4.2 Air Quality

4.2.1 Introduction

This section evaluates the potential for the proposed project, which includes the Housing Element Update (HEU), the Stanford Community Plan (SCP) update, and related rezonings (collectively, the "project") to result in substantial adverse effects on air quality. Below, the section describes the existing air quality conditions, as well as the regulatory framework. Finally, the impact discussion evaluates potential impacts to air quality due to activities that emit criteria and non-criteria air pollutants that could result from implementation of the project in the context of existing conditions. The analysis determines whether those emissions are significant relative to applicable air quality standards and identifies feasible mitigation measures for significant adverse impacts.

A Notice of Preparation (NOP) for the Draft EIR was circulated on August 8, 2022, and a scoping meeting was held on August 23, 2022. A revised NOP reflecting changes to the HEU's list of opportunity sites was circulated on March 21, 2023. Both NOPs circulated for a period of 30 days, and the NOPs and the comments received during their respective comment periods can be found in **Appendix A** of this EIR. No comments relating to air quality were received during either NOP comment period.

The primary sources of information referenced in this section included the following:

- The Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Air Quality Guidelines (2017a);
- The BAAQMD Final 2017 Clean Air Plan (2017b);
- Santa Clara County General Plan Health Element (1994).
- Stanford Community Plan (2000).

4.2.2 Environmental Setting

Climate and Meteorology

Climate and meteorological 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. The plan area is located in Santa Clara County and is within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB encompasses the nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties, and the southern portions of Solano and Sonoma Counties.

The climate of the Bay Area is determined largely by a high-pressure system that is often present over the eastern Pacific Ocean off the west coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing an increased number of storms systems to pass through the region. During summer and early fall, when fewer storms pass through the region, emissions generated in the Bay Area accumulate as a result of the more stable conditions. The

combination of abundant sunshine and the restraining influences of topography and subsidence inversions creates conditions conducive to the formation of photochemical pollutants, such as ground-level ozone and secondary particulates, including nitrates and sulfates.

Air Pollutants of Concern

Air pollutants of concern within the SFBAAB include certain criteria air pollutants and toxic air contaminants (TACs). These are described below.

Criteria Air Pollutants

As required by the federal Clean Air Act (CAA) passed in 1970, the U.S. Environmental Protection Agency (U.S. EPA) has identified six criteria air pollutants that are pervasive in urban environments, and for which state and national health-based ambient air quality standards have been established. The U.S. EPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO2), particulate matter (PM), and lead are the six criteria air pollutants originally identified by the U.S. EPA. Since that time, subsets of particulate matter have also been identified for which permissible levels have been established. These include particle matter less than 10 microns in diameter (PM_{10}), and particle matter less than 2.5 microns in diameter ($PM_{2.5}$). See Section 4.2.3, Regulatory Framework, for further discussion of specific pollutants and their attainment status within the air basin with respect to state and federal air quality standards.

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 [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 SFBAAB, 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.

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 with the highest emissions occurring 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; however, ambient levels of CO have decreased substantially due to improved vehicle fuel efficiency.

Particulate Matter (PM_{10} 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 regulated by the state and federal Clean Air Acts is measured in two size ranges: PM_{10} for particles less than 10 microns in diameter, and $PM_{2.5}$ for particles less than 2.5 microns in diameter. In the SFBAAB, motor vehicles generate about one-half of the air basin's particulates through tailpipe emissions as well as brake pads and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of fine particulates.

Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than as a health hazard. However, PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. According to 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 (CARB 2022)."

$PM_{2.5}$ is of particular concern because epidemiological 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 (San Francisco Department of Public Health, 2008). New studies are also showing that long-term average exposure to $PM_{2.5}$ is associated with an increased risk of death from the novel coronavirus 2019 disease (COVID-19) in the United States. One study found that an increase of one microgram per cubic meter ($\mu g/m^3$) in $PM_{2.5}$ is associated with an 8 percent increase in the COVID-19 death rate. The increase in wildfire smoke also could have contributed to increased cases of COVID-19 (Wu, et al., 2021).

