equipment and construction work at night, while Section 2909 provides for limits on stationary-source noise from machinery and equipment. Sections 2907 and 2908 are enforced by the Department of Building Inspection, and Section 2909 is enforced by the Department of Public Health. Summaries of these and other relevant sections are presented below.

Construction Noise

Sections 2907(a) and (b) of the Police Code state that it shall be unlawful for any person, including the City and County of San Francisco, to operate any powered construction equipment, regardless of age or date of acquisition, if the operation of such equipment emits noise at a level in excess of 80 dBA when measured at a distance of 100 feet from such equipment, or an equivalent sound level at some other convenient distance. Exemptions from this requirement include:

- Impact tools and equipment with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation; and
- Pavement breakers and jackhammers equipped with acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation.

Section 2908 prohibits any person, between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day, from erecting, constructing, demolishing, excavating for, altering, or repairing any building or structure if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line unless a special permit has been applied for and granted by the Director of Public Works.

Operational Noise

Section 2909 establishes a not-to-exceed noise standard for fixed sources of noise, such as building mechanical equipment and industrial or commercial processing machinery. Unlike the California Building Code (Title 24) standard, which is applicable to interior living space only, the standards in Section 2909(a), (b), and (c) are applicable outdoors, at the property line of the affected use, and vary based on the residential or commercial nature of the noise generator's use. For example, the noise limits for commercial and industrial properties provide that no person shall produce or allow to be produced a noise level more than 8 dBA above the local ambient level at the property plane. For residential properties, the noise limits are 5 dBA above the ambient level at any point outside of the property plane of a residential use. The noise limits for public property provide that no person shall produce a noise level more than 10 dBA above the local ambient level at a distance of 25 feet or more on public property.

As is common for noise standards, the permitted noise level for fixed residential interior noise limits identified in Section 2909(d) is lower at night than during the day. For example, maximum noise levels at any sleeping or living room in any dwelling unit located on residential property must not exceed 45 dBA between 10:00 p.m. and 7:00 a.m., and 50 dBA between 7:00 a.m. and 10:00 p.m. None of the noise limits set forth in this section apply to activity for which the City and County of San Francisco has issued a permit that contains noise limit provisions that are different from those set forth in this article. Additionally, the Directors of Public Health, Public Works, or Building Inspection, or the Entertainment Commission, or the Chief of Police may grant variances to noise regulations, over which they have jurisdiction pursuant to Section 2916.

Article 1, Section 47.2 of the Police Code regulates the use of any sound amplifying equipment, whether truck-mounted or otherwise, within the City and County of San Francisco and consists of the following regulations:

1. The only sounds permitted are music or human speech.
2. Hours of operation permitted shall be between 9:00 a.m. and 10:00 p.m.; operation after 10:00 p.m. is permitted only at the location of a public event or affair of general public interest or as otherwise permitted by the Entertainment Commission.
3. Except as permitted by the Entertainment Commission, sound shall not be issued within 450 feet of hospitals, schools, churches, courthouses, public libraries, or mortuaries.
4. No sound truck with its amplifying device in operation shall traverse any one block in the City and County more than four times in any one calendar day.
5. Amplified human speech and music shall not be unreasonably loud, raucous, jarring, or disturbing to persons of normal sensitiveness within the area of audibility, nor louder than permitted in Subsections (6) and (7) hereof.
6. When the sound truck is in motion, the volume of sound shall be controlled so that it will not be audible for a distance in excess of 450 feet from its source; provided, however, that when the sound truck is stopped by traffic, the said sound amplifying equipment shall not be operated for longer than one minute at such a stop.

7. Except as permitted by the Entertainment Commission for public gatherings, in all cases where sound amplifying equipment remains at one location or when the sound truck is not in motion, the volume of sound shall be controlled so that it will not be audible for a distance in excess of 250 feet from the periphery of the attendant audience.
8. No sound amplifying equipment shall be operated unless the axis of the center of any sound reproducing equipment used shall be parallel to the direction of travel of the sound truck; provided, however, that any sound reproducing equipment may be so placed upon said sound truck as to not vary more than 15 degrees on either side of the axis of the center of the direction of travel and, provided further, that radial, nondirectional type of loudspeakers may be used on said sound trucks either alone or in conjunction with sound reproducing equipment placed within 15 degrees of the center line of the direction of travel.

4.10.3 Significance Standards

Would implementation of the proposed 2014 LRDP result in:

- a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?
- b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (including construction)?
- 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?
- 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?

4.10.4 Analysis Methodology

4.10.4.1 Exposure of Persons to or Generation of Noise in Excess of Established Standards

The first two thresholds of significance examine (1) the extent to which development under the 2014 LRDP would expose people to noise levels that exceed established noise standards or (2) whether development under the 2014 LRDP would generate noise in excess of established noise standards. Because later thresholds address permanent and temporary increases in ambient noise levels in the vicinity of the project site, the evaluation of this threshold focuses on exposure of people within the 2014 LRDP campus sites to noise in excess of established standards.

To assess the extent to which implementation of the 2014 LRDP would expose receptors to noise levels in excess of established standards, future 2014 LRDP activities were evaluated against the policies and programs of the City of San Francisco General Plan Noise Element and the General Plan Guidelines of the State of California. The acceptable noise exposures for land use compatibility published by the State of California, which differ marginally from those of the City of San Francisco, are presented in **Figure 4.10-1**. The noise environment of surrounding land uses proposed under the 2014 LRDP were assessed for compatibility with these standards.

4.10.4.2 Exposure of Persons to or Generation of Groundborne Vibration

Impacts from groundborne vibration during 2014 LRDP construction activities are assessed using vibration damage threshold criteria expressed in PPV for architectural damage. The Caltrans measure of the threshold of architectural damage for conventional sensitive structures is 0.5 in/sec PPV for new residential structures and modern commercial buildings and 0.25 in/sec PPV for historic and older buildings.

Impacts from groundborne vibration during 2014 LRDP construction activities are also assessed for their potential to cause annoyance to adjacent residents. Caltrans vibration annoyance potential criteria characterize vibrations of 0.01 in/sec PPV as “barely perceptible,” 0.04 in/sec PPV as “distinctly perceptible,” 0.1 in/sec PPV as “strongly perceptible,” and 0.4 in/sec PPV as “severe” (Caltrans, 2004).

4.10.4.3 Substantial Permanent Increases in Ambient Noise Levels

The impact assessment of substantial permanent increases in noise levels resulting from development under the 2014 LRDP is based on a combination of existing ambient noise conditions at a given receptor and the incremental increase in noise caused by 2014 LRDP development activities. LRDP development-related noise generally would be associated with increased traffic generation. Guidance on the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations (FICON, 1992). The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. The term “annoyance” is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, they are considered applicable to all sources of transportation noise that are described in terms of cumulative noise exposure metrics such as the DNL, as shown in **Table 4.10-2**. The rationale for the Table 4.10-2 criteria is that, as ambient noise levels increase, a small increase in decibel levels is sufficient to cause significant annoyance. The quieter the ambient noise level is, the more the noise can increase (in decibels) before it causes significant annoyance. Thus, the significance of permanent increases in noise levels is evaluated based on the information provided in Table 4.10-2.

**Figure 4.10-1
 Land Use Compatibility for Community Noise Environment**



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

SOURCE: State of California, Governor's Office of Planning and Research, 2003. *General Plan Guidelines*.

**TABLE 4.10-2
 MEASURES OF SUBSTANTIAL INCREASE IN TRANSPORTATION NOISE EXPOSURE**

Ambient Noise Level Without Project (DNL)	Significant Impact Assumed to Occur if Project Site Development Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

NOTES:
 DNL = day-night noise level. dB = decibels.

SOURCE: FICON, 1992.

4.10.4.4 Substantial Temporary or Periodic Increases in Noise Levels in the Vicinity of the Campus Sites above Levels Existing without 2014 LRDP Development

Temporary increases in noise levels in the vicinity of a development site are typically the result of site development and construction activities. Assessment of noise from construction activities resulting from development under the 2014 LRDP employs the restrictions established by Sections 2907 and 2908 of the San Francisco Police Code (which also indirectly applies to exposure of people or generation of noise in excess of established standards). These sections of the Police Code limit construction hours. Further, the Police Code prohibits individual pieces of construction equipment from operating at a noise level in excess of 80 dBA at a distance of 100 feet from such equipment. These requirements were used as the basis of analyzing temporary or periodic noise impacts of the proposed development under the 2014 LRDP.

4.10.4.5 Exposure of People to Excessive Airport Noise

The potential for exposure of people to excessive noise from public airports adequately was addressed in the Initial Study and is not evaluated further in this EIR. There are no public airports within two miles of the City and County of San Francisco.

4.10.4.6 Exposure of People to Excessive Noise from Private Airstrip Operations

The only UCSF campus site within two miles of what may be considered a private airstrip is Mission Bay. On completion of the current construction of the Phase 1 Medical Center at Mission Bay, UCSF will operate an active helipad. The proposed UCSF and non-UCSF facilities that would be closest to this helipad will be the proposed buildings constructed under implementation of the 2014 LRDP, including the new housing at the Mission Bay campus site, and existing nearby residential housing. Noise contours for helicopter operations at the Phase 1 Medical Center were developed as part of the analysis of the Phase 1 Medical Center (UCSF 2008 and 2009). The potential for noise exposure to residents of the proposed new housing at the Mission

Bay campus site will be analyzed, considering, among other things, acceptable noise exposures for land use compatibility published by the State of California presented in Figure 4.10-1.

4.10.5 References

- Caltrans, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.
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4.11 Population and Housing

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Population and Housing impacts. 2014 LRDP Population and Housing effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*.

4.11.1 Regional Setting

The City and County of San Francisco would be the primary area affected directly by 2014 LRDP-related population and housing effects. However, effects may extend beyond San Francisco to neighboring counties in the Bay Area. The 2013 UCSF Transportation Commute Survey prepared in support of the LRDP indicates that over half of UCSF students and employees commute from San Francisco, and therefore likely reside in San Francisco. Besides San Francisco, commuters largely travel from four other counties to UCSF campus sites: Alameda, Contra Costa, Marin, and San Mateo. Therefore, the discussion below provides information on San Francisco with additional information on these four counties.

