4.2 AIR QUALITY

This section of the Focused Tiered Draft EIR presents potential air quality impacts of the Creative Arts and Holloway Mixed-Use Project (Project). Preparation of this Draft EIR was preceded by the Tiered Initial Study, which determined that an EIR would be prepared to consider the potential for the Project to result in new significant impacts on air quality or substantially more severe impacts compared to those identified in the Campus Master Plan (CMP) EIR. Section 4.2 of the Draft CMP EIR (SF State 2006) and Section 2.2.2 of the Final CMP EIR (SF State 2007a) address the air quality effects of campus growth under the 2007 CMP (SF State 2007b).

This section presents the environmental setting, impacts of the Project on the environment, and proposed measures to mitigate any identified significant impacts. Where relevant, information is incorporated by reference from the 2007 CMP EIR, from which this EIR is tiered, as described in Chapter 2. To determine the potential for impacts beyond those evaluated in the CMP EIR, additional modeling and evaluation of air quality impacts was performed for this EIR. Appendix C provides the modeling results that support this evaluation.

There were no public or agency comments related to air quality received during the public scoping period in response to the Notice of Preparation. For a complete list of public comments received during the public scoping period, refer to Appendix B.

4.2.1 Environmental Setting

Section 4.2 of the Draft CMP EIR addresses the existing environmental setting for air quality (SF State 2006). The following discussion summarizes information presented in the "Environmental Setting" subsection of Section 4.2 of the Draft CMP EIR, updated with current information as necessary.

Study Area

The Project site is located in the City and County of San Francisco (City), within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB encompasses all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, and the southern portions of Solano and Sonoma Counties.

Air pollutants are emitted by a variety of sources, including mobile sources (vehicles), area sources (hearths, consumer product use, architectural coatings, and landscape maintenance equipment), energy sources (natural gas), and stationary sources (generators or other stationary equipment). Some air pollutants need to be examined at the local level, and others are predominately an issue at the regional level. For instance, ozone (O_3) is formed in the atmosphere in the presence of sunlight by a series of chemical reactions involving oxides of

nitrogen (NO_x) and reactive organic gas (ROG) (also termed volatile organic compounds). Because these reactions are broad-scale in effects, O_3 is typically analyzed at the regional level (i.e., in the Air Basin) rather than the local level. On the other hand, air pollutants such as coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), and toxic air contaminants (TACs) are a potential concern in the immediate vicinity of the pollutant source because the pollutants are emitted directly by or are formed close to the source. Therefore, the study area for emissions of PM_{10}, $PM_{2.5}$, CO, and TACs is the local area near the source, such as in the vicinity of the Project site, and the study area for regional pollutants such as NO_x and ROGs is the entire SFBAAB.

Regional Climatology

Air quality is a function of the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features that influence pollutant movement and dispersal. Atmospheric conditions such as wind speed, wind direction, atmospheric stability, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, and consequently affect air quality.

The climate of the SFBAAB is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the west coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing more storms to pass through the region. During summer and early fall, when few storms pass through the region, emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as O_3, and secondary particulates, such as nitrates and sulfates.

The Project site is located in the SFBAAB peninsula climatological subregion that extends from northwest San Jose to the Golden Gate Bridge. Specific topographic and climatological conditions for the subregion are described in the Bay Area Air Quality Management District's (BAAQMD) California Environmental Quality Act Air Quality Guidelines (BAAQMD 2012). The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2,000 feet at the southern end and decreasing to 500 feet in South San Francisco. In this area, marine air traveling through the San Bruno Gap (extending from Fort Funston on the coast to the San Francisco Airport) and the Crystal Springs Gap (between Half Moon Bay and San Carlos) is a dominant weather factor. The air pollution potential in this subregion is highest at the northern end (from motor vehicle congestion) and in the southeast, which is protected from the high winds and fog of the marine layer (BAAQMD 2012).

The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences as a result of local topographic features. Annual average wind

speeds range from 5 to 10 miles per hour (mph) throughout the peninsula, with higher wind speeds usually found along the coast. Winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap. San Francisco is at the northern end of the peninsula subregion, where pollutant emissions are high, particularly from motor vehicle congestion, but winds are generally fast enough to carry the pollutants away before they can accumulate (BAAQMD 2012). The San Francisco State University (SF State) campus is located within San Francisco's fog belt. Ocean fog and associated low clouds are prominent features of the campus, particularly during summer. Cool, damp westerly winds and fog can persist for extended periods of time, especially between May and August.

Air Quality Standards and Regulations

Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the United States Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive people from illness or discomfort. Pollutants of concern include O_3, nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Federal. The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including setting National Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant standards; approving state attainment plans; setting motor vehicle emissions standards; issuing stationary source emissions standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the

NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames.

State. The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; pollution levels must be below these standards before a basin can attain the standard. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, $PM_{2.5}$, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded.

An area is designated as "in attainment" when it is in compliance with the federal and/or state standards. The NAAQS, CAAQS, and attainment classifications for the criteria pollutants are outlined in Table 4.2-1.

Table 4.2-1
State and Federal Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Standard	*Attainment Status*	*Standard*	*Attainment Status*
Ozone (O_3)	1 hour	0.09 ppm	N	NA	NA
	8 hour	0.07 ppm	N	0.070 ppm	N/Marginal[c]
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	20 µg/m^3	N	NA	NA

Table 4.2-1
State and Federal Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Standard	*Attainment Status*	*Standard*	*Attainment Status*
Fine Particulate Matter ($PM_{2.5}$)	24 hour	NA	NA	35 µg/m^3	N[d]
	Annual	12 µg/m^3	N	12 µg/m^3	U/A[e]
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
	Rolling 3-Month Average	NA	NA	0.15 µg/m^3	U/A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	See Note "f"	U	NA	NA

Source: BAAQMD 2016a.

µg/m^3 = micrograms per cubic meter; mg/m^3= milligrams per cubic meter; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; ppm = parts per million by volume; A = Attainment; N = Nonattainment; U = Unclassified; NA = Not Applicable (no applicable standard)

a California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b National standards shown are the "primary standards" designed to protect public health. NAAQS (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over three years, is equal to or less than 0.070 ppm. EPA will make recommendations on attainment designations by October 1, 2016, and issue final designations October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the ozone level in the area.

d On January 9, 2013, the 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 "nonattainment" for the national 24-hour $PM_{2.5}$ standard until such time as the BAAQMD submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

e In December 2012, the EPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 µg/m^3. In December 2014, EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

f 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.