Nitrogen Dioxide (NO_2)

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are its main sources. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of the air on high pollution days, especially in conjunction with high ozone levels. In 2010, the U.S. EPA implemented the current one-hour NO_2 standard (0.10 ppm) (see *Regulatory Framework* below). On November 15, 2012, CARB approved a revision to the State Implementation Plan (SIP) for implementing the 2010 federal NO_2 standards. All areas in California are designated as attainment/unclassified for the federal NO2 standards (CARB, 2012).

Air Quality Index

The U.S. EPA developed the Air Quality Index (AQI) scale to make the public health impacts of air pollution concentrations easily understandable. The AQI, much like an air quality "thermometer," translates daily air pollution concentrations into a number on a scale between 0

and 500. The numbers in the scale are divided into six color-coded ranges, with numbers 0–300 as outlined below:

- **Green (0-50)** indicates "good" air quality. No health impacts are expected when air quality is in the green range.
- **Yellow (51-100)** indicates air quality is "moderate." Unusually sensitive people should consider limited prolonged outdoor exertion.
- **Orange (101–150)** indicates air quality is "unhealthy for sensitive groups." Active children and adults, and people with respiratory disease, such as asthma, should limit outdoor exertion.
- **Red (151–200)** indicates air quality is "unhealthy." Active children and adults, and people with respiratory disease, such as asthma should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
- **Purple (201–300)** indicates air quality is "very unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit outdoor exertion.

The AQI numbers refer to specific amounts of pollution in the air and are based on the federal air quality standards for ozone, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. In most cases, the federal standard for these air pollutants corresponds to the number 100 on the AQI chart. If the concentration of any of these pollutants rises above its respective standard, it can be unhealthy for the public. In determining the air quality forecast, local air districts use the anticipated concentration measurements for each of the major pollutants, converts them into AQI numbers, and determines the highest AQI for each zone in a district. Readings below 100 on the AQI scale would not typically affect the health of the public (although readings in the moderate range of 50 to 100 may affect unusually sensitive people). Levels above 300 rarely occur in the United States, and readings above 200 have not occurred in the SFBAAB in decades, with the exception of the October 2017 and November 2018 wildfires north of San Francisco and the August/September 2020 complex wildfires that occurred throughout the SBFBAAB (BAAQMD, 2022).

Wildfires appear to be occurring with increasing frequency in California and the Bay Area as climate changes (since 2000, 18 of the state's 20 largest wildfires and 18 of the state's 20 most destructive fires on record have occurred (Cal Fire, 2022a; Cal Fire, 2022b). As a result of these fires in Bay Area counties (Napa and Sonoma) and counties north and east of the Bay Area (e.g., Butte, Lassen, Plumas, and Shasta), the AQI in the Bay Area reached the "very unhealthy" and "hazardous" designations, ranging from values of 201 to above 350. During those periods, the air district issued "Spare the Air" alerts and recommended that individuals stay inside with windows closed and refrain from significant outdoor activity.

AQI statistics over recent years indicate that air quality in the SFBAAB is predominantly in the "Good" or "Moderate" categories and healthy on most days for most people. Historical air district data indicate that the air basin experienced air quality in the red level (unhealthy) on 18 days between 2019 and 2021. As shown in **Table 4.2-1**, the air basin had a total of 71 red-level or orange-level (unhealthy or unhealthy for sensitive groups) days between 2019 and 2021. A number of these days are attributable to the increasing frequency of wildfires. This table also

shows that the air basin experienced only one purple level (very unhealthy) day in between 2019 and 2021.

TABLE 4.2-1
AIR QUALITY INDEX STATISTICS FOR THE SAN FRANCISCO BAY AREA AIR BASIN

AQI Statistics for Air Basin	Number of Days by Year		
	2019	2020	2021
Unhealthy for Sensitive Groups (Orange)	10	34	9
Unhealthy (Red)	0	17	1
Very Unhealthy (Purple)	0	1	0

SOURCE: BAAQMD, 2022.