4.11.1.1 Population

In 2010, there were about 805,000 people living in San Francisco. There were approximately 346,000 households in San Francisco, and the average household size was 2.3 persons per household (U.S. Census, 2010). The number of people living in San Francisco increased by about 4% between 2000 and 2010, and during this period the City's population exceeded its prior peak of 780,000 residents recorded in 1951. The City's population in 2013 is estimated to be approximately 825,000, an increase of about 2.5% since 2010 (DOF, 2013). In 2010, the five-county region's population was approximately 4.34 million, an increase of about 5.1% since 2000. The 2013 population for the five-county region is estimated to be 4.44 million, an increase of about 2.3% since 2010 (DOF, 2013).

4.11.1.2 Housing

According to the decennial census, there were 379,900 housing units in San Francisco in 2010 — an increase of 30,400 units since 2000 (U.S. Census, 2010). During the period from 2008 to 2012, San Francisco had an estimated homeowner vacancy rate of 1.4% and rental vacancy rate of 4.3% (U.S. Census, 2012). The five-county region contains a total of approximately 1,742,000 housing units with an average vacancy rate of 6.6%. The estimated household size for the region overall is 2.6 persons per household. San Francisco's population accounts for about 19% of the five-county region's total population. With its housing growth and consistent gains in population over the last 15 years, San Francisco has generally maintained its share of regional population, which represents a marked change from the historical trend of declining regional share.

4.11.1.3 Regional Projections

The Association of Bay Area Governments (ABAG) is the regional planning agency for the nine Bay Area counties and provides projections of future Bay Area population, housing, and employment. In April 2010, ABAG, MTC, the BAAQMD, and the BCDC launched a “One Bay Area” outreach and planning initiative to coordinate efforts among the region’s nine counties and 101 towns and cities in the development of an integrated transportation, land use and housing plan. A major effort of the agencies, in partnership with the region’s counties, cities and towns, has been the development of “Plan Bay Area” as the region’s long-range plan for sustainable land use, transportation and housing. Adopted in July 2013, *Plan Bay Area* is intended to respond to requirements of Senate Bill 375, which requires the Regional Transportation Plan to contain a Sustainable Communities Strategy that integrates land use planning and transportation planning and identifies where the region’s population will be housed. The plan will be updated every four years (ABAG, 2013).

Table 4.11-1 shows ABAG’s current forecast for San Francisco and the four other counties affected by the LRDP, which was prepared in 2013 for *Plan Bay Area*. The *Plan Bay Area* forecasts show that of the five counties, San Francisco will have the second highest growth in households and jobs over the 2010–2040 planning period. The City’s population is expected to increase by 280,490 new residents between 2010 and 2040, which would represent a 35% increase over the City’s 2010 population levels. Over the same 30-year period, the five-county region’s population is expected to increase by 29%, or by nearly 1.267 million new residents. Household growth is expected to be slightly below population growth, with the number of households in San Francisco increasing by 29% between 2010 and 2040 and households in the five-county region increasing by 26%.

The rate of future job growth in San Francisco is expected to be similar to the rate of population growth. Between 2010 and 2040, San Francisco is expected to add about 191,000 new jobs, which would represent nearly a 34% increase over its 2010 employment levels. Over the same 30-year period, the five-county region’s employment is expected to increase by 33%, or by about 685,000 new jobs.

4.11.1.4 University of California, San Francisco

As indicated in Chapter 3, *Project Description*, UCSF currently (2013) has approximately 6,310 students and postdoctoral scholars; 8,090 paid and unpaid faculty; and 16,440 full-time equivalent staff.

4.11.2 Regulatory Considerations

Population and housing changes, in and of themselves, are not normally considered to be significant impacts (i.e., substantial, adverse impacts on the physical environment) under CEQA, but CEQA does allow inclusion of these effects as indicators of other impacts. Therefore, this analysis quantifies and describes the magnitude of such potential changes. The potential physical environmental impacts associated with changes in population and housing are analyzed in other sections of this EIR (e.g., transportation, public services, air quality). Direct increases in

**TABLE 4.11-1
 PLAN BAY AREA FORECAST OF POPULATION, HOUSEHOLDS, AND EMPLOYMENT
 FOR SAN FRANCISCO AND THE FIVE-COUNTY REGION (2010-2040)**

Factor	2010	2040	2010 to 2040	
			Increase	Percent
Population				
San Francisco	805,240	1,085,730	280,490	35%
Alameda	1,510,270	1,987,950	477,680	32%
Contra Costa	1,049,030	1,338,440	289,410	28%
Marin	252,410	285,400	32,990	13%
San Mateo	718,450	904,430	185,980	26%
Five-County Region	4,335,400	5,601,950	1,266,550	29%
Households				
San Francisco	345,810	447,350	101,540	29%
Alameda	545,140	705,330	160,190	29%
Contra Costa	375,360	464,150	88,790	24%
Marin	103,210	112,050	8,840	9%
San Mateo	257,840	315,090	57,250	22%
Five-County Region	1,627,360	2,043,970	416,610	26%
Employment				
San Francisco	568,720	759,500	190,780	34%
Alameda	694,450	947,650	253,200	36%
Contra Costa	344,920	467,390	122,470	36%
Marin	110,730	129,140	18,410	17%
San Mateo	345,200	445,080	99,880	29%
Five-County Region	2,064,020	2,748,760	684,740	33%

NOTE: Numbers may not sum due to rounding

SOURCE: ABAG and MTC, Plan Bay Area: Strategy for a Sustainable Region, Final Forecast of Jobs, Population, and Housing, July 2013.

employment can create secondary impacts, such as an increased demand for housing. This housing demand would be considered a significant effect if the housing demand could not be met with existing or future housing supply within the housing market for new UCSF students and employees. While the development of housing itself would not be a significant adverse impact, construction of housing could create other short-term environmental impacts, such as air quality or noise impacts.

4.11.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- 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)?

- b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?
- d) Exceed the LRDP EIR standard of significance by creating a demand for housing outside the market area where the facilities or site are located?

Regarding criteria b) and c), the Initial Study concluded that implementation of the 2014 LRDP would clearly result in no impact or a less-than-significant impact. Therefore, these criteria are not discussed further in the EIR.

4.11.4 Analysis Methodology

The analysis estimates the amount of population and related housing needs that would result from implementation of the 2014 LRDP. To evaluate the relative magnitude of the increases in population and housing needs resulting from implementation of the 2014 LRDP, the analysis compares these estimates with growth estimates developed for both the City and the entire five-county region. “Substantial” growth resulting from implementation of the 2014 LRDP is defined as increases in population or employment that are unplanned, i.e., are inconsistent with growth anticipated in planning documents.

4.11.5 References

ABAG and MTC, Plan Bay Area: Strategy for a Sustainable Region, Final Forecast of Jobs, Population, and Housing, July 2013

State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011- 2013, with 2010 Benchmark*. Sacramento, California, May 2013.

U.S. Census Bureau, American FactFinder, DP-1 Profile of General Population and Housing Characteristics: 2010, 2010 Demographic Profile Data for the following individual counties: Alameda, Contra Costa, Marin, San Francisco, and San Mateo, California.

U.S. Census Bureau, American FactFinder, DP-04 Selected Housing Characteristics: 2008-2012 American Community Survey 5-Year Estimates, San Francisco County.

4.12 Public Services

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Public Services impacts. 2014 LRDP Public Services effects are discussed in Chapter 5, *2014 LRDP – Impacts and Mitigation Measures*. Public Services effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.12.1 Regional Setting

The study area is defined as the four UCSF main campus sites and surrounding areas for which the 2014 LRDP development activities are proposed and which are relevant to the public services under discussion. The campus sites in the study area include Parnassus Heights, Mission Bay, Mount Zion, and Mission Center.

4.12.1.1 Fire Protection

UCSF does not have its own fire department. The San Francisco Fire Department (SFFD), headquartered at 698 Second Street, provides fire protection and emergency services to the City of San Francisco, as well as to all UCSF facilities within the City. SFFD serves an estimated 1.5 million people within the 49 square miles of the city. Emergency medical transportation to San Francisco hospitals is provided by a dynamically deployed fleet of both public and private ambulance services.

Fire suppression companies are organized into two divisions, which are further divided into nine battalions, located throughout the City (SFFD, 2013b). As of 2013, the SFFD consists of 1,500 firefighting and emergency medical field personnel and resources include 44 Engine companies, 19 Truck companies, a dynamically deployed fleet of Ambulances, two Heavy Rescue Squad units, two Fireboats and multiple special purpose units. The Airport Division is comprised of three firefighting stations and seven companies located at the San Francisco International Airport (SFFD, 2013b).

The San Francisco Public Utilities Commission-City Distribution Division operates and maintains an Auxiliary Water Supply System (AWSS) used for fire protection use only. This high pressure water supply system is distinct and separate from the City's domestic water and fire hydrant system. The AWSS consists of 150 miles of 8- to 20-inch diameters mains, 1,550 special hydrants, a high elevation water reservoir and two large water tanks, emergency saltwater pump stations, and series of underground cisterns. The two AWSS emergency saltwater pumping stations (located at Second and Townsend streets and at Fort Mason) each have a pumping capacity of 10,000 gallons per minute (gpm) to supplement the AWSS with saltwater.

Each UCSF campus site is assigned a designated station that responds to university-related calls.

- **Parnassus Heights campus site:** Station 12, located at 1145 Stanyan Street, 0.5 mile from the campus core.
- **Mission Bay campus site:** Station 8, located approximately 1.5 miles north of the campus site at 36 Bluxome Street.
- **Mount Zion campus site:** Station 10, located 0.5 mile west at 655 Presidio Avenue.
- **Mission Center campus site:** Station 7, located at 2300 Folsom Street, 0.5 mile south of the campus site.