In summary, the SFBAAB is designated as a nonattainment area for federal and state O_3 and $PM_{2.5}$ standards. The SFBAAB is also designated as a nonattainment area for the state PM_{10} standard. The SFBAAB is designated as "unclassified" or "attainment" for all other criteria air pollutants. Notably, "unclassified" areas cannot be classified based on available information as meeting or not meeting the ambient air quality standard for the pollutant.

Local. The BAAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SFBAAB, where the Project is located. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, issuance of permits for stationary sources of air pollution, inspection of stationary sources of air pollution and response to citizen complaints, monitoring of ambient air quality and meteorological conditions, and implementation of programs and regulations required by the federal and California Clean Air Acts.

The BAAQMD adopted the Bay Area 2010 Clean Air Plan (BAAQMD 2010a) in cooperation with the Metropolitan Transportation Commission and the Association of Bay Area Governments (ABAG). It sets forth a plan to reach compliance with the state's 1-hour air quality O_3 standard. The Clean Air Plan is a comprehensive strategy to reduce air pollution from stationary and mobile sources. The plan outlines strategies to reduce O_3 precursors, as well as particulate matter, TACs, and greenhouse gas emissions, to meet the goal of reducing air pollution to attain air quality standards and protect public health. Currently, the BAAQMD, the Metropolitan Transportation Commission, and ABAG are working on the 2016 Clean Air Plan/Regional Climate Protection Strategy, which is an update to the current Clean Air Plan (BAAQMD 2016b).

The BAAQMD establishes and administers a program of rules and regulations to attain and maintain state and national air quality standards.

Toxic Air Contaminants

A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources such as automobiles; and area sources such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced from short-term (acute) or long-term (chronic) exposure to a given TAC.

Federal. At the federal level, TACs are identified as Hazardous Air Pollutants (HAPs). The 1977 federal Clean Air Act amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard based on scientific studies of exposure to humans and other mammals. Under

the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

State. The state Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the federal HAPs. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a Diesel Risk Reduction Plan to reduce diesel emissions from new and existing diesel-fueled vehicles and engines. The regulation is anticipated to result in an 80% decrease in statewide diesel health risk by 2020 compared with to the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel powered equipment (CARB 2000). Several Airborne Toxic Control Measures aim to reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 California Code of Regulations (CCR) 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

Local. The BAAQMD is responsible for administering federal and state regulations related to TACs, primarily through establishment of rules and regulations. The BAAQMD also requires performance of a TAC screening analysis as part of permit applications for non-exempt new or modified facilities that emit TACs. The BAAQMD will grant a permit for a new or modified stationary source if the source meets either of the following impact criterion: (1) the estimated incremental cancer risk from the project is less than 1 in 1 million, or (2) the estimated incremental risk is less than 10 in 1 million, and the toxics best available control technology, which are standards to reduce TAC emissions, will be implemented.

Ambient Air Quality

Criteria Air Pollutants

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. The Project site's local ambient air quality is monitored by the

BAAQMD. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The most recent background ambient air quality data from 2013 to 2015 are presented in Table 4.2-2. The ambient air monitoring station closest to the Project site is the Arkansas Street monitoring station, located at 10 Arkansas Street, approximately 6 miles northeast of the Project site. The data collected at this station are considered representative of the air quality experienced in the Project vicinity. Air quality data for O_3, NO_2, CO, PM_{10}, and $PM_{2.5}$ from the Arkansas Street monitoring station are provided in Table 4.2-2.

Table 4.2-2
Local Ambient Air Quality Data – Arkansas Street Station

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Ozone (O_3)				
Maximum 1-hour concentration (ppm)	0.09 ppm (state)	0.069	0.079	0.085
Number of days exceeding state standard (days)		*0*	*0*	*0*
Maximum 8-hour concentration (ppm)	0.070 ppm (state)	0.060	0.069	0.067
	0.070 ppm (federal)	0.059	0.069	0.067
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*0*	*0*
Nitrogen Dioxide (NO_2)				
Maximum 1-hour concentration (ppm)	0.18 ppm (state)	0.072	0.083	0.070
	0.100 ppm (federal)	0.0726	0.0837	0.706
Number of days exceeding state standard (days)		*0*	*0*	*0*
Number of days exceeding federal standard (days)		*0*	*2*	*1*
Annual concentration (ppm)	0.030 ppm (state)	0.013	0.012	0.012
	0.053 ppm (federal)	—	—	—
Carbon Monoxide (CO)				
Maximum 1-hour concentration (ppm)	20 ppm (state)	—	—	—
	35 ppm (federal)	1.8	ND	1.8
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*ND*	*0*
Maximum 8-hour concentration (ppm)	9.0 ppm (state)	—	—	—
	9 ppm (federal)	1.4	ND	1.3
Number of days exceeding state standard (days)		—	—	—
Number of days exceeding federal standard (days)		*0*	*ND*	*0*
Coarse Particulate Matter (PM_{10})				
Maximum 24-hour concentration ($\mu g/m^3$)	50 $\mu g/m^3$ (state)	44.3	35.9	47.0
	150 $\mu g/m^3$ (federal)	41.9	34.5	44.7
Number of days exceeding state standard (days)[a]		*ND (0)*	*ND (0)*	*ND (0)*
Number of days exceeding federal standard (days)[a]		*ND (0)*	*ND (0)*	*ND (0)*

Table 4.2-2
Local Ambient Air Quality Data – Arkansas Street Station

Concentration or Exceedances	Ambient Air Quality Standard	2013	2014	2015
Annual concentration (state method) (μg/m³)	20 μg/m³ (state)	ND	ND	ND
Fine Particulate Matter ($PM_{2.5}$)				
Maximum 24-hour concentration (μg/m³)	35 μg/m³ (federal)	48.5	33.2	35.4
Number of days exceeding federal standard (days)[a]		*2.0 (2)*	*0.0 (0)*	*0.0 (0)*
Annual concentration (μg/m³)	12 μg/m³ (state)	ND	7.7	7.9
	12.0 μg/m³ (federal)	10.1	7.7	7.9

Sources: CARB 2016a; EPA 2016.
— = not available; μg/m3 = micrograms per cubic meter; ND = insufficient data available to determine the value; ppm = parts per million
Data taken from CARB iADAM (http://www.arb.ca.gov/adam) and EPA AirData (http://www.epa.gov/airdata/) represent the highest concentrations experienced over a given year.