Toxic Air Contaminants

In addition to criteria air pollutants, plans and individual projects may directly or indirectly emit toxic air contaminants (TACs). TACs are airborne substances that can cause short-term (acute) and/or long-term (chronic and/or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). Human health effects of TACs can include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity that may be emitted from a variety of common sources including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. Thus, individual TACs vary greatly in the health risk they present; and at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike criteria air pollutants, TACs do not have ambient air quality standards but instead are regulated by the air district using a risk-based approach to determine which 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 the risks.[1] Exposure assessment guidance published by the air district in January 2016 adopts the assumption that residences would be exposed to air pollution 24 hours per day, 350 days per year, for 30 years (BAAQMD, 2016). Therefore, assessments of air pollutant exposure to residents typically result in the greatest adverse health outcomes of all population groups.

Although not a TAC, exposures to $PM_{2.5}$ are strongly associated with mortality, respiratory diseases, and reductions in lung development in children, and other endpoints such as hospitalization for cardiopulmonary disease (San Francisco Department of Public Works, 2008). In addition to $PM_{2.5}$, diesel particulate matter (DPM) is also of concern. CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans (CARB,

[1] In general, a health risk assessment is required if the air district concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. The applicant of the project that would emit TACs is required to conduct a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, estimating the increased risk of cancer from exposure to one or more TACs.

1998). The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other TAC routinely measured in the region.

Despite notable emission reductions since CARB's 2000 Diesel Risk Reduction Plan (CARB 2000), CARB recommends that proximity to sources of DPM emissions (e.g. a freeway) be considered in the siting of new sensitive land uses. 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, 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 (CARB, 2005).

Air Pollution Sources

Air pollution sources contributing to emissions within the County and near the HEU and SCP planning areas include sources described below.

Stationary Sources

The air districts inventory of permitted stationary sources of emissions indicates that there are dozens of permitted stationary emission sources present within or near the HEU area. These permitted stationary sources are primarily standby generators, gasoline stations, and other facilities such as auto body shops. Permitted sources near the SCP area include several standby generators on the Stanford University campus and gasoline stations along El Camino Real.

Roadway Traffic Emissions

Motor vehicles are responsible for a large share of pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases and also contribute to particles by generating road dust and through tire wear.

The air district guidance indicates that roadways with volumes exceeding 10,000 average annual daily traffic may impact sensitive receptors if they are located within 1,000 feet of any sensitive receptor. This traffic contributes to elevated concentrations near the roadway of $PM_{2.5}$, DPM if heavy trucks are present, and other contaminants emitted from motor vehicles. Average daily traffic counts were taken by the traffic consultant, Hexagon. The roadways with more than 10,000 average annual daily traffic in the HEU and SCP areas are generally along Bascom, Camden, Capitol, Leigh, Moorpark, and Toyon avenues, Hostetter, McKee, Quarry, Tully, and White roads, San Carlos Street, and Stevens Creek Boulevard.

Existing Ambient Air Quality

Criteria Air Pollutants

The region's air quality monitoring network measures the ambient concentrations of criteria air pollutants at various locations in the SFBAAB. There are two active air quality monitoring stations each located in San José and Redwood City. Although not in Santa Clara County, the Redwood City air monitoring station was the closest in proximity to the cluster of Stanford HEU sites. **Tables 4.2-2** and **4.2-3** show the most recent monitoring data for four criteria air pollutants including ozone, PM_{10}, $PM_{2.5}$, and NO_2, for the years 2019 through 2021, for the San José and Redwood City air monitoring sites, respectively. The San José air monitoring station is located at the cross streets of Jackson Street and N 4th Street, north of Downtown San José. The air monitoring site is approximately within a 7-mile radius from all the San José HEU sites. The Redwood City air monitoring station is located at the at the cross streets of Barron Avenue and Bay Road, east of central Redwood City. The air monitoring site is approximately 5 miles northwest of all the Stanford HEU sites. Tables 4.2-2 and 4.2-3 do not include CO or SO2 as these are not pollutants of concern for the region. The SFBAAB attains the CO standard due to decreasing emissions over the last several years from improved vehicle fuel efficiency. Monitors are not required for SO2 in the SFBAAB, as it has never been designated as non-attainment for SO2. The table also compares the measured pollutant concentrations to the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for each of the criteria air pollutants of concern. The concentrations shown in **bold** indicate an exceedance of the standard for the air basin.