Other stations in proximity to each campus site include:

- **Parnassus Heights:** Station 20 at 285 Olympia Way (1.5 miles); Station 22, at 1290 16th Avenue (1.0 mile); and Station 24 at 100 Hoffman Avenue (2.0 miles).
- **Mission Bay:** Station 29 at 299 Vermont Street (0.8 miles); and Station 37 at 798 Wisconsin Street (1.1 miles).
- **Mount Zion:** Station 5 at 1301 Turk Street (0.9 miles); Station 21 at 1443 Grove Street (0.8) miles; and Station 38 at 2150 California Street (0.8) miles.
- **Mission Center:** Station 6 at 135 Sanchez Street (1.3 miles); Station 29 at 299 Vermont Street (0.8 miles); and Station 36 at 109 Oak Street (1.3 miles).

Table 4.12-1 provides a summary of the staffing and equipment for each of the four designated response stations.

**TABLE 4.12-1
 SUMMARY OF EXISTING SFFD STAFFING AND EQUIPMENT IN 2014 LRDP AREA**

SFFD Designated Fire Station	Staffing per Shift	Total Members	Fire Engines/ Trucks
Parnassus Heights No. 12: Stanyan St./Grattan St.	9	32	E12 T12
Mission Bay No. 8: Bluxome St./4th St.	10	35	E08 T08
Mount Zion No. 10: Presidio Ave./Bush St.	9	32	E10 T10
Mission Center No. 7: Folsom St./19th St.	15	53	E07 T07

SOURCE: San Francisco Fire Department, 2014

Table 4.12-2 summarizes SFFD responses at the four designated response stations in the year from August 2012 to August 2013.

**TABLE 4.12-2
 SUMMARY OF SFFD RESPONSES FOR FIRE STATIONS IN PROJECT AREA
 (AUGUST 2012 TO AUGUST 2013^a)**

SFFD Fire Station No.	Fire Responses	Medical Responses	Total Responses
12	1,278	2,521	3,799
8	2,039	6,179	8,218
10	1,975	3,200	5,175
7	3,144	11,335	14,479

SOURCE: San Francisco Fire Department, 2014.

Fire Support Standards

Emergency calls for fire and medical services at UCSF campus sites are routed to the SFFD for dispatching. Response times generally reflect the seriousness of the call. As of 2013, the SFFD has a response time goal for the first arriving unit of 5:00 minutes, while actual response times averaged 4:52 minutes (SFFD, 2013b).

4.12.1.2 Police Services

University of California Police Department

The UC Police Department (UCPD) provides police protection services for University of California properties and facilities that comprise UCSF. The UCPD is responsible for approximately 38,600 patients, visitors, students, faculty, staff and affiliates. Headquartered at 654 Minnesota Street, just south of the Mission Bay campus site, the UCPD employs approximately 120.5 authorized staff. UCPD headquarters is approximately 4 miles from Parnassus Heights, 0.25 miles from Mission Bay, and 4.1 miles from Mount Zion. UCPD operates a patrol station at both the Parnassus Heights and Mission Bay campus sites, and UCPD has offices in the Mission Center building.

The UCPD is comprised of the Field Services Division, which provides police and investigative services, the Technical Services Division, the Professional Standards Division, and the Homeland Security and Emergency Management Division.

As of 2012, the service ratio of police personnel to UCSF population is 1.9 sworn police officers per 1,000 persons (UCPD, 2012). Police officers patrol by car, bicycle and on foot to maintain high-profile, proactive and preventive public safety services (UCPD, 2014). In 2012, UCSF police responded to 49,883 calls for service and processed 313 arrests. UCSF police also conducts Community Oriented Policing and Problem Solving (COPPS) activities, in which the police work with community members to fight crime, of which 3,094 activities were conducted in 2012 (UCPD, 2012).

San Francisco Police Department

The San Francisco Police Department (SFPD) is responsible for police protection services in the City and County of San Francisco. The UCPD has a mutual-aid agreement with the SFPD to provide cooperative assistance within a 1-mile radius of each UCSF campus site. A memorandum of understanding between the UCPD and the SFPD establishes that UCPD has exclusive jurisdiction over police service on UCSF properties. Depending on the nature of the emergency, the UCPD may request assistance from the SFPD (UCSF, 2005).

SFPD is comprised of the Patrol Division, Airport Division, Investigations Division, Homeland Security Department, and Administrative Division. The Patrol Division is divided into the Metro Division and the Golden Gate Division, which oversee ten separate districts. The Golden Gate Division districts encompass the Parnassus Heights, Mission Bay, and Mount Zion campus sites.

The Mission Center campus site falls within the jurisdiction of the Metro Division and is located in the Mission District, headquartered at 630 Valencia Street. The Parnassus Heights campus site is located in the Park District, headquartered at 1899 Waller Street. The Mount Zion campus site is located in the Richmond District, headquartered at 461 6th Avenue. The Mission Bay campus site is located within the Bayview District, headquartered at 201 Williams Street.

In 2011, the City broke ground on a new Public Safety Building in Mission Bay, located at Third Street and Mission Rock Street, which is scheduled to be operational in late 2014. The Public Safety Building will house a new fire station and also serve as the new home of the SFPD Headquarters and Southern District Station.

The SFPD is mandated by the City Charter to maintain a sworn staff of 1,971, excluding officers assigned to the San Francisco International Airport and officers not available for field duty (e.g., due to on-duty injuries, temporary modified duty, medical leave, and administrative leave). During 2012, the Department averaged 1,644 total full-duty sworn officers (SFPD, 2012). In 2012, the SFPD changed how it assigned its officers to ensure adequate staff would be available to provide minimum safety services, as well as to staff special events and deploy officers to meet unexpected needs when services require “all hands,” such as during the month of October 2012 when multiple major events were held in the city. Throughout 2012, days off were cancelled and/or shifts modified in order to meet the needs of the SFPD (SFPD, 2012). In order to address the anticipated retirement of over 100 sworn officers in mid-2013, the SFPD drafted a six-year hiring plan, approved by the Mayor, which will return the SFPD to its Charter-mandated staffing level of 1,971 sworn officers (SFPD, 2012).

San Francisco Sheriff's Department

The San Francisco Sheriff's Department (SFSD) manages the San Francisco County Jail and protects City-owned critical infrastructure. In addition, the SFSD augments law enforcement at the request of the SFPD.

California Highway Patrol

The California Highway Patrol (CHP) provides law enforcement services on state highways including the San Francisco-Oakland Bay Bridge. The San Francisco CHP station is located at 455 Eighth Street in San Francisco.

4.12.1.3 Public Schools

San Francisco Unified School District

The San Francisco Unified School District (SFUSD) operates San Francisco's public schools. During the 2011–2012 academic year, the SFUSD managed 115 schools (73 elementary schools, 16 middle schools, 18 high schools, six alternative schools, and two continuation schools), with a total enrollment of approximately 56,200 (EDP, 2014).

In general, student enrollment within the SFUSD has steadily decreased since the late 1990s. However, enrollment has begun to increase since reaching a low of approximately 55,100 during the 2007–2008 academic year (CDE, 2014). The SFUSD anticipates that elementary school enrollment will grow due to the large birth rates earlier in the decade. Middle school enrollment is anticipated to rise as well, but remain below current enrollment in 2013. High school enrollment will experience a continuous decline through 2013 due to the declining births of the 1990s (SFUSD, 2014). There are multiple schools that serve each campus site; the current enrollment and historic enrollment trends are discussed below.

Schools serving the area around the Parnassus Heights campus site include Alice Fong Yu Alternative School (K-8) at 1541 12th Avenue, Clarendon Alternative Elementary School (K-5) at 500 Clarendon Avenue, Grattan Elementary School (K-5) at 165 Grattan Street, Everett Middle School (6-8) at 450 Church Street, and Mission High School (9-12) at 3750 18th Street. Enrollment at Alice Fong Yu Alternative School has increased steadily over the last decade from 486 students to 574 students during the 2012-13 school year. Clarendon Alternative Elementary School experienced a steady decrease with a low of 528 students during the 2008-09 academic year, then reaching 585 students in 2012-13. Over the last decade, Grattan Elementary School has increased significantly from 254 students to 390 students in 2012-13, with rapid growth over 5 percent per year from 2007 to 2010. Everett Middle School has generally declined in enrollment, from 588 to a low point of 341 students during the 2010-11 school year, at which point, enrollment began to increase reaching 406 in 2012-13. Enrollment at Mission High School has fluctuated over the years, with a high of 978 students and a low of 835 students, and currently has 927 students enrolled (EDP, 2014).

Schools serving the area around the Mission Bay campus site include Bessie Carmichael/Filipino Education Center School (K-5) at 375 Seventh Street and 824 Harrison Street (6-8), Daniel Webster (elementary) located at 465 Missouri Street, and International Studies Academy at 655 De Haro Street. Enrollment at Bessie Carmichael averaged fewer than 400 students during the 1990s through the 2004–2005 academic year, when the school served kindergarten through 5th grades. Grades 6 through 8 were subsequently added to the school during the period from 2005 through 2008. Approximately 648 students are enrolled for the 2012–2013 academic year.

Enrollment at Daniel Webster also declined during the early 2000s, but has steadily increased since 2007–2008. Approximately 262 students are enrolled for the 2012–2013 academic year. Around 400 students are currently enrolled at International Studies Academy (EDP, 2014).

Schools serving the area around the Mount Zion campus site include Dr. William L. Cobb Elementary School (PK-5) at 2725 California Street, Rosa Parks Elementary School (K-5) at 1501 O’Farrell Street, Theodore Roosevelt Middle School (6-8) at 460 Arguello Boulevard, and Raoul Wallenberg Traditional Alternative High School (9-12) at 40 Vega Street. Dr. William L. Cobb Elementary School has fluctuated in enrollment over the last decade from 195 students to a low of 167; in the 2012-13 school year when 201 students were enrolled. Rosa Parks Elementary School increased significantly from 246 students to 369 students in the 2006-07 school year, at which point, enrollment growth slowed; 411 students were enrolled from 2012-13. Theodore Roosevelt Middle School has steadily decreased over the years from 787 students in 2003-04 to 710 students from 2012-13. Raoul Wallenberg Traditional Alternative High School has remained relatively consistent since 2003, with a low of 613 students enrolled and a current enrollment around 637 students (EDP, 2014).