[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

Toxic Air Contaminants

Air toxics monitoring stations are located throughout California. These stations, maintained either by CARB or the local air district, monitor and record ambient TACs in the air. These stations measure 10 to 15 TACs, depending on the 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 TAC monitoring station is located approximately 6 miles northeast of the SF State campus at 10 Arkansas Street. Ambient annual average TAC concentrations and their associated health risks of contracting cancer over a 70-year exposure are summarized in Table 4.2-3. CARB estimates a risk of 75.5 in 1 million from the monitored ambient TACs without considering diesel particulates. In the case of diesel particulate matter (DPM), there is no routine method for monitoring ambient concentrations; therefore, DPM is not monitored at the Arkansas Street station. CARB made preliminary estimates of cancer risk from DPM for the Bay Area using its PM_{10} emissions database and PM_{10} ambient monitoring data, the results of several studies with chemical speciation of ambient data, and receptor modeling techniques. The estimation for DPM-associated cancer risk was last performed in 2000, with an estimated concentration of 1.6 micrograms per cubic meter ($\mu g/m^3$) and a health risk of 480 in 1 million.

Table 4.2-3
2014 Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants and Health Risk – Arkansas Street Station

Chemical Compound	Ambient Concentration	Cancer Risk (Chances in 1 Million)
Gaseous TACs	*ppb*	
Acetaldehyde	0.50	2
Benzene	0.194	18
1,3-Butadiene	0.037	14
Formaldehyde	1.28	9
Methylene Chloride	0.108	0.4
Perchloroethylene	0.011	0.4
Trichloroethylene	0.010	0.1
Carbon Tetrachloride	0.092	24
Chloroform	0.025	0.6
Particulate TACs	*ng/m³*	
Chromium (Hexavalent)	0.045	7
Total Risk for All TACs		75.5

Sources: CARB 2016b.
ng/m^3 = nanograms per cubic meter; ppb = parts per billion; TAC = toxic air contaminant

To identify areas of San Francisco most adversely affected by sources of TACs, the City partnered with the BAAQMD to inventory and assess air pollution and exposures from mobile, stationary, and area sources. Areas with poor air quality, termed "Air Pollutant Exposure Zones," were identified based on two health-protective criteria: (1) excess cancer risk from the contribution of emissions from all modeled sources greater than 100 per 1 million population, and/or (2) cumulative $PM_{2.5}$ concentrations greater than 10 $\mu g/m^3$. Based on the Citywide Air Pollutant Exposure Zone Map (CCSF 2014), the Project site is not within a modeled "Air Pollutant Exposure Zone" (i.e., where the concentration of $PM_{2.5}$ or the cancer risk exceed the levels specified above).

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Children, pregnant women, older adults, and people with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered "sensitive receptors" include residences, schools, day care centers, playgrounds, and medical facilities. The nearest sensitive receptors to the Project are located within 100 feet of both Block 1 and Block 6 and consist of on- and off-campus residential uses in University Park South and the adjacent Parkmerced.

4.2.2 Impacts and Mitigation Measures

2007 CMP EIR Standards of Significance

As indicated in the CMP EIR, the significance criteria used to evaluate the impacts of the Project related to air quality are based on Appendix G of the CEQA Guidelines; applicable agency plans, policies, and/or guidelines; and agency and professional standards. Based on the above, a significant impact related to air quality would occur if the Project would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- 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).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

Standards of Significance Changes since 2007 CMP EIR

Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.) indicates that, where available, the significance criteria established by the applicable air quality management district or pollution control district may be relied upon to determine whether a project would have a significant impact on air quality. BAAQMD significance thresholds have been updated since the CMP EIR was prepared and certified (2006/2007).

The BAAQMD adopted updated CEQA Air Quality Guidelines, including new thresholds of significance, in June 2010 (BAAQMD 2010b), and revised them in May 2011. The CEQA Air Quality Guidelines advise lead agencies on how to evaluate potential air quality impacts, including establishing quantitative and qualitative thresholds of significance. The BAAQMD resolutions adopting and revising the significance thresholds in 2011 were set aside by a judicial writ of mandate on March 5, 2012. In May 2012, the BAAQMD updated its CEQA Air Quality Guidelines to continue to provide direction on recommended analysis methodologies, but without recommended quantitative significance thresholds (BAAQMD 2012). On August 13, 2013, the First District Court of Appeal ordered the trial court to reverse the judgment and upheld the BAAQMD's CEQA thresholds. The BAAQMD has not formally re-instated the thresholds or otherwise responded to this Appellate Court reversal. Although the significance thresholds adopted by the BAAQMD in 2011 are not currently recommended by the BAAQMD, these thresholds are based on substantial evidence identified in BAAQMD's 2009

Justification Report (BAAQMD 2009), and many lead agencies in the region continue to use them. Therefore, these standards are used herein.

Current BAAQMD significance thresholds are summarized in Table 4.2-4. In general, the BAAQMD significance criteria pollutant (ROG, NO_x, PM_{10}, $PM_{2.5}$, and CO) thresholds address the first three air quality Appendix G CEQA thresholds. The BAAQMD maintains that these criteria pollutant thresholds are intended to maintain ambient air quality concentrations below state and federal standards and to prevent a cumulatively considerable contribution to regional nonattainment with ambient air quality standards. The TAC thresholds (cancer and noncancer risks) and local CO thresholds address the fourth Appendix G threshold, and the BAAQMD odors threshold addresses the fifth Appendix G threshold.

Table 4.2-4
Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	*Average Daily Emissions (lbs/day)*	*Maximum Annual Emissions (tons/year)*
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average, 20.0 ppm (1-hour average)	
Risks and Hazards (Individual Project)	Compliance with Qualified Community Risk Reduction Plan or Increased cancer risk of >10.0 in a million Increased noncancer risk of >1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase >0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from property line of source or receptor		
Risks and Hazards (Cumulative)	Compliance with Qualified Community Risk Reduction Plan or Cancer risk of >100 in a million (from all local sources) Noncancer risk of >10.0 Hazard Index (chronic, from all local sources) Ambient $PM_{2.5}$ >0.8 µg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from property line of source or receptor		
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous material located near receptors or new receptors located near stored or used acutely hazardous materials considered significant	
Odors	None	Five confirmed complaints to BAAQMD per year averaged over 3 years	

Source: BAAQMD 2009; BAAQMD 2010b

lbs/day = pounds per day; tons/year = tons per year; ppm = parts per million; µg/m^3 = micrograms per cubic meter; ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; CO = carbon monoxide

Analytical Method

Since the certification of the CMP EIR in 2007, the BAAQMD has updated its Clean Air Plan and CEQA Guidelines and associated emissions-based thresholds, as described above and shown in Table 4.2-4 (BAAQMD 2010b, 2012). Additionally, the California Emissions Estimator Model (CalEEMod) is the land use and air quality model now in use to estimate construction and operational emissions of proposed projects. As such, the analytical method applied in the 2007 CMP EIR has been updated accordingly for the Project. Assumptions and methodology for construction and operational air pollutant emissions are described below.