Compliance with the standards is on a regional basis, as opposed to the city level. In the SFBAAB, compliance is demonstrated by ongoing measurements of pollutant concentrations at more than 30 air quality monitoring stations operated by the air district in all nine Bay Area counties. An exceedance of an ambient air quality standard at any one of the stations counts as a regional exceedance.

Toxic Air Contaminants

In addition to monitoring criteria air pollutants, both the BAAQMD and CARB operate TAC monitoring networks in the SFBAAB. These stations measure 10 to 15 TACs depending on the specific station. The monitoring stations are located in areas where there are expected to be the highest concentrations of TACs, and the TACs selected for monitoring at these stations are those that have traditionally been found in the highest concentrations in ambient air and therefore tend to produce the most substantial risk. There are no TAC monitoring stations within 20 miles of the HEU or SCP planning areas.

TABLE 4.2-2
SUMMARY OF AIR QUALITY MONITORING DATA (2019-2021) – SAN JOSÉ – JACKSON STREET STATION[a]

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured		
		2019	2020	2021
Ozone				
Days 1-Hour State Standard Exceeded		1	1	3
Maximum 1-Hour Concentration (ppm)	>0.09 ppm[b]	**0.095**	**0.106**	**0.098**
Days 8-hour State/National Standard Exceeded		2	2	4
Maximum 8hour Concentration (ppm)	>0.07 ppm[b,c]	**0.081**	**0.085**	**0.084**
Respirable Particulate Matter (PM_{10})				
Days 24-hour National Standard Exceeded	>150 µg/m3[c]	0	0	0
Days 24-hour State Standard Exceeded	>50 µg/m3[b]	4	10	0
Maximum 24-hour Concentration (µg/m3)		**77.1**	137.1	45.1
State Annual Average (µg/m3)	>20 µg/m3[b]	**19.1**	**-**	20.1
Fine Particulate Matter ($PM_{2.5}$)				
Days 24-hour National Standard Exceeded	>35 µg/m3[c]	**0**	**12**	1
Maximum 24-hour Concentration (µg/m3)		**34.4**	**120.5**	38.1
Annual Average (µg/m3)	>12 µg/m3[b,c]	**9.1**	**11.5**	8.9
Nitrogen Dioxide (NO_2)				
Days 1-hour National Standard Exceeded	**>0.1 ppm**	**0**	**0**	0
Maximum 1-hour Concentration (ppm)	>0.1 ppm[c]	0.059	0.051	0.047

NOTES:

Bold values are in excess of applicable standards.
ppm = parts per million.
µg/m3 = micrograms per cubic meter.

a The San José – Jackson Street, CA station is one of the closest monitoring stations to the HEU planning areas.
b State standard, not to be exceeded.
c National standard, not to be exceeded.

SOURCE: CARB, 2022; U.S. EPA, 2022.