Schools serving the area around the Mission Center campus site include Marshall Elementary School (K-5) at 1575 Fifteenth Street, Everett Middle School (6-8) at 450 Church Street, Mission High School (9-12) at 3750 Eighteenth Street, and John O’Connell High School (9-12) at 2355 Folsom Street. Marshall Elementary decreased from 228 students to 214 students in 2006-07 and then increased to 249 students by 2012-13. As discussed above, Everett Middle School has generally declined in enrollment, from 588 in 2003-04 to 406 in 2012-13, and Mission High School has fluctuated over the years from a high of 978 students and a low of 835 students. John O’Connell High School has decreased significantly over the last decade from 932-students in 2003-04 to 449 students in 2012-13.

As discussed in Section 3, *Project Description*, Block 14 of the Mission Bay campus site is currently reserved for use by the SFUSD as a public school site. Per the agreements through which the Mission Bay campus site was acquired by the Regents, the SFUSD has until 2027 to request conveyance of the 2.4-acre site for use as a school. If the SFUSD does not request Block 14 during that timeframe, UCSF may then develop Block 14 for its own use after the necessary planning, environmental review, and amendment of the LRDP.

4.12.1.4 Parks

Effects on local and regional parks are discussed in Section 4.13, *Recreation*.

4.12.2 Regulatory Considerations

4.12.2.1 California Master Mutual Aid Agreement

The California Master Mutual Aid Agreement is a framework agreement between the State of California and local governments for aid and assistance by the interchange of services and facilities, including but not limited to fire, police, medical and health, communication, and transportation

services and facilities to cope with the problems of rescue, relief, evacuation, rehabilitation, and reconstruction.

Fire Regulations

All projects undertaken at UCSF are subject to the approval of the State Fire Marshal and compliance with California Health and Safety Code Sections 13000 et seq. which sets forth State fire regulations concerning building standards (as set forth in Title 24 of the California Building Code), fire protection and notification systems, fire protection devices (such as fire extinguishers and smoke alarms), high-rise building and child care facility standards, and fire suppression training. California Fire Code Section 403.2 addresses public safety for both indoor and outdoor gatherings, including emergency vehicle ingress and egress, fire protection, emergency medical services, public assembly areas and the directing of both attendees and vehicles (including the parking of vehicles), vendor and food concession distribution, and the need for the presence of law enforcement and fire and emergency medical services personnel at the event. The Fire Marshal's office has review and approval authority over all development proposals on the UCSF campus sites.

Police Regulations

As noted above, the UCPD has a mutual-aid agreement with the SFPD to provide cooperative assistance within a 1-mile radius of each UCSF campus site. A memorandum of understanding between the UCPD and the SFPD establishes that UCPD has exclusive jurisdiction over police service on UCSF properties (UCSF, 2005).

Projects implemented under the 2014 LRDP would be required to comply with applicable rules of the California Office of Statewide Health Planning & Development (OSHPD) with respect to the incorporation of security features in standard building design plans.

Schools

The University is not subject to fee requirements such as those paid by developers pursuant to California Government Code Sections 53080, 65995, and 66001.

4.12.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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?
 - ii) Police protection?
 - iii) Schools?
 - iv) Parks?
 - v) Other public facilities?

4.12.4 Analysis Methodology

Implementation of the proposed 2014 LRDP could have a significant impact if (1) it would require the construction of new or physically altered governmental facilities in order to maintain acceptable levels of public services, and (2) the construction or alteration of such facilities would result in one or more substantial adverse impacts on the environment.

In general, development that would occur on UCSF campus sites under the 2014 LRDP would increase demand for public services. While some impacts would result from on-campus activities, such as new buildings requiring additional fire coverage, other impacts would occur with the increase in population in surrounding communities.

While the 2014 LRDP includes space at the Mission Bay campus site that may be considered for UCSF police services in the future, the potential for impacts on public services is analyzed at the program level. With respect to specific projects, UCSF would determine the appropriate level of environmental review when more detailed plans become available.

Public service providers that would be affected by the changes in the 2014 LRDP were consulted to determine if new facilities would need to be built, or existing facilities would need to be expanded, in order to maintain current levels of service, including response times, service ratios and other performance objectives. If new or altered public service facilities are determined to be required to serve the 2014 LRDP planning area, then the analysis evaluates whether construction of such facilities would have a substantial adverse physical impact on the environment. For example, if the SFPD determined that a new police station would be required to be constructed to maintain adequate service levels for law enforcement, the impact analysis would evaluate whether construction or operation of the new police station would have significant impacts on the physical environment.

For purposes of the impact analysis, it is assumed that all temporary and permanent improvements would be designed and constructed in compliance with all applicable building and fire codes, which include requirements for fire alarms, security systems, smoke detectors, sprinkler systems, fire extinguishers, and the number and location of exits.

4.12.5 References

Education Data Partnership (EDP), Fiscal, Demographics, and Performance Data on California's K-12 Schools, available online at <http://www.ed-data.k12.ca.us/Pages/Home.aspx/>, accessed February 7, 2014.

California Department of Education (CDE), Educational Demographics Office, available online at <http://dq.cde.ca.gov/dataquest/>, accessed February 7, 2014.

San Francisco Police Department (SFPD), *2012 Annual Report*, available online at <https://dl.dropboxusercontent.com/u/76892345/Annual%20Reports/2012%20Annual%20Report.pdf>, accessed February 6, 2014.

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UCPD, Police Department Annual Report and Crime Statistics, Program Highlights <http://police.ucsf.edu>, accessed January 27 and February 5, 2014.

4.13 Recreation

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Recreation impacts. 2014 LRDP Recreation effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Recreation effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.13.1 Regional Setting

In addition to UCSF, additional agencies that own and manage recreation facilities on and near the UCSF campuses include: the San Francisco Recreation and Park Department, and the agencies that manage the Mission Bay Park System.

4.13.1.1 UCSF Recreation Facilities

Parnassus Heights

The Parnassus Heights campus site features three primary areas with open space and recreation opportunities. The campus has several plazas of various sizes, including Saunders Court, which is considered the primary designed open space on campus. In addition, the Millberry Fitness and Recreation Center is the primary recreational facility for students, staff, and neighbors of the Parnassus Heights campus site. The Center offers a full gym, indoor pool, spinning studio, and fitness classes.

Mount Sutro Open Space Reserve

The University-owned Mount Sutro Open Space Reserve consists of 61 acres of largely undeveloped forest located near the geographical center of San Francisco. The Reserve is surrounded by the UCSF campus to the north and northwest, and by urban residential neighborhoods to the south, east and west. In addition, the Interior Greenbelt natural area, owned by the City and County of San Francisco, is adjacent to the east side of Reserve. The Reserve is open to the general public.

Mission Bay

Koret Quad is located near the center of the Mission Bay campus site, and serves as a public plaza and open space, with large lawn areas surrounded by shade trees. The Bakar Fitness and Recreation Center is located in the center of campus, in the William J. Rutter Center complex, and offers a variety of indoor and outdoor athletic activities for students, faculty, staff, and the public.

4.13.1.2 City and County of San Francisco

The San Francisco Recreation and Park Department (SFRPD) maintains more than 200 parks, playgrounds, and open spaces throughout the City. The City's park system also includes 15 recreation centers, nine swimming pools, and five golf courses, as well as tennis courts, ball diamonds, athletic fields and basketball courts. The SFRPD manages the Marina Yacht Harbor, Candlestick Park, the San Francisco Zoo, and the Lake Merced complex. In total, the SFRPD currently owns and manages roughly 3,400 acres of parkland and open space. Together with other City properties and state and federal open space properties within the City, about 5,250 acres of recreational resources (consisting of a variety of parks, walkways, landscaped areas, recreational facilities, playing fields, and unmaintained open areas) serve San Francisco (SFPD, 2011).

Within San Francisco, publicly accessible open spaces and recreational facilities are categorized according to their size and particular amenities as serving the City, district, neighborhood, or sub-neighborhood (a smaller area within an established neighborhood). Several larger open space areas, including Golden Gate Park (1,017 acres), the Lake Merced complex (700 acres; including the 368-acre lake) and John McLaren Park (317 acres) comprise about one half of the total City-owned acreage in recreational use. Unlike neighborhood facilities, these larger facilities provide programs, activities and recreational opportunities that serve the City as a whole.

In addition to the larger open spaces, SFRPD land comprises more than 100 parks and recreational facilities (both outdoor and indoor), which function mainly for neighborhood use. These smaller facilities are primarily used by residents in the immediate surrounding area and are categorized by size and intended service area. District-serving parks are generally larger than 10 acres and have a service area consisting of a three-eighths-mile radius around the park, while neighborhood-serving parks are generally one to 10 acres and have a service area of one-quarter mile. Sub-neighborhood-serving open spaces, often referred to as mini parks, are too small to accommodate athletic facilities and have a service area of one-eighth of a mile.

4.13.1.3 National Parks

The Golden Gate National Recreation Area (GGNRA) includes over 80,000 acres and more than two dozen natural, historic, and cultural sites interspersed throughout the San Francisco and Bay Area from northern San Mateo County to southern Marin County and parts of San Francisco. The GGNRA includes Muir Woods National Monument, Alcatraz, the Presidio of San Francisco, and the Marin Headlands, among other sites.

4.13.2 Regulatory Considerations

4.13.2.1 UCSF Physical Design Framework

The UCSF *Physical Design Framework* describes the vision for the physical development of UCSF campus sites, serving as the foundation for the planning and designing of future projects. The *Physical Design Framework* includes a goal to expand the open space network at the Parnassus Heights campus site by renovating Saunders Court, creating new open spaces and

accommodating a wider variety of activities. For the Mission Bay campus site, the framework includes goals to complete the Open Space Network, and enhance the Campus Core (Koret Quad).