Construction

Emissions from the construction phase of the Project were estimated using CalEEMod, Version 2013.2.2. Construction scenario assumptions, including phasing, equipment mix, building square-footage to be demolished, soil cut/fill, and vehicle trips, were based on information provided by SF State and CalEEMod default values when Project specifics were not known.

For purposes of estimating Project emissions, it is assumed that construction of the Project would commence in August 2017 and would last approximately 29 months, ending in December 2019. The analysis contained herein is based on the following assumptions (duration of phases is approximate):

- Demolition: 1.5 months (August 2017–September 2017)
- Site Preparation: 0.5 month (September 2017)
- Grading and Utilities: 1.5 months (September 2017–November 2017)
- Building Construction: 24 months (November 2017–November 2019)
- Paving: 1 month (November 2019)
- Application of Architectural Coatings: 1 month (December 2019)

For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during Project construction.

Construction-worker and vendor-truck trip estimates by construction phase were based on CalEEMod default values. Haul-truck trips during the grading phase were based on estimated earthwork quantities for the underground parking (Block 6) and building basements (Block 1). Grading is currently estimated to involve 32,600 cubic yards of soil for export. Assuming a haul-truck capacity of 16 cubic yards per truck, earth-moving activities would result in approximately 4,075 one-way truck trips during the grading phase. Demolition of the existing buildings and

hardscape is estimated to result in an additional 440 one-way haul-truck trips. CalEEMod default trip length values were used for the distances for all construction-related trips.

The construction equipment mix and vehicle trips used for estimating Project-generated construction emissions are shown in Table 4.2-5.

Table 4.2-5
Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor-Truck Trips*	*Total Haul-Truck Trips*	*Equipment Type*	*Quantity*	*Daily Usage Hours*
Demolition	15	0	440	Concrete/Industrial Saws	1	8
				Excavators	3	8
				Rubber-Tired Dozers	2	8
Site Preparation	18	0	1,500	Rubber-Tired Dozers	3	8
				Tractors/Loaders/Backhoes	4	8
Grading and Utilities	18	0	2,575	Excavators	1	8
				Graders	1	8
				Rubber-Tired Dozers	1	8
				Tractors/Loaders/Backhoes	3	8
				Trenchers	1	8
Building Construction	220	52	0	Cranes	1	7
				Forklifts	3	8
				Generator Sets	1	8
				Tractors/Loaders/Backhoes	3	7
				Welders	1	8
Paving	20	0	0	Cement and Mortar Mixers	2	6
				Pavers	1	8
				Paving Equipment	2	6
				Rollers	2	6
Architectural Coating	44	0	0	Air Compressors	1	6

Note: See Appendix C for details.

Operations

Emissions from the operational phase of the Project were estimated using CalEEMod for existing uses to be demolished (year 2016) and for the first year of Project operations (year 2020) for mobile, area, and energy sources. Model outputs and assumptions are included in Appendix C.

Mobile Sources. According to the traffic analysis prepared for the Project (Fehr & Peers 2016), trips generated by the Project would consist of vehicle trips (including drive alone,

motorcycle, carpool, and taxi), public transit, and walking and bicycling. Since no additional transit capacity would be needed for the Project, and walking and bicycling would not generate emissions, only the vehicle trips were included in this analysis. CalEEMod was used to estimate emissions associated with existing land use vehicle trips. Notably, the Project would result in a net decrease in daily vehicle trips associated with the housing portion, since the increase in beds available under the Project would allow a greater number of existing students to live on campus, which would reduce vehicle trips to campus. This net decrease in vehicle trips would be representative of non-event days. For event days, the concert hall would result in approximately 251 new vehicle trips. SF State estimated that there could be approximately 65 to 80 events per year at the concert hall, or approximately seven events per month.[1] CalEEMod was used to model a non-event day and an event day for the Project, with annual emissions estimated based on the proportion of non-event days (265 days) and event days (80 days). CalEEMod default data, including temperature, trip characteristics, vehicle mix, variable start information, emissions factors, and trip distances, were conservatively used for the model inputs to estimate daily emissions from proposed vehicular sources. Emissions factors representing the vehicle mix and emissions for 2020 were used to estimate emissions associated with full buildout of the Project.

Area Sources. CalEEMod was used to estimate operational emissions from area sources, including emissions from consumer product use, architectural coatings, and landscape maintenance equipment associated with the Project, and existing uses to be demolished. Emissions associated with natural gas usage in space heating, water heating, and stoves were calculated in the building energy use module of CalEEMod, as described below. Neither the Project nor existing uses include woodstoves or fireplaces (wood or natural gas). As such, area source emissions associated with hearths were not included.

Consumer products in this analysis are chemically formulated products used by household and institutional consumers, including detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Other paint products, furniture coatings, and architectural coatings are not considered consumer products in this case (CAPCOA 2013). Consumer product ROG emissions were estimated in CalEEMod based on the floor area of residential and nonresidential buildings, and on the default factor of pounds of ROG per building square foot per day. Although the parking garage to be constructed under the Project as part of the student housing/mixed-use building is not anticipated to use the same consumer products as residential and typical nonresidential land uses, ROG emissions associated with parking lot degreaser may occur. As such, the CalEEMod default values for

[1] Provided by SF State staff. These percentages are based on attendance data from existing events at other comparable theaters on campus.

consumer products were assumed, although this results in a likely over-estimate of consumer product ROG emissions.