TABLE 4.2-3
SUMMARY OF AIR QUALITY MONITORING DATA (2019-2021) – REDWOOD CITY STATION [a]

Pollutant	Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured		
		2019	2020	2021
Ozone				
Days 1-Hour State Standard Exceeded		0	1	0
Maximum 1-Hour Concentration (ppm)	>0.09 ppm[b]	0.083	**0.098**	0.085
Days 8-hour State/National Standard Exceeded		2	1	0
Maximum 8hour Concentration (ppm)	>0.07 ppm[b,c]	**0.077**	**0.077**	0.063
Respirable Particulate Matter (PM_{10})				
Days 24-hour National Standard Exceeded	>150 µg/m3[c]	-	-	-
Days 24-hour State Standard Exceeded	>50 µg/m3[b]	-	-	-
Maximum 24-hour Concentration (µg/m3)		-	-	-
State Annual Average (µg/m3)	>20 µg/m3[b]	**-**	**-**	**-**
Fine Particulate Matter ($PM_{2.5}$)				
Days 24-hour National Standard Exceeded	>35 µg/m3[c]	**0**	**9**	0
Maximum 24-hour Concentration (µg/m3)		**29.5**	**124.1**	30.1
Annual Average (µg/m3)	>12 µg/m3[b,c]	**-**	**9.8**	6.1
Nitrogen Dioxide (NO_2)				
Days 1-hour National Standard Exceeded	**>0.1 ppm**	**0**	**0**	0
Maximum 1-hour Concentration (ppm)	>0.1 ppm[c]	0.054	0.045	0.040

NOTES:

Bold values are in excess of applicable standard.
ppm = parts per million.
µg/m3 = micrograms per cubic meter.

a The Redwood City CA station is one of the closest monitoring station to the HEU planning areas.
b State standard, not to be exceeded.
c National standard, not to be exceeded.

SOURCE: CARB, 2022; U.S. EPA, 2022.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. The ability to detect odors varies considerably among the population and is subjective. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Odor sources typically include wastewater treatment plants, landfills, confined animal facilities, composing stations, food manufacturing plants, refineries, and chemical plants (BAAQMD, 2017ba)

Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive than others to air pollution. Reasons for greater sensitivity can include existing health problems, duration of exposure to air pollutants, or certain peoples' increased susceptibility to pollution-related health problems due to factors such as age. 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 factors responsible for variations in exposure are also often similar to factors associated with greater susceptibility to air quality health effects. For example, lower income residents may be more likely to live in substandard housing and be more likely to live near industrial or roadway sources of pollution.

The BAAQMD defines sensitive receptors as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include land uses such as schools, hospitals, and residential areas. Land uses such as schools, children's day care centers, hospitals, and nursing and convalescent homes are considered to be sensitive to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Residential uses are considered sensitive because these individuals could be present, and people in residential areas are often at home for extended periods of time, so they can be exposed to pollutants for extended periods.

In April 2005, CARB released the Air Quality and Land Use Handbook, which encourages local land use agencies to consider the risks from air pollution prior to making decisions that approve the siting of new sensitive receptors (e.g., schools, homes, and daycare centers) near sources of pollution, such as major roadways and freeways. There are a variety of sensitive receptors in the County and the HEU and SCP planning areas, including residential uses, schools, daycares, hospitals, and convalescent homes.

4.2.3 Regulatory Setting

Regulation of air pollution is achieved through both national and state ambient air quality standards and through emissions limits on individual sources of air pollutants. Local Air Quality Management Districts and Air Pollution Control Districts are responsible for demonstrating attainment with state air quality standards through the adoption and enforcement of Attainment Plans.

Federal

Criteria Air Pollutants

The 1970 Clean Air Act (most recently 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 ambient air quality 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 weakened 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. **Table 4.2-4** presents current state (California Ambient Air Quality Standards, or CAAQS) and national (National Ambient Air Quality Standards, or NAAQS) ambient air quality standards.

NAAQS and CAAQS have been set at levels considered safe to protect public, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. As explained by CARB, "An air quality standard defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment" (CARB, 2017). That is, if a region is in compliance with the ambient air quality standards, its regional air quality can be considered protective of public health. The NAAQS are statutorily required to be set by the U.S. EPA at levels that are "requisite to protect the public health."[2] Therefore, the closer a region is to attaining a particular ambient air quality standard, the lower the human health impact is from that pollutant. See Section 4.2.2, above, for a brief description of the health effects of exposure to criteria air pollutants.