4.13.2.2 Mission Bay Campus Master Plan and Design Guidelines

The Mission Bay Campus Master Plan and Design Guidelines provides the framework for the development of the UCSF Mission Bay campus site, including 160,000 gsf of support space allocated to outdoor recreation, fitness, childcare and food services.

4.13.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- 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?
- b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

4.13.4 Analysis Methodology

This analysis focuses on (1) how the implementation of the 2014 LRDP would affect the demand for regional and City parks and recreational facilities in the vicinity of the LRDP planning area, and (2) the impacts of construction of recreational facilities under the proposed 2014 LRDP. Consideration is given to whether the 2014 LRDP includes features that would reduce the demand for off-site recreation and park services (e.g., on-site recreation facilities or land dedication).

4.13.4.1 Assessment of Impacts to Existing On-Campus Recreation Facilities

The analyses of general impacts to on-campus recreation are based on a programmatic, qualitative analysis of whether the 2014 LRDP continues to address maintenance and expansion of such resources. The severity of impacts to recreational facilities is addressed using measurements such as population increase and condition.

4.13.4.2 Assessment of Impacts to Existing Off-Campus Recreation Facilities

Direct impacts resulting from population growth on campus sites with housing (i.e., Parnassus Heights and Mission Bay) would primarily affect campus facilities and adjacent recreation facilities. However, induced growth associated with the 2014 LRDP may result in impacts to surrounding communities and their recreation facilities. Analysis of recreation effects primarily considers such factors as park accessibility, location, maintenance, capacity, and usability.

4.13.4.3 Assessment of Impacts of Proposed Recreational Facilities

The analysis considers the environmental impacts of construction of the recreational facilities proposed by the 2014 LRDP. Impacts of constructing these facilities and, as needed, mitigation measures and other regulatory requirements, are discussed below as well as in other chapters of this EIR as listed in the impact analyses for each campus site.

4.13.5 References

San Francisco Planning Department (SFPD), *Draft Update of the Recreation and Open Space Element*, November 2013. Available online at: http://openspace.sfplanning.org/docs/Recreation_and_Open_Space_Element_NOVEMBER_2013.pdf, accessed on February 5, 2014.

4.14 Transportation and Traffic

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Transportation and Traffic impacts. 2014 LRDP Transportation and Traffic effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Transportation and Traffic effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.14.1 Regional Setting

4.14.1.1 Regional Roadway Network

Regional roadway access to the UCSF campus sites is provided by several major regional freeways and roadways, as discussed below.

Interstate 80 (I-80) is located approximately three miles east of the Parnassus Heights campus site, about one mile northwest of the Mission Bay campus site, about two mile southeast of the Mount Zion campus site, and about half a mile northeast of the Mission Center campus site. I-80 connects San Francisco to the East Bay and other points to the east of the City via the San Francisco-Oakland Bay Bridge.

U.S. Highway 101 (U.S. 101) is located approximately two miles east of the Parnassus Heights campus site, about one mile west of the Mission Bay campus site, about one mile east of the Mount Zion campus site, and one block north of the Mission Center campus site. U.S. 101 connects San Francisco with the Peninsula and the South Bay to the south, and with the North Bay to the north via the Golden Gate Bridge. U.S. 101 connects to I-80 north/northeast of the Mission Bay campus site. Within the northern part of San Francisco, U.S. 101 operates on surface streets (i.e., Van Ness Avenue and Lombard Street).

State Highway 1 (19th Avenue) is located approximately one mile west of the Parnassus Heights campus site, connecting San Francisco to the North Bay via the Golden Gate Bridge and to the South Bay via a connection to I-280 south of the Parnassus Heights campus site. Within the study area, 19th Avenue has six lanes, with left turns prohibited at most intersections.

Interstate 280 (I-280) is located adjacent to the Mission Bay campus site to the west and connects San Francisco to the South Bay. I-280 connects to U.S. 101 south of the Mission Bay campus site. Access to I-280 is provided at the on-and off-ramps at Mariposa and Eighteenth streets.

4.14.1.2 Regional Transit Service

Golden Gate Transit. The Golden Gate Bridge, Highway, and Transportation District operates Golden Gate Transit (GGT), which provides bus and ferry service between the North Bay (Marin and Sonoma counties) and San Francisco. GGT operates 22 commuter bus routes, nine basic bus routes, and 16 ferry feeder bus routes into San Francisco. Bus routes operate at headways of 15 to 90 minutes depending on time and day of week and bus type. Golden Gate Transit also operates ferry service between the North Bay and San Francisco, connecting Larkspur and Sausalito with the Ferry Building during the morning and evening commute periods. Golden Gate Transit riders would need to transfer to Muni to access the Parnassus Heights, Mission Bay, Mount Zion, or Mission Center campus sites.

Alameda-Contra Costa County Transit District (AC Transit). AC Transit operates bus service in western Alameda and Contra Costa Counties, as well as routes to the City of San Francisco and San Mateo County. AC Transit operates 33 “Transbay” bus routes between the East Bay and the Temporary Transbay Terminal, temporarily located at Howard Street and Beale Street. The Temporary Transbay Terminal is accessible from the Parnassus Heights campus site via Muni. The majority of Transbay service is provided only during commute periods in the peak direction of travel, with headways between buses from 15 to 20 minutes. The peak direction of service is into San Francisco during the AM peak period and out of San Francisco during the PM peak period. All-day service is provided on a few lines, with headways of approximately 30 minutes. AC Transit riders need to transfer to Muni to access the Parnassus Heights, Mission Bay, Mount Zion, or Mission Center campus sites.

San Mateo County Transit District (SamTrans). SamTrans operates bus and rail service in San Mateo County. A few SamTrans routes also serve the Temporary Transbay Terminal in downtown San Francisco, including Routes 292, 391, and 397. Route 292 makes San Francisco stops along Potrero Avenue and Mission Street throughout the day. AM peak hour headways are between 10 and 15 minutes, and PM peak hour headways are 20 minutes. Routes 391 and 397 run along Mission Street in San Francisco but stop only at the Temporary Transbay Terminal. Route 391 operates only during the peak travel periods with 15 minute headways; Route 397 is a late night service route with headways of one hour. SamTrans riders need to transfer to Muni or UCSF shuttle to access the Parnassus Heights, Mission Bay, Mount Zion, or Mission Center campus sites.

Bay Area Rapid Transit (BART). BART provides regional commuter rail service between San Francisco and the East Bay (Pittsburg/Bay Point, Richmond, Dublin/Pleasanton and Fremont), as well as between San Francisco and San Mateo County (SFO Airport and Millbrae). Weekday hours of operation are between 4 AM and midnight. During the weekday PM peak period, headways are 5 to 15 minutes along each line. Within San Francisco, BART operates underground along Market Street to Civic Center Station where it turns south through the Mission District towards Daly City. The closest BART station to the Parnassus Heights campus site is the Civic Center BART station, which is accessible via Muni or UCSF shuttle, as are the Mission Bay, Mount Zion, or Mission Center campus sites.

Caltrain. Caltrain provides passenger rail service on the Peninsula between San Francisco and Downtown San Jose with several stops in San Mateo County and Santa Clara County. Limited service is available south of San Jose. Caltrain service headways during the AM and PM peak periods are 10 to 60 minutes, depending on the type of train. The peak direction of service is southbound during the AM peak period and northbound during the PM peak period. Caltrain service terminates at the San Francisco Station at Fourth and King streets (Fourth/ King station). The Fourth/King station is served by local, limited, and express “Baby Bullet” trains that are accessible from the Parnassus Heights, Mission Bay, Mount Zion, or Mission Center campus sites via Muni or UCSF shuttle.

Caltrain is proposing to implement a Modernization Program that will electrify the railway to provide upgraded performance and allow more efficient operations and a higher capacity (scheduled to be complete by 2019). Currently, Caltrain crosses Sixteenth Street at-grade at the intersection of Sixteenth Street/Seventh Street/Mississippi Street. There are currently 10 trains per hour during peak periods, and the Modernization Program will allow the number of trains to increase to 12 trains per hour. Additionally, Caltrain is anticipating a “blended system”, with California High Speed Rail trains running alongside Caltrain on the same tracks. The blended system may require a grade separation at Sixteenth/Seventh/Mississippi streets. Electrification of Caltrain (and the associated improved travel times and frequencies), as well as the introduction of High Speed Rail, may improve transit access for the Mission Bay campus site.

4.14.1.3 UCSF Transportation Demand Management Plan (TDM)

There are many different factors that determine how people travel to/from work, including home location, work shifts, access to transit, and travel incentives and disincentives (e.g., how convenient or costly it is to park). A TDM program is a set of policies and programs that include incentives, information, and education to encourage employees to commute to work by modes other than driving alone. The UCSF TDM program includes strategies that emphasize alternative commuting options, such as public transit, private shuttle service, biking, walking, and carpooling. The key elements of the UCSF TDM program are summarized in **Table 4.14-1**.

4.14.1.4 UCSF Shuttle System

The core element of UCSF’s TDM plan is the shuttle service that UCSF operates throughout San Francisco. The shuttle system fleet (currently 60 shuttles) provides service between transit facilities, remote parking lots, the various UCSF campus sites, and UCSF-affiliated hospitals / medical centers within the City. The primary shuttle routes serve the Parnassus Heights, Mission Bay, Mission Center, San Francisco General Hospital, Mount Zion and Laurel Heights campus sites. Service includes 13 fixed-route lines and two on-demand evening services. Fixed-route shuttle headways are generally between 15 to 25 minutes, and most routes operate between 6:00 AM and 9:00 PM, Monday through Friday. The two on-demand services operate both weekday and weekend nights. Riders can request on-demand service within a pre-defined border around the Parnassus Heights and Mission Bay campus sites by calling UCPD dispatch. All shuttle buses are equipped with bike racks, and many are equipped with WiFi. The service is free for UCSF faculty, staff, students, patients, and visitors.