ROG off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers used during building maintenance. CalEEMod calculates the ROG evaporative emissions from application of residential and nonresidential surface coatings based on the ROG emissions factor, the building square footage, the assumed fraction of surface area, and the reapplication rate. The model default reapplication rate of 10% of area per year was assumed. Consistent with CalEEMod defaults, it was assumed that the residential surface area for painting equals 2.7 times the floor square footage, with 75% assumed for interior coating and 25% assumed for exterior surface coating. For nonresidential land uses (e.g., concert hall, creative arts building, and retail), it was assumed that the surface area for painting equals 2 times the floor square footage, with 75% assumed for interior coating and 25% assumed for exterior surface coating. For the parking garage, the architectural coating area was assumed to be 6% of the total square footage, consistent with the supporting CalEEMod studies provided as an appendix to the CalEEMod User's Guide (CAPCOA 2013).

Landscape maintenance would involve use of fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. Emissions associated from landscape equipment use were estimated based on CalEEMod default values for emissions factors (grams per residential dwelling unit per day and grams per square foot of nonresidential building space per day) and number of summer days (when landscape maintenance would generally be performed) and winter days.

Energy Sources. As represented in CalEEMod, energy sources would include emissions associated with building electricity and natural gas usage (non-hearth). Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for greenhouse gases in CalEEMod, since criteria pollutant emissions occur at the site of the power plant, which is typically off site.

CalEEMod default values for energy consumption for each land use were applied for the Project analysis, which account for 2008 Title 24 standards. Title 24 of the California Code of Regulations serves to enhance and regulate California's building standards. The most recent amendments to Title 24, Part 6, referred to as the 2016 standards, will become effective on January 1, 2017. The previous amendments were referred to as the 2013 standards and are currently effective. Buildings constructed in accordance with the 2013 standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards. For the purposes of estimating Project-generated energy emissions, a mitigation measure was applied to CalEEMod to assume a 25% reduction from the 2008 standards (the basis for the default energy usage factors in CalEEMod) to reflect the benefits of compliance

with the 2013 standards. In addition, it was assumed that the Project would exceed the current Title 24 standard by 20% to achieve at least Leadership in Energy and Environmental Design (LEED) Gold, which was also incorporated into the mitigation in the model. For the existing uses to be demolished, the energy consumption values were based on the "historical" option in CalEEMod, since they were constructed prior to 2005.

CMP EIR Mitigation Measures Included in Project

The adopted mitigation measures included in the 2007 CMP EIR that are applicable to the Project are presented below (SF State 2007). These measures are already being implemented as part of the CMP and the adopted CMP EIR Mitigation Monitoring & Reporting Program, and, therefore, they are considered to be part of the Project, as described in Chapter 3.

CMP Mitigation Air-1: The Campus shall apply the following feasible control measures as required by BAAQMD:

Basic Control Measures – For all construction sites:

- Water all active construction areas at least twice daily, or as needed.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Enhanced Control Measures – For sites greater than 4 acres in area:

- All "Basic" control measures listed above.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more.)
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)

- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading and other construction activity at any one time.

CMP Mitigation AIR-2A: The SF State campus will work with the ABAG to ensure that campus growth associated with the Campus Master Plan is accounted for in the regional population forecasts.

CMP Mitigation AIR-2B: The SF State campus will work with BAAQMD to ensure that campus growth-related emissions are accounted for in the regional emissions inventory and mitigated in future air quality planning efforts.

Project Impacts and Mitigation Measures

Tiered Initial Study Results

As described in the Tiered Initial Study (Appendix A), the 2007 CMP EIR determined that the impacts of CMP buildout related to potential conflicts with the applicable air plan and construction emissions of PM_{10} and $PM_{2.5}$ would be less than significant with identified mitigation measures. The impacts related to the exposure of sensitive receptors to substantial pollutant concentrations and objectionable odors were determined to be less than significant.

The Project would involve construction of three buildings on two sites in the southern portion of the SF State campus: the Creative Arts replacement building and the concert hall on Block 1, also referred to as the Tapia Triangle, and the student housing/mixed-use building on Block 6, located on the south side of Holloway Avenue. As noted above, since certification of the 2007 CMP EIR, the BAAQMD has updated its Clean Air Plan and CEQA Guidelines and associated emissions-based thresholds (BAAQMD 2010b, 2012). In addition, an updated emissions model, CalEEMod, is now the preferred land use and air quality model to estimate construction and operational emissions of proposed projects. Given the above, the Tiered Initial Study concluded that the Focused Tiered EIR should evaluate potential air quality impacts of the Project related to conflicts with the current Clean Air Plan, contributions to air quality violations, exposure of sensitive receptors to substantial pollutant concentrations, and creation of objectionable odors

to determine whether there may be new or increased impacts compared to those identified in the 2007 CMP EIR. This analysis is provided below.

Project and Cumulative Impacts

For each impact presented below, the CMP EIR impact is presented first in gray text for easy reference to the 2007 CMP EIR's prior impact conclusions. The Project impact is presented second and emphasizes whether new or increased impacts would result with the Project.

However, there is only a Project impact presented for impacts related to odors, as the CMP EIR did not evaluate odors. This EIR includes an evaluation of odors, as this topic is better addressed at a project-specific level (see Project Impact AIR-5 below).

CMP Impact AIR-1: Construction activities under the Campus Master Plan would result in emissions of PM_{10} and $PM_{2.5}$ on a short-term basis (*Potentially significant impact / Less-than-significant with mitigation*)

Project Impact AIR-1: The Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation (L*ess than significant impact / No new or increased impact*)

Construction Impacts. Construction of the Project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, and ROG off-gassing) and off-site sources (e.g., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity; the specific type of operation; and, for dust, the prevailing weather conditions. Therefore, such emissions levels can only be approximately estimated with a corresponding uncertainty in ambient air quality impacts.

As described in the "Analytical Method" discussion above, criteria air pollutant emissions associated with temporary construction activities were quantified using CalEEMod. Construction emissions were calculated for the average daily emissions over the construction period. Construction schedule assumptions, including phase type, duration, and sequencing, were based on information provided by SF State and represent a reasonable scenario based on the best information available. Default values provided in CalEEMod were used where detailed Project information was not available. Detailed model assumptions and outputs are included in Appendix C.

Implementation of the Project would generate air pollutant emissions from entrained dust, off-road equipment, vehicle emissions, architectural coatings, and asphalt pavement application. Entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM_{10} and $PM_{2.5}$ emissions. The BAAQMD does not have a quantitative significance threshold for fugitive dust. The BAAQMD's CEQA Guidelines recommend that projects determine the significance for fugitive dust through application of best management practices (BMPs). The Project would be required to comply with the BAAQMD BMPs to control dust emissions generated during earthwork activities (CMP Mitigation AIR-1). Implementation of the required fugitive dust control measures would ensure that air quality and fugitive-dust-related impacts associated with construction would remain less than significant.