[2] See https://www.law.cornell.edu/uscode/text/42/7409.

TABLE 4.2-4
STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS AND MAJOR SOURCES

Pollutant	Averaging Time	CAAQS	NAAQS	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hour	0.070 ppm	0.070 ppm	
Carbon Monoxide	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hour	9.0 ppm	9 ppm	
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm	
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hour	---	0.5 ppm [1]	
	24 hour	0.04 ppm	0.14 ppm	
	Annual Avg.	---	0.030 ppm	
Respirable Particulate Matter (PM_{10})	24 hour	50 ug/m^3	150 ug/m^3	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 ug/m^3	---	
Fine Particulate Matter ($PM_{2.5}$)	24 hour	---	35 ug/m^3	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	Annual Avg.	12 ug/m^3	12.0 ug/m^3	
Lead	Monthly Ave.	1.5 ug/m^3	---	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 ug/m^3	
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Geothermal power plants, petroleum production and refining
Sulfates	24 hour	25 ug/m^3	No National Standard	Produced by the reaction in the air of SO_2.
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	See $PM_{2.5}$.
Vinyl chloride	24 hour	0.01 ppm	No National Standard	Polyvinyl chloride and vinyl manufacturing.

NOTE:
ppb = parts per billion; ppm = parts per million; ug/m^3 = micrograms per cubic meter.

a Secondary national standard.

SOURCES: CARB, 2016.

Pursuant to the 1990 Federal Clean Air Act Amendments (FCAAA), the US EPA classifies air basins (or portions thereof) as "attainment", "nonattainment", or "unclassified" for each criteria air pollutant, based on whether the national standards had been achieved. As shown in **Table 4.2-5**, at the federal level, the SFBAAB is designated as a nonattainment area for the 8-hour ozone standard and the federal 24-hour $PM_{2.5}$ standard. The SFBAAB is in attainment for all other federal ambient air quality standards. State-level attainment status of the SFBAAB is discussed further below.

TABLE 4.2-5
SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	Designation/Classification	
		State Standards	Federal Standards
Ozone	8 Hour	Nonattainment	Nonattainment
	1 Hour	Nonattainment	--
Carbon Monoxide	8 Hour	Attainment	Attainment
	1 Hour	Attainment	Attainment
Nitrogen Dioxide	1 Hour	Attainment	--
	Annual Arithmetic Mean	--	Attainment
Sulfur Dioxide	24 Hour	Attainment	--
	1 Hour	Attainment	--
	Annual Arithmetic Mean	--	--
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	Nonattainment	--
	24 Hour	Nonattainment	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	Nonattainment	Unclassified/Attainment
	24 Hour	--	Nonattainment
Sulfates	24 Hour	Attainment	--
Lead	30 Day Average	--	Attainment
	Calendar Quarter	--	Attainment
	Rolling Month Average	--	--
Hydrogen Sulfide	1 Hour	Unclassified	--
Vinyl Chloride	24 Hour	No information available	--
Visibility Reducing Particles	8 Hour	Unclassified	--

SOURCE: BAAQMD, 2017a.

The FCAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The FCAA added requirements for states containing areas that violate the national standards to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The U.S. EPA has the responsibility to review all SIPs to determine if they conform to the mandates of the FCAA and will achieve air quality goals when implemented.

State

Criteria Air Pollutants

Although the federal Clean Air Act established the NAAQS, 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 challenges in California, there are differences between the state and national ambient air quality standards, as shown in Table 4.2-5. California ambient standards tend to be at least as protective as national ambient standards or are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code section 39600 et seq.), which, like its federal counterpart, called for designation of areas as "attainment", "nonattainment", or "unclassified" with respect to the state standards. The SFBAAB is currently designated as nonattainment for the state 8-hour and 1-hour ozone standards, the state average and 24-hour PM_{10} standards, and the state average $PM_{2.5}$ standards. The SFBAAB is designated as attainment or unclassified with respect to the other state standards.