**TABLE 4.14-1
 EXISTING UCSF TDM PROGRAM ELEMENTS**

TDM Strategy	Description
Annual Transportation Survey	Annual employee and student survey to learn more about travel to, from, and within UCSF campus sites
Bicycle Racks	Total of approximately 970 bike stalls distributed throughout campus sites with capacity exceeding demand, with one exception – Parnassus Heights campus site
Showers and Lockers	Showers and lockers are provided at various campus sites, which can be used by bicyclists
Bicycle Permits	Free bicycle permits are provided, allowing free access to enclosed bicycle parking facilities; free tire repair kits; bike fix-it stations available at Parnassus and Mission Bay campus sites; discounted SF Bike Coalition membership.
Shuttle	UCSF shuttle system serving all main campus sites
Priced Permit Parking	UCSF offers over 30 varieties of parking permits to employees, students and departments. The price of individual permits range from \$20 to \$161 per month. Departmental permits are \$266 per month. A limited number of permits are issued per year and are distributed based on a prioritization hierarchy
Priced Visitor Parking	UCSF offers short-term visitor parking. Both hourly and daily rates are available
City Carshare	UCSF staff and students qualify for personal memberships at a discounted rate; 18 City Carshare vehicles are available at various campus sites.
Pre-Tax Program	The Pre-Tax program allows employees to reduce their public transit and non-UCSF vanpool costs by about one-third. The program works by allowing participants to deduct up to \$125 per month from their paycheck without paying payroll taxes on this income
Carpool Parking	Preferential parking for UCSF employees with a valid carpool permit
Zimride	UCSF-specific Zimride (ride sharing) website
Emergency Ride Home	Employees who need an emergency ride home can be reimbursed up to \$50 for a transit, taxi or rental car trip
Telecommuting Policy	Determined by job position/requirements and Department
Vanpool Program	The vanpool program requires a minimum of eight participants per vanpool. The driver participates for free and the riders pay about \$240 per month per person. Currently, there are 33 vanpools that travel throughout the Bay Area, and as far as Sacramento.

SOURCE: UCSF Staff, 2013

The seated per-vehicle capacity of the shuttle buses (Blue, Tan, Black, Purple, Green, Pink, Bronze, Yellow, Lime, Red, Grey, Gold and VA lines) varies from 22 to 33 persons. The capacity utilization of the shuttle program is as follows: four lines (Grey, Blue, Gold, and Black) operate above 100 percent capacity during the AM peak period, the Tan line operates above 100 percent capacity in the midday period, and five lines (Bronze, Tan, Gold, Grey, and Black) operate above 100 percent capacity during the PM peak period. Of these instances, the highest ridership was found on the Grey and Blue lines in the AM peak period, and the Yellow and Tan lines in the PM peak period, where capacity utilization is above 120 percent for one or more hours. The following UCSF shuttle lines operate below 50 percent capacity during part or all of the day:

- Lime line during all times but the PM peak;
- Black, Gold, and Tan lines during the evening;
- Grey line midday; and
- Purple line during all times.

4.14.2 Regulatory Considerations

UCSF is situated on land that is owned or controlled by the Regents of the University of California. As such, UCSF generally is exempted by the federal and state constitutions from compliance with local land use regulations, including general plans and zoning. Specifically, transportation improvements or modifications required to mitigate impacts of the 2014 LRDP to roadways under the authority of the City of San Francisco would be responsibility of the City, and would need to be approved by the applicable City agencies. However, as stated in Section 3.4.1.1, it is a LRDP objective that UCSF consults and coordinates on a regular basis with the City (e.g., the Planning Department, Municipal Transportation Agency, Department of Public Works, and Office of Community Investment and Infrastructure) when planning new development, especially if improvements are being proposed within City rights-of-way adjacent to campus sites.

4.14.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- 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?
- 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?
- 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?
- d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- e) Result in inadequate emergency access?
- 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?
- g) Exceed the applicable LRDP EIR standard of significance by causing substantial conflict among autos, bicyclists, pedestrians, and transit vehicles?

Regarding criterion c), after evaluation of the activities proposed by the 2014 LRDP, the Initial Study concluded that 2014 LRDP activities would clearly result in no impact or a less-than-significant impact at all campus sites. Therefore, this criterion is not discussed further in the EIR.

4.14.3.1 Analysis Methodology

Below is a list of thresholds of significance used by UCSF to assess whether the 2014 LRDP would result in significant impacts to the transportation network.

Traffic

Signalized Intersections – a significant impact would occur if:

- LRDP traffic causes intersection LOS D or better to deteriorate to LOS E or F.
- LRDP traffic causes intersection LOS E to deteriorate to LOS F.
- LRDP increases traffic by five percent on critical movements operating at LOS E or F of an intersection operating at LOS E or F under Existing conditions.

Unsignalized Intersections – a significant impact would occur if:

- LRDP traffic causes the LOS at the worst approach to deteriorate from LOS D or better to LOS E or F and Caltrans signal warrants would be met.
- LRDP traffic causes Caltrans signal warrants to be met when the worst approach is already operating at LOS E or F.
- LRDP adds traffic to an intersection that operates at LOS E or F under Existing conditions and makes a considerable contribution (five percent on critical approaches operating at LOS E or F) to the worsening of the average delay per vehicle and Caltrans signal warrants would be met.

Cumulative – a significant impact would occur if:

- LRDP would make a considerable contribution to the deterioration of intersection conditions (LOS E or F) if LRDP-generated traffic contributes five percent or more to the critical movements operating at LOS E or F under cumulative conditions.

Transit

The LRDP would have a significant effect on the environment if project demand for public transit causes the need for development or expansion of mass transit facilities, the development of which would cause significant environmental impacts.

Pedestrians and Bicycles

The LRDP would have a significant effect on the environment if it would cause a substantial conflict among autos, bicyclists, pedestrians, and transit vehicles.

Loading

The LRDP would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, or if it created

potentially hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians.

Parking

LRDP-generated parking demand that is not met by the project is not considered significant.

Construction

Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

4.15 Utilities and Service Systems

This section presents the Regional Setting, Regulatory Considerations, Significance Standards and Analysis Methodology for the evaluation of Utilities and Service System impacts. 2014 LRDP Utilities and Service System effects are discussed in Chapter 5, *2014 LRDP –Impacts and Mitigation Measures*. Utilities and Service System effects resulting from 2014 LRDP proposals at each of the four affected campus sites are discussed in Chapter 6, *Parnassus Heights – Impacts and Mitigation Measures*, Chapter 7, *Mission Bay – Impacts and Mitigation Measures*, Chapter 8, *Mount Zion – Impacts and Mitigation Measures* and Chapter 9, *Mission Center – Impacts and Mitigation Measures*.

4.15.1 Regional Setting

4.15.1.1 Water Supply and Infrastructure

Existing and Planned Future Water Supply

The San Francisco Public Utilities Commission (SFPUC) provides regional water services to approximately 2.6 million people in San Francisco, Santa Clara, Alameda, San Mateo, and Tuolumne Counties, including all of the City and County of San Francisco. About 85% of the water delivered to SFPUC customers comes from Tuolumne River water stored in Hetch Hetchy Reservoir in the Sierra Nevada, and the remaining 15% comes from runoff in the Alameda and Peninsula watersheds captured in reservoirs located in San Mateo and Alameda Counties, supplemented with local groundwater and recycled water. The regional water system conveys Tuolumne River water to the Bay Area and blends it with local runoff before supplying its customers with potable water. The system includes over 280 miles of pipelines, over 60 miles of tunnels, 11 reservoirs, 5 pump stations, and 2 water treatment plants, and currently delivers a total of approximately 219 million gallons of water per day (mgd) to its customers (SFPUC, 2013).

The SFPUC serves water to both retail and wholesale customers, with about one third of its water supplies for retail customers (primarily located in San Francisco), including the 2014 LRDP area.⁴⁷ Retail customers include the residents, businesses, and industries within the City as well as other customers such as the Town of Sunol, San Francisco International Airport, and the Lawrence Livermore National Laboratory, among others. Within the City, the SFPUC provides distribution and storage for water and fire protection for the local water system; this system includes 10 reservoirs, 8 water tanks, 17 pump stations, and approximately 1,250 miles of transmission lines and water mains. For its retail customers, the SFPUC supplements its supplies from the regional water system, which provides more than 97% of the supply, with a small portion of local groundwater and recycled water (less than 3%). In 2010, available supply for retail customers, including in-City users, was 83.2 mgd (SFPUC, 2010).

⁴⁷ In addition to retail demand, the SFPUC provides water to 27 wholesale customers in San Mateo, Alameda, and Santa Clara Counties by contractual agreement. The wholesale customers receive about two-thirds of the SFPUC's regional water system supply. Under the 2009 Water Supply Agreement among the SFPUC and wholesale customers, wholesale customers are assured 184 mgd of supply and retail customers are assured 81 mgd of supply through 2018 during normal hydrologic years. As reported in the SFPUC's 2010 *Urban Water Management Plan*, wholesale customers used about 149.5 mgd in 2010.

In 2008, the SFPUC adopted the Water System Improvement Program (WSIP), a multi-billion dollar capital program, to improve and enhance water quality, seismic reliability, delivery reliability, and water supply of the regional water system. Since then, the SFPUC has been implementing numerous WSIP projects—which are now in various stages, ranging from planning and construction to fully operational facilities—and moving towards achieving the WSIP objectives. Included in the WSIP projects are local water supply projects to diversify the retail water supply sources to meet the future water needs of its retail customers.

The SFPUC plans to augment local supplies for its retail customers by extracting up to 4 mgd of groundwater from new wells in the Westside Groundwater Basin located on the west side of the City; this project is anticipated to provide an additional 1 mgd of water supply upon initial startup in mid-2016, up to 3 mgd during Phase 1, and up to 4 mgd total by the end of Phase 2. In addition, the SFPUC has plans to provide an additional 4.0 mgd of recycled water through the Westside and Eastside Recycled Water Projects, primarily for landscape irrigation, toilet flushing and industrial uses, which in turn would increase the availability of potable water for retail customers. With implementation of these projects, total retail supply is anticipated to be 83.5 mgd in 2015 and to increase to 90.3 mgd by 2035 during normal hydrologic years (SFPUC, 2013).