Internal combustion engines used by construction equipment, vendor trucks (e.g., delivery trucks), and worker vehicles would result in emissions of ROG, NO_x, CO, PM_{10}, and $PM_{2.5}$. The application of architectural coatings, such as exterior application/interior paint and other finishes, and application of asphalt pavement would also produce ROG emissions. Average daily emissions for Project construction, necessary for comparison to BAAQMD thresholds of significance, were computed by dividing the total construction emissions by the number of construction days. Table 4.2-6 shows Project construction emissions of ROG, NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust during Project construction.

Table 4.2-6
Average Daily Construction Emissions

Year	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
	Pounds per Day			
2017–2019 Construction	8.9	29.7	1.5	1.4
BAAQMD Construction Thresholds	*54*	*54*	*82*	*54*
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: Appendix C
Note: The values shown are average daily emissions based on total overall construction emissions divided by 632 active work days.
ROG = reactive organic gas; NOx = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 4.2-6, construction of the Project would not exceed BAAQMD significance thresholds. Construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions. Impacts during construction would be less than significant. There are no new or increased impacts compared to the CMP EIR as a result of construction emissions of criteria pollutants generated by the Project.

Operational Impacts. The Project would involve demolition of existing housing units and construction of the Creative Arts replacement building, concert hall, and student housing/mixed-use building. Operation of the Project would generate criteria air pollutant

emissions from mobile sources, including vehicle trips associated with concert hall events; area sources, including the use of consumer products, architectural coatings for repainting, and landscape maintenance equipment; and energy sources, including combustion of fuels used for space and water heating. As described in the "Analytical Method" discussion above, criteria air pollutant emissions associated with long-term operations were quantified using CalEEMod for the existing uses to be demolished and for the Project uses to be developed. CalEEMod was used to model a non-event day and an event day for the Project, with annual emissions estimated based on the proportion of non-event days (265 days) and event days (80 days). Table 4.2-7 summarizes the annual emissions of criteria pollutants that would be generated by development of the Project, and emissions of existing land uses to be demolished. Detailed calculations are presented in Appendix C.

Table 4.2-7
Annual Unmitigated Operational Emissions

Scenario	ROG	NO_x	PM_{10}	$PM_{2.5}$
	Tons per Year			
Proposed Project	1.7	0.3	0.4	0.4
Existing Uses	0.3	0.2	0.1	0.0
Net Increase (Project minus Existing)	1.4	0.1	0.3	0.4
BAAQMD Operational Thresholds	*10*	*10*	*15*	*10*
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: Appendix C
Notes: The values shown for the Project and existing use scenarios are the combined annual emissions from mobile, area, and energy sources from CalEEMod. Project annual emissions were estimated based on the proportion of non-event days (265 days) and event days (80 days), assuming half the events occur in winter and half the events occur in summer. In addition, Project emissions are based on the "Mitigated" CalEEMod outputs in order to incorporate the 2013 Title 24 standards (i.e., 25% reduction versus 2008 Title 24) and the 20% beyond Title 24 development standard to approximate LEED Gold, even though compliance with these standards would not be considered actual mitigation.
ROG = reactive organic gas; NOx = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 4.2-7, operation of the Project would not result in a net increase of criteria air pollutants that would exceed annual thresholds as established by the BAAQMD. Impacts related to emissions of criteria pollutants during operation would be less than significant. There are no new or increased impacts compared to the CMP EIR as a result of operational emissions of criteria pollutants generated by the Project.

Project Mitigation AIR-1: No additional mitigation required.

CMP Impact AIR-2: Campus growth under the Campus Master Plan would result in operational emissions that could hinder the attainment of

the Clean Air Plan (*Potentially significant impact / Less-than-significant impact with mitigation*)

Project Impact AIR-2: The Project would not conflict with or obstruct the implementation of the applicable air quality plan (*Less-than-significant impact / No new or increased impact*)

The applicable air quality plan is the Bay Area 2010 Clean Air Plan, adopted in September 2010 (BAAQMD 2010b). Projects are considered consistent with, and would not conflict with or obstruct implementation of, the local air quality management plan if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop local air quality management plans. Demographic growth forecasts for various socioeconomic categories, developed by the Metropolitan Transportation Commission, ABAG, and local and regional agencies were used to estimate future emissions in the 2010 Clean Air Plan.

The 2011 BAAQMD CEQA Guidelines recommend consideration of the following three questions to determine consistency with the relevant air quality plan:

- Does the project support the primary goals of the air quality plan?
- Does the project include applicable control measures from the air quality plan?
- Does the project disrupt or hinder implementation of any Clean Air Plan control measures?

Regarding question number 1, the three primary goals of the Bay Area 2010 Clean Air Plan are to (1) attain air quality standards, (2) reduce population exposure to unhealthy air and protect public health in the Bay Area, and (3) reduce greenhouse gas emissions and protect the climate (BAAQMD 2010a). The BAAQMD adopts Clean Air Plan control measures into the BAAQMD rules and regulations, which are then used to regulate sources of air pollution in the SFBAAB. Therefore, compliance with these requirements would ensure that the Project would not obstruct implementation of the Clean Air Plan.

As discussed in the Tiered Initial Study, Section 4.10, Land Use and Planning, the adopted CMP is the applicable campus land use plan, and the Project, including the CMP revision, would fully conform with the adopted CMP (see Appendix A).

As shown in the analysis for Project Impacts AIR-1, AIR-3, and AIR-4A and -4B, the Project would not create a localized air violation of state or federal air quality standards, expose sensitive receptors to substantial pollution, or cumulatively contribute to any criteria pollutants to which the region is in nonattainment. The Project would not conflict with the previously

stated goals of the Bay Area 2010 Clean Air Plan. Therefore, impacts with regard to BAAQMD CEQA Guidelines question number 1 would be less than significant.