Toxic Air Contaminants

The Health and Safety Code defines TACs as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under AB 1807 (Tanner). A total of 243 substances have been designated TACs under California law, including the 189 (federal) Hazardous Air Pollutants.

Off-road Diesel Emissions

The CARB In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation) applies to all self-propelled off-road diesel vehicles 25 horsepower or greater used in California and most two-engine vehicles (except on-road two-engine sweepers). This includes vehicles that are rented or leased (rental or leased fleets). CARB's goal is to gradually reduce the state-wide construction vehicle fleet's emissions through turnover, repower, or retrofits. New engine emissions requirements were grouped into tiers based on the year in which the engine was built (CARB 2022a). In 2014, new engines were required to meet Tier 4 Final standards, which to date are the most stringent emissions standards for off-road vehicle engines. The goal of the In-Use Off-Road Diesel-Fueled Fleets Regulation is to reduce particulate matter (PM_{10} and $PM_{2.5}$) and NO_x emissions from off-road heavy-duty diesel vehicles in California (CARB 2022b). This regulation also limits idling to 5 minutes, requires a written idling policy for larger vehicle fleets, and requires that fleet operators provide information on their engines to CARB and label vehicles with a CARB-issued vehicle identification number.

CARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. As discussed above, CARB published Air Quality and Land Use Handbook: A Community Health Perspective in April 2005. This handbook is intended to give guidance to local governments in the siting of sensitive land uses near sources of air pollution. Recent studies have shown that public exposure to air pollution can be substantially elevated near

freeways and certain other facilities such as ports, rail yards, and distribution centers. Sensitive receptor siting recommendations for applicable uses in Santa Clara County are listed in **Table 4.2-6** below. 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 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 (CARB, 2005).

TABLE 4.2-6
RECOMMENDATIONS FOR SITING NEW SENSITIVE LAND USES

Source Category	Advisory Recommendations of Locations to Avoid
Freeways and High-Traffic Roads	500' of a freeway or urban road with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day.
Dry Cleaners Using Perchloroethylene	300' of any dry cleaning operation. For operations with two or more machines, provide 500'. For operations with three or more machines, consult the local air district. Also, do not site new sensitive receptors in the same building with perchloroethylene dry cleaning operations.
Gasoline Dispensing Facilities	300' of a large gas station, defined as a facility with a throughput of 3.6 million gallons per year or greater. A 50' separation is recommended for typical gas dispensing facilities.

SOURCE: CARB, 2005.

California Building and Energy Efficiency Standards (Title 24)

The California Energy Commission first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce emissions of criteria pollutants or TACs, increased energy efficiency and reduced consumption of natural gas and other fuels would result in fewer criteria pollutant and TAC emissions from residential and non-residential buildings subject to the standard. The standards are updated periodically (typically every three years) to allow for the consideration and inclusion of new energy efficiency technologies and methods (California Energy Commission, 2018).

Title 24, Part 6, standards became effective on January 1, 2017. The most recent update to the Title 24 energy efficiency standards (2019 standards) went into effect on January 1, 2020. Development as part of the HEU or SCP would adhere to the applicable version of Title 24 as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits.

California Green Standards Building Code

Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. The CALGreen Code is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting

substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment.

Since 2011, the CALGreen Code has been mandatory for all new residential and non-residential buildings constructed in the state. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality. The CALGreen Code was most recently updated in 2019 to include new mandatory measures for residential and non-residential uses; the new measures took effect on January 1, 2020.

Regional

Bay Area Air Quality Management District Clean Air Plan

The BAAQMD *2017 Clean Air Plan: Spare the Air, Cool the Climate* was adopted on April 19, 2017, by the air district in cooperation with the Metropolitan Transportation Commission, the San Francisco Bay Conservation and Development Commission, and the Association of Bay Area Governments to provide a regional strategy to improve air quality within the SFBAAB and meet public health goals (BAAQMD, 2017d). The control strategy described in the 2017 Clean Air Plan includes a wide range of control measures designed to reduce emissions and lower ambient concentrations of harmful pollutants, safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, and reduce greenhouse gas emissions (GHGs) to protect the climate.