Dry Year Water Supplies

The above water supply estimates are based on typical years with normal (i.e., average or above average) precipitation. However, in any given year, the amount of water available to the SFPUC is constrained by hydrology, physical facilities, and institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is dependent on local reservoir storage to maximize the reliability of its water supplies, particularly during dry years, when stored water from wet years can be used (SFPUC, 2011). Local water supply sources, including local groundwater and recycled water, are very important during dry years.

During a prolonged drought, the water supplies from the regional water system would be curtailed, and the SFPUC has adopted a Water Shortage Allocation Plan that outlines procedures for allocating water from the regional system among its retail and wholesale customers. The allocation methodology depends on the extent and duration of the shortage. **Table 4.15-1** summarizes the existing and future SFPUC retail water supplies during normal and representative dry years.

**TABLE 4.15-1
 EXISTING AND PLANNED FUTURE SFPUC RETAIL WATER SUPPLIES
 (million gallons per day)**

Hydrologic Year Type	2010	2015	2035
Normal Year, existing sources	83.2	83.5	83.5
Normal Year, existing + planned future sources	83.2	83.5	90.3
Years 2 and 3 of Multiple Dry Years	--	82.0	88.8

SOURCE: SFPUC, 2013

Existing and Projected Water Demand

Water use within San Francisco is currently below historical consumption levels, and both total consumption and per capita water use have generally been declining since the mid-1970s. In 2012, SFPUC retail water use was 77.8 mgd, comprised of 72.8 mgd of in-City retail use and 5.0 mgd of suburban retail use (SFPUC, 2013).

In summer 2012, the San Francisco Planning Department updated its Land Use Allocation (LUA) for the Association of Bay Area Governments (ABAG) Sustainable Community Strategy Jobs-Housing Connections Scenario. The revised LUA projects an additional 11,235 dwelling units and 35,068 jobs in 2035 over the previous LUA projections from 2009 considered in the SFPUC’s 2010 *Urban Water Management Plan* (UWMP). The SFPUC thus concluded that its 2010 UWMP did not account for every project requiring a water assessment within San Francisco. Therefore, this EIR does not rely on the 2010 UWMP for determining impacts on the water supply system, but rather uses updated information developed by the SFPUC in 2013.

Because the SFPUC will not be preparing an update to the UWMP until 2015, the SFPUC developed a Water Availability Study (WAS) during the interim period to document current and projected water supplies compared to projected demands associated with this updated growth projection. As a result of the updated growth projections discussed in the WAS, the SFPUC anticipates total retail demand to increase to 83.7 mgd in 2015 and 84.2 mgd in 2035 (SFPUC, 2013).

Table 4.15-2 summarizes the existing and projected future water SFPUC retail customer water demands and shows the breakdown of in-City and suburban customer demands.

**TABLE 4.15-2
 EXISTING AND PROJECTED FUTURE SFPUC RETAIL WATER DEMANDS
 (million gallons per day)**

Retail Customer	2012	2015	2035
In-City (in San Francisco)	72.8	78.1	78.6
Suburban (outside San Francisco)	5.0	5.6	5.6
Total Retail Demand	77.8	83.7	84.2

SOURCE: SFPUC, 2011 and 2013

According to the recently published UCSF 2014 *Water Action Plan*, the average water demand for UCSF during the three-year period of 2007 to 2010 was 226,024,565 gallons per year (excluding the UCSF Medical Center). The Parnassus Heights and Mission Bay campus sites consumed about 119 million gallons and 66 million gallons per year during this three-year period, respectively (UCSF, 2014).

Water Supply and Demand Comparison

As described above, in 2010, available water supply for SFPUC retail customers was 83.2 mgd, which is more than enough to meet the 2012 demand of 77.8 mgd.

In 2015, the SFPUC estimates water supplies for retail customers of 83.5 mgd in a normal hydrologic year, and a retail demand of 83.7 mgd; this indicates a deficit of about 0.2 mgd for that year. By 2035, however, the SFPUC anticipates that there will be 90.3 mgd of water supply available to retail customers from existing and planned future water sources; this would more than meet the estimated 84.2 mgd of water demand (SFPUC, 2013).

According to the WAS, the SFPUC can meet the future demands of its retail customers in normal years, single dry years, and multiple dry year events, with the exception of 2015, which is prior to full implementation of new supplies under the WSIP. The deficit for 2015 in a normal year represents less than a 0.25% shortfall, and during a multiple dry year event represents a 2.0% shortfall; these small percentage shortfalls can generally be managed through voluntary conservation measures or, if necessary, rationing. However, based on current trends of decreasing retail demand—as evidenced by the 2011–2012 demand of 77.8 mgd — the projected 2015 demand may be overly conservative (that is, actual demand may be lower than projected). Regardless, between now and 2015, the SFPUC has procedures in place to meet retail customer water demands over a range of hydrologic conditions, and, if determined to be necessary, the SFPUC could impose delivery reductions or rationing, or it could purchase additional water from the regional water system.

4.15.1.2 Wastewater Collection and Treatment / Stormwater

The SFPUC maintains and operates a combined sewer system (CSS) that serves most of San Francisco, including all UCSF sites. This system collects stormwater runoff and wastewater flows in the same network of pipes. It conveys flows to facilities where they are treated prior to discharge through outfalls into the Bay or Pacific Ocean. The Mission Bay area, including the Mission Bay campus site, was formerly connected to the CSS. This system was separated in 2011 and stormwater flows are now discharged to San Francisco Bay. Discharges are regulated under National Pollutant Discharge Elimination System (NPDES) permits from the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

The collection system consists of about 976 miles of underground pipes throughout the City, which is divided into an eastern and western basin. In the eastern basin, average dry weather flows of 63 mgd are directed to the Southeast Water Pollution Control Plant (SEWPCP) located on Phelps Street, south of Islais Creek on the eastern waterfront. The SEWPCP receives flows from the Mission Bay, Mount Zion and Mission Center campus sites and about half of the stormwater from the Parnassus Heights campus site. Sewage flows from the Parnassus Heights campus site are directed to the Oceanside Water Pollution Control Plant (OWPCP) east of the Great Highway near the San Francisco Zoo. The SEWPCP has a dry weather capacity of 84.5 mgd, and all dry weather flows receive secondary treatment before being discharged to San Francisco Bay through the Pier 80 outfall, which has a capacity of 110 mgd. Flows from the western basin are directed to the OWPCP and discharged by gravity approximately four miles offshore in the Pacific Ocean. During wet weather the OWPCP provides primary treatment for flows up to 65 mgd and secondary treatment to a maximum flow rate of 43 mgd (SFPUC, 2010).

During wet weather, up to 150 mgd of wet weather flows receive secondary treatment at the SEWPCP. The SEWPCP can also treat up to an additional 100 mgd to a primary treatment standard plus disinfection. Up to an additional 150 mgd of wet weather flows receive primary treatment plus disinfection at the North Point Wet Weather Facility, located on the north side of the City at 111 Bay Street, which operates only during wet weather. Treated effluent from this facility is discharged through four deep water outfalls, approximately 800 feet from the bay shoreline. Two of the deep water outfalls terminate at the end of Pier 33 and two terminate at the end of Pier 35 on the northeastern Bay shore.

The CSS includes storage and transport boxes that, during wet weather, retain the combined stormwater and sewage flows that exceed the capacities of the SEWPCP and the North Point Wet Weather Facility for later treatment. The transport boxes connect to 29 combined sewer outfalls to the Bay. When rainfall intensity results in combined flows that exceed the total capacity of the SEWPCP, the North Point Wet Weather Facility, and the storage and transport structures, the excess flows are discharged through the combined sewer discharge structures in compliance with NPDES permits. Citywide, discharges from these discharge structures receive “flow-through treatment,” which is similar to primary treatment, to remove settleable solids and floatable materials. Wet weather flows are intermittent throughout the rainy season, and combined sewer overflow events vary in nature and duration depending largely on the intensity of individual rainstorms.

4.15.1.3 Solid Waste Collection and Disposal

According to the California Integrated Waste Management Act of 1989 (AB 939), San Francisco is required to adopt an integrated waste management plan, implement a program to reduce the amount of waste disposed, and have its waste diversion performance periodically reviewed by the California Department of Resources Recycling and Recovery (CalRecycle). In 2012, San Francisco sent approximately 455,000 tons of solid waste to landfills, up from 447,000 tons in 2011 (CalRecycle, 2014). San Francisco diverted more than 80% of waste material from landfill disposal in 2011 through recycling, composting, and reuse (CCSF, 2012).

Beginning with the 2007 jurisdiction annual reports, diversion rates were no longer used to measure compliance with AB 939. With the passage of SB 1016 in 2006 (the Per Capita Disposal Measurement System), per capita disposal rates are instead measured to determine if a jurisdiction’s efforts are meeting the intent of AB 939. The City’s per resident disposal target rate is 6.6 pounds per person per day (PPD), and its per employee disposal target rate is 10.6 PPD. In 2012, which is the most recent date for which data are available, the measured disposal rate was 2.9 PPD for residents and 4.2 PPD for employees, thereby meeting the City’s target rates (CalRecycle, 2014).

More than 80% of solid waste generated in San Francisco is transported to the Altamont Landfill in Alameda County. The Altamont Landfill has a permitted peak maximum daily disposal of 11,150 tons per day and accepted 1.06 million tons in 2009, down from 1.31 million tons in 2005. The landfill has an estimated remaining capacity of approximately 46 million cubic yards or 74% of its permitted capacity. The estimated closure date of the landfill is 2025 (CalRecycle, 2014).