Regarding BAAQMD CEQA Guidelines question number 2, the Clean Air Plan includes 59 control measures related to six primary categories: Stationary Source Measures, Mobile Source Measures, Transportation Control Measures, Land Use and Local Impact Measures, Energy and Climate Measures, and Further Study Measures. Of these measures, 18 address stationary sources and would be implemented by the BAAQMD using its permit authority; therefore, these measures are not suited to implementation through local planning efforts. In addition, 16 other measures are a draft list of measures for further study and are not yet identified as feasible for implementation under the 2010 Clean Air Plan. Although most of the control measures in the Clean Air Plan would not apply to the Project, measures most applicable to the Project are transportation control measures and energy and climate measures. According to the traffic analysis prepared for the Project (Fehr & Peers 2016), the Project would result in a decrease in vehicle commute trips based on increased on-campus student housing, which would shift 355 off-campus students to living on campus. The Project would also locate new student housing in proximity to the existing Muni "M" line and bus lines, and to the future planned underground Muni M line and station and planned 19th Avenue bicycle and pedestrian facilities. In addition, for event days, transit would comprise a substantial portion of total trips based on the availability of transit options. For the energy and climate measures, the Project would be subject to a number of sustainability requirements, including the California CalGreen Code. The Project would be constructed to at least LEED Gold or equivalent performance and energy efficiency beyond Title 24 requirements. Impacts with regard to BAAQMD CEQA Guidelines question number 2 would be less than significant.

Regarding BAAQMD CEQA Guidelines question number 3, the BAAQMD has identified examples of how a plan may cause the disruption or delay of control measures, such as a project that may preclude an extension of a transit line or bike path, or one that proposes excessive parking beyond parking requirements. The Project would not preclude extension of a transit line or bike path, and would result in no net increase in parking. Therefore, the Project would not conflict with or obstruct implementation of control measures delineated in the Clean Air Plan. Impacts with regard to question number 3 would be less than significant.

The Project would not conflict with or obstruct implementation of the 2010 Clean Air Plan, and the impact would be less than significant. The Project would not result in new or increased impacts compared to the CMP EIR related to conflicts with the Clean Air Plan. Although not directly required to reduce this impact, CMP Mitigation AIR-2A and Mitigation AIR-2B (listed above under "CMP EIR Mitigation Measures Included in Project") pertain to SF State growth and regional air quality planning and would continue to apply with the Project.

Project Mitigation AIR-2: No additional mitigation required.

CMP Impact AIR-3: Traffic generated by development under the Campus Master Plan, in conjunction with traffic associated with other regional growth, would result in an increase in local CO concentrations at study area intersections (*Less-than-significant impact*).

Project Impact AIR-3: The Project would not expose sensitive receptors to substantial pollutant concentrations *(Less-than-significant impact / No new or increased impact).*

Air Toxics. The BAAQMD has adopted project and cumulative thresholds for three risk-related air quality indicators to sensitive receptors: cancer risks, noncancer health effects, and increases in ambient air concentrations of $PM_{2.5}$. These impacts are addressed on a localized, rather than regional, basis in relation to sensitive receptors identified for the Project. Sensitive receptors are groups of individuals, including children, older adults, the acutely ill, and the chronically ill, that may be more susceptible to health risks due to chemical exposure. Sensitive-receptor population groups are likely to be located at hospitals, medical clinics, schools, playgrounds, childcare centers, residences, and retirement homes. The nearest sensitive receptors to the Project site are located within 100 feet of both Block 1 and Block 6, consisting of on- and off-campus residential uses in University Park South and in the adjacent Parkmerced.

TACs and $PM_{2.5}$ can cause cancer and noncancer chronic and acute health impacts such as birth defects, neurological damage, asthma, bronchitis, and genetic damage, and short-term acute affects such as eye watering, respiratory irritation, running nose, throat pain, and headaches. State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and aimed at TACs that are a problem in California. The state has formally identified more than 200 substances as TACs, including the federal HAPs, and is adopting control measures for sources of these TACs. CARB has classified DPM as a TAC. The following measures are required by state law to reduce diesel particulate emissions:

- Fleet owners of mobile construction equipment are subject to the CARB Regulation for In-Use Off-Road Diesel Vehicles (13 CCR, Chapter 9, Section 2449) to reduce DPM and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles.
- All commercial diesel vehicles are subject to 13 CCR Section 2485, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and

unloading must be limited to 5 minutes; electric auxiliary power units should be used whenever possible.

The greatest potential for TAC emissions during construction would be DPM emissions from heavy equipment operations and heavy-duty trucks during construction of the Project, and the associated health impacts to sensitive receptors. As shown in Table 4.2-6, average daily particulate matter (PM_{10} or $PM_{2.5}$) exhaust emissions generated by construction equipment operation would be well below the BAAQMD significance thresholds. Moreover, total construction of the Project would last approximately 29 months, after which Project-related TAC emissions would cease.

For demolition activities, structures to be demolished sometimes contain asbestos-containing material (ACM). Demolition of existing buildings and structures would be subject to BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). BAAQMD Regulation 11, Rule 2 is intended to limit asbestos emissions from demolition or renovation of structures and the associated disturbance of ACM generated or handled during these activities. All ACM found on site would be removed prior to demolition or renovation activity in accordance with BAAQMD Regulation 11, Rule 2, including specific requirements for surveying, notification, removal, and disposal of ACM. The Project is required to comply with BAAQMD Regulation 11, Rule 2, ensuring that ACMs would be removed and disposed of appropriately and safely. Complying with BAAQMD Regulation 11, Rule 2 would minimize the release of airborne asbestos emissions; therefore, demolition activity would result in a less-than-significant impacts to nearby sensitive receptors.

An emergency generator is proposed for the Project to support elevator operations during power outages. However, the generator would be required to go through the BAAQMD permitting process, which includes ensuring that potential health risks to nearby sensitive receptors would be less than significant. As such, no substantial residual TAC emissions and corresponding cancer risk are anticipated after construction, and no long-term non-permitted sources of TAC emissions are anticipated during operation of the Project. Thus, the Project would not result in a long-term (i.e., 9-year, 30-year, or 70-year) source of substantial TAC emissions. Therefore, the exposure of Project-related TAC emission impacts to sensitive receptors would be less than significant. The Project would not result in new or increased impacts compared to the CMP EIR related to TAC emissions.

Local Carbon Monoxide Concentrations

The BAAQMD thresholds of significance for local CO emissions is the 1-hour and 8-hour CAAQS of 20 parts per million and 9 parts per million, respectively. By definition, these represent levels that are protective of public health. According to the 2011 thresholds of the

BAAQMD, a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

- Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The Project would generate minimal new vehicle traffic trips and would comply with these screening criteria. Based on the BAAQMD's criteria, Project-related traffic would not exceed CO standards and, therefore, no further analysis was conducted for CO impacts. The CO emissions impact would be less than significant on a Project level and cumulative basis. The Project would not result in new or increased impacts compared to the CMP EIR related to CO emissions.

Cumulative Health Risk

As noted in Section 4.2.1, to identify areas of San Francisco most adversely affected by sources of TACs, the City partnered with the BAAQMD to inventory and assess cumulative air pollution and exposures from mobile, stationary, and area sources within San Francisco. Based on the Citywide Air Pollutant Exposure Zone Map (CCSF 2014), the Project site is not within a modeled "Air Pollutant Exposure Zone" with poor air quality (i.e., where the concentration of $PM_{2.5}$ or the cancer risk exceed 10 $\mu g/m^3$ or 100 per 1 million population, respectively). Therefore, the Project would not locate sensitive receptors in an area with significant cumulative health risks.

Project Mitigation AIR-3: Mitigation not required.

CMP Impact AIR-4: Campus growth under the Campus Master Plan in conjunction with other regional growth in the air basin could potentially result in operational emissions that could hinder the attainment of the Clean Air Plan (*Potentially significant impact / Less-than-significant impact with mitigation*).

Project Impact AIR-4A: The Project would not result in a cumulatively considerable new increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors) *(Less-than-significant impact / No new or increased impact).*

Past, present, and future development projects may contribute to the region's adverse air quality impacts on a cumulative basis. Per BAAQMD's CEQA Guidelines, by its nature, air pollution is largely a cumulative impact; no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. In developing thresholds of significance for air pollutants, the BAAQMD considered the emissions levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, if the Project's emissions are below the BAAQMD thresholds, then the Project's cumulative impact would be less than significant.

Construction Impacts. Thresholds established by the BAAQMD, as shown in Table 4.2-4, are used to evaluate air quality impacts, including cumulative impacts. Thresholds established by the BAAQMD reflect the attainment status of the Project region and provide for the consideration of Project impacts in light of the region's nonattainment status for certain criteria pollutants. Table 4.2-6 shows that construction of the Project would not exceed BAAQMD construction thresholds for any criteria pollutants; therefore, construction activities would not contribute to existing cumulatively considerable impacts. Cumulative impacts would be less than significant during the temporary construction period.

Operational Impacts. Thresholds of significance for operational emissions of criteria air pollutants and precursors are shown in Table 4.2-4. The thresholds of significance show the levels at which a project's individual emissions of criteria air pollutants and precursors would have a significant contribution to the region's existing air quality conditions. As shown in Table 4.2-7, annual net operational emissions of criteria air pollutants generated by the Project would be well below the thresholds of significance established by the BAAQMD. Therefore, cumulative impacts associated with Project operations would be less than significant. The Project would not result in new or increased impacts compared to the CMP EIR related to cumulative impacts.

Project Mitigation AIR-4A: No additional mitigation required.

Project Impact AIR-4B: The Project would not contribute to cumulative impacts with respect to air quality (*Less-than-significant impact*).

The SFBAAB is designated as a nonattainment area for federal and state O_3 and $PM_{2.5}$ standards. The SFBAAB is also designated as a nonattainment area for the state PM_{10} standard. Overall air quality in the SFBAAB results from cumulative emissions from all emissions sources. As discussed previously, construction and operation of the Project would generate ROG and NO_x emissions (which are precursors to O_3), and emissions of PM_{10} and $PM_{2.5}$. However, as indicated in Tables 4.2-6 and 4.2-7, Project-generated construction and operational emissions would not exceed the BAAQMD emissions-based significance thresholds for ROG, NO_x, PM_{10}, or $PM_{2.5}$, and, thus, the Project would not be considered to result in a cumulatively considerable contribution to regional air quality impacts.

Cumulative localized impacts could result if a construction project occurs concurrently with another project. The only known active project in the Project vicinity that could contribute to cumulative localized construction emissions would be Phase 1 of the Parkmerced project, with the nearest development site (300 Arballo) approximately 500 feet from the Block 1 portion of the Project site. Accumulation of cumulative PM_{10} and $PM_{2.5}$ emissions would be minimized based on the substantial distance between the Project and this Parkmerced development site, and because all projects in the BAAQMD jurisdiction are subject to BAAQMD construction BMPs, which set forth general and specific emission reduction requirements for all construction sites in the BAAQMD.

In addition, projects are considered consistent with, and would not conflict with or obstruct implementation of, the local air quality management plan if the growth in socioeconomic factors (e.g., population, employment) is consistent with the regional plans used to develop local air quality management plans. As described in Project Impact AIR-2, the Project would not conflict with the primary goals of the Clean Air Plan or hinder implementation of the Clean Air Plan's control measures.

As described in Project Impact AIR-3, the Project site is not located within an "Air Pollutant Exposure Zone." Although the Project would result in short-term TAC emissions during construction, it would not result in a long-term (i.e., 9-year, 30-year, or 70-year) non-permitted source of substantial TAC emissions. The Project's incremental increase in localized TAC emissions resulting from construction and operation would be minor and would not contribute substantially to cumulative TAC emissions that could affect nearby sensitive land uses. Therefore, cumulative air quality impacts would be less than significant. The Project would not result in new or increased impacts compared to the CMP EIR related to cumulative impacts.

Project Mitigation AIR-4B: No additional mitigation required.

Project Impact AIR-5: The Project would not create objectionable odors affecting a substantial number of people (*Less-than-significant impact/New impact*).

The 2007 CMP EIR did not evaluate the potential for CMP growth and development to result in objectionable odors. None of the new facilities that would be built on campus under the CMP would involve sources of objectionable odors. A project-level analysis is provided below for the Project.

Odors would be generated from vehicles and/or equipment exhaust emissions during construction of the Project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be less than significant.

The BAAQMD has identified typical sources of odor in the BAAQMD CEQA Air Quality Guidelines, a few examples of which include manufacturing plants, rendering plants, coffee roasters, wastewater treatment plants, sanitary landfills, and solid waste transfer stations. Although sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds. The Project would not include uses that have been identified by the BAAQMD as potential sources of objectionable odors. In addition, the Project would not locate new sensitive receptors in proximity to substantial odor-generating sources. This impact would be less than significant.

Project Mitigation AIR-5: Mitigation not required.

4.2.3 References

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