In 1988, San Francisco contracted for the disposal of 15 million tons of solid waste at the Altamont Landfill. The City contract with the Altamont Landfill expires in 2015. Through August 1, 2009, the City had used approximately 12.5 million tons of this contract capacity. The City projects that the remaining contract capacity will be reached no sooner than August 2014. In 2009, the City announced that it could award its landfill disposal contract to a Recology subsidiary for shipment of solid waste by truck and rail to the Recology Ostrom Road Landfill in Yuba County. This facility has an expected closure date of 2066 with a total design capacity of over 41 million cubic yards. The City is also considering the Recology Hay Road Landfill in Solano County as a disposal site and is currently conducting environmental review of this location. The ultimate determination with respect to future landfill contracting will be made by the Board of Supervisors on the basis of solid waste planning efforts being undertaken by the City's Department of the Environment.⁴⁸

UCSF Facilities Management is responsible for implementing the *UC Policy on Sustainable Practices* solid waste goal of zero waste by 2020 (not including waste from the Medical Center). In 2012, the diversion rate was 63%.

4.15.1.4 Electricity and Natural Gas

Electrical and natural gas service is provided to northern and central California, including San Francisco, by Pacific Gas and Electric Company (PG&E). In 2012-2013, UCSF purchased 6,871,248 therms of natural gas from PG&E and used 41,560,148 kilowatt hours of electricity.

The majority (67%) of UCSF's 2008 electricity purchases from the state grid came from PG&E. The 2008 PG&E power mix consisted of non-emitting nuclear generation (22%), large hydroelectric facilities (16%) and renewable resources (14%), such as wind, geothermal, biomass and small hydro. The remaining portion came from natural gas (39%), coal (8%), and other fossil-based resources (1%).

The remainder of UCSF's electricity purchases come from a UC system-wide direct access supplier, currently Sempra Energy, and the Western Area Power Administration (WAPA)⁴⁹. In order to "green" the direct access supply of electricity, UCSF along with the other UC campuses served under the direct access contract have purchased renewable energy certificates equal to approximately 18% of the direct access electricity supply. These certificates guarantee that renewable energy equal to 18% of the direct access load is placed on the grid on behalf of the Universities (UCSF, 2009).

⁴⁸ San Francisco is currently participating as a responsible agency in the environmental review process that Yuba County has begun for the Recology Ostrom Road Green Rail and Permit Amendment Project and to conduct CEQA review of San Francisco's proposal to enter into one or more new agreements with Recology. On March 28, 2013, Yuba County and San Francisco entered into a Cooperative Agreement to designate Yuba County as the lead agency for this project and to outline their cooperative efforts concerning environmental review.

⁴⁹ While WAPA does not provide a generation source breakdown to specific users, its primary supply is from hydropower (approximately 90%). <http://ww2.wapa.gov/sites/western/Pages/default.aspx>

The Parnassus Heights campus site has a central utility plant (PCUP) which serves the campus site buildings, including three Medical Center buildings: Moffitt Hospital, Long Hospital and the Ambulatory Care Center. The plant includes a cogeneration system which provides electricity to the whole Parnassus Heights campus site. The PCUP also produces steam, which is distributed throughout the campus site, and chilled water, which is distributed to University buildings on the south side of Parnassus Avenue. The cogeneration system comprises two combustion turbines burning natural gas and nominally generating 5 megawatts each.

The Mission Bay campus site has a central utility plant on Block 16 that serves four research buildings through a steam / chilled water distribution system. The Mount Zion campus site has a central boiler plant that serves five hospital buildings on the main block.

4.15.2 Regulatory Considerations

Urban Water Management Plan

In 1983, the California Legislature enacted the Urban Water Management Planning Act (California Water Code Sections 10610 through 10656). The act states that every urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, should make every effort to ensure reliable water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The act describes the contents of the Urban Water Management Plan as well as how urban water suppliers should adopt and implement the plans. The plan must be updated at least every five years on or before December 31 in years ending in five and zero. The provisions of the Urban Water Management Plan for the SFPUC are described above.

Water Supply Assessment

The State of California adopted Senate Bill 610 (SB 610) effective January 1, 2002. SB 610 requires cities and counties, when evaluating large development and redevelopment projects, to request an assessment of the availability of water supplies from the water supply entity that will provide water to a project. The Water Supply Assessment (WSA) is performed in conjunction with the land use approval process associated with a project and must include an evaluation of the sufficiency of the water supplies available to the water supplier to meet existing and future demands, including the demand for a project over a 20-year time period that includes normal, single-dry, and multiple dry years.

When a new development project is accounted for in the demand projections of an UWMP, the WSA can refer to the UWMP and no further analysis is necessary. As described in Section 4.15.1, above, the SFPUC allows for all development projects requiring a WSA under SB 610 to rely solely on the SFPUC's adopted UWMP without having to prepare individual WSAs. However, because the SFPUC will not be preparing an update to the UWMP until 2015, a Water Availability Study was prepared by the SFPUC during the interim period. This study documented current and projected water supplies compared to projected demands associated with growth not covered in the UWMP in order to satisfy the requirement for the preparation of a WSA.

Water Code Section 10910 and 14 CCR 15155 (entitled “City or County Consultation with Water Agencies”) apply only to cities and counties. Water Code Section 10910(a) states: “Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.” Although these requirements do not specifically apply to UCSF, or the University of California, UCSF voluntarily requested a WSA be prepared following the requirements of SB 610 for informational purposes for the net new development proposed under the 2014 LRDP.

RWQCB Permits

The Porter-Cologne Water Quality Control Act authorizes the SWRCB, which, in turn, delegated certain authority to the several Regional Water Quality Control Boards (RWQCB) to issue and enforce NPDES permits. In addition, the SWRCB develops water quality standards and performs other functions to protect California’s waters. The RWQCBs, pursuant to their delegated powers, carry out the SWRCB regulations and standards as well as issue and enforce permits. In 2003, the SWRCB adopted the General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer System (MS4s). A revised permit applying to the MS4 at UCSF was adopted in 2013 and requires UCSF to develop, implement and enforce a Storm Water Management Plan/Program (SWMP) by July 2016. See Section 4.8, *Hydrology and Water Quality*, for further discussion of NPDES permits.

Assembly Bill 939 and Senate Bill 1016

The California Integrated Waste Management Act of 1989, or Assembly Bill 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans, and mandated that local jurisdictions divert at least 50% of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75% by 2010. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less-than-significant levels. With the passage of Senate Bill 1016 (the Per Capita Disposal Measurement System) in 2006, only per capita disposal rates are measured to determine if a jurisdiction’s efforts are meeting the intent of Assembly Bill 939.

UCSF Water Conservation Plan

The UCSF 2014 Water Action Plan (WAP) is the blueprint for reaching a per capita 20% reduction in water consumption by 2020. The WAP fulfills the *UC Policy on Sustainable Practices* requirement regarding Sustainable Water Systems and outlines the path to achieving UCSF’s contribution to UC President Janet Napolitano’s goal to reduce per capita water use by 20% throughout the UC system by 2020. UCSF has made substantial progress towards reaching its goals having reduced per capita consumption 4.4% by the end of fiscal year 2012-2013. Initial projects that contributed to this reduction include the recycling of condensed steam and recycling excess filtered water from laboratories. Additional projects that UCSF is implementing include replacing older and wasteful restroom fixtures with high and ultra-high efficiency fixtures;

retrofitting or replacing water consuming equipment such as walk-in boxes, sterilizers, and autoclaves; eliminating once-through cooling devices; reducing continuous flow; and addressing leaks (UCSF, 2014).

On January 17, 2014 the Governor announced an emergency drought declaration for the State and asked each State agency to reduce their water consumption by 20% over the next year. In response to the declaration and the Governor's Office request for the University to take immediate actions, President Napolitano presented the UC Chancellors with drought response measures to reduce short-term water consumption to the extent possible on their respective campuses (UCOP, 2014). In response to the President's letter, UCSF has committed to the following strategic actions to reduce water use:

- Accelerate and expand leak detection program and/or install "report a leak" stickers to engage the campus community.
- Reduce research/agricultural water consumption.
- Implement an education outreach water conservation campaign targeting office, laboratories, and student housing.
- Provide incentives for paying customers that reduce water and fee hikes for users that do not.
- Prioritize energy efficiency retrofit and deferred maintenance projects that also result in water savings.
- Incorporate water-saving guidelines for new facilities into the Campus Standards and Design Guide. (UCSF, 2014)

4.15.3 Significance Standards

Would implementation of the proposed 2014 LRDP:

- a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
- 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?
- 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?
- d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
- e) 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?

- f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?
- g) Comply with applicable federal, state, and local statutes and regulations related to solid waste?
- h) Result in the wasteful, inefficient and unnecessary consumption of energy (see CEQA Statutes Section 21100(b)(3))?
- i) Exceed the LRDP EIR standard of significance by requiring or resulting in the construction of new electrical or natural gas facilities, which would cause significant environmental effects?

4.15.4 Analysis Methodology

The environmental impact analysis for utilities and service systems begins with an assessment of existing utility use and infrastructure services at the main UCSF campus sites. The projected demands for utilities and infrastructure services generated are then calculated and compared to existing usage to determine the net increase resulting from implementation of the 2014 LRDP. Typically, utility assessments focus on supply, treatment or generation capacity and distribution or collection infrastructure requirements. For each potential impact, the analysis compares the net increase resulting from implementation of the 2014 LRDP against the significance criteria set forth above. If the impact would be significant, the analysis identifies feasible mitigation measures that would eliminate the impact or reduce it to a less-than-significant level. If the impact cannot be reduced to a less-than-significant level after implementation of all feasible mitigation measures, then it would remain significant and unavoidable.

4.15.5 References

- California Department of Resources Recycling and Recovery (CalRecycle), <http://www.calrecycle.ca.gov/>, accessed February 20, 2014.
- City and County of San Francisco (CCSF), Press Release, "Mayor Lee Announces San Francisco Reaches 80 Percent Landfill Waste Diversion, Leads All Cities in North America," Office of the Mayor, October 5, 2012.
- San Francisco Public Utilities Commission (SFPUC), *2013 Water Availability Study for the City and County of San Francisco*, May 2013.
- SFPUC, *2010 Urban Water Management Plan for the City and County of San Francisco*, June 2011.
- SFPUC, *Sewer System Improvement Program Report: Draft Report for SFPUC Commission Review*, prepared by Wastewater Enterprise Staff, August 10, 2010.
- University Office of the President (UCOP), Letter to the Chancellors, March 21, 2014.

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