The 2017 Clean Air Plan addresses four categories of pollutants: ground-level ozone and its key precursors, ROG and NO_X; PM, primarily $PM_{2.5}$, and precursors to secondary $PM_{2.5}$; air toxics; and GHG emissions. The control measures are categorized based on the economic sector framework including stationary sources, transportation, energy, buildings, agriculture, natural and working lands, waste management, and water measures.

The air district is the regional agency with jurisdiction over the nine-county region located in the air basin. The Association of Bay Area Governments, the Metropolitan Transportation Commission, 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. The air district is responsible for attaining and/or maintaining air quality in the region within federal and state air quality standards. Specifically, the air district 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. The air district has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, and can impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The air district also regulates new or expanding stationary sources of TACs and requires air toxic control measures for many sources emitting TACs.

Bay Area Air Quality Management District Rules

The air district rules that would be most applicable to the subsequent projects pertain mostly to permits for emergency generators and include Rules 2-1, 2-2, and 2-5. The air district regulates stationary-source emissions of TACs through Rule 2-1 (General Permit Requirements), Rule 2-2 (New Source Review), and Rule 2-5 (New Source Review of Toxic Air Contaminants). Under these rules, all stationary sources that have the potential to emit TACs above a certain level are required to obtain permits from the air district. These rules provide guidance for the review of new and modified stationary sources of TAC emissions, including evaluation of health risks and potential mitigation measures.

Sources must apply Best Available Control Technology (BACT) to reduce emissions, and the air district recently updated its BACT requirement for emergency generators greater than 1,000 horsepower (hp) to achieve EPA Tier 4 standards (BAAQMD, 2021).

Local

County of Santa Clara

Santa Clara County General Plan

On August 25, 2015, the County adopted a new Health Element of the Santa Clara County General Plan. The Health Element incorporates and updates certain subject matter and policies from the previous health and safety chapters of the Santa Clara County General Plan and provides a renewed emphasis on collaborative, comprehensive approaches to planning for community health. The Health Element Section G, Air Quality and Climate Change, contains the following strategy and policies with regard to air quality:

> **Strategy #1:** Strive for air quality improvement through regional and local land use, transportation, and air quality planning.
>
> ***Policy HE-G.1***: *Air quality environmental review.* Continue to utilize and comply with the Air District's project- and plan-level thresholds of significance for air pollutants and greenhouse gas emissions.
>
> ***Policy HE-G.2***: *Coordination with regional agencies.* Coordinate with the Air District to promote and implement stationary and area source emission measures.
>
> ***Policy HE-G.3***: *Fleet upgrades.* Promote Air District mobile source measures to reduce emissions by accelerating the replacement of older, dirtier vehicles and equipment, and by expanding the use of zero emission and plug-in vehicles.
>
> ***Policy HE-G.4***: *Off-road sources.* Encourage mobile source emission reduction from off-road equipment such as construction, farming, lawn and garden, and recreational vehicles by retrofitting, retiring and replacing equipment and by using alternate fuel vehicles.
>
> ***Policy HE-G.5***: *GHG reduction.* Support efforts to reduce GHG emissions from mobile sources, such as reducing vehicle trips, vehicle use, vehicle miles traveled (VMT), vehicle idling, and traffic congestion. These efforts may include improved transit service, better roadway system efficiency, state-of-the-art signal timing and Intelligent

Transportation Systems (ITS), transportation demand management, parking and roadway pricing strategies, and growth management measures.

Policy HE-G.6: *Regional/local plans*. Encourage and support regional and local land use planning that reduces automobile use and promotes active transportation.

Policy HE-G.7: *Sensitive receptor uses.* Promote measures to protect sensitive receptor uses, such as residential areas, schools, day care centers, recreational playfields and trails, and medical facilities by locating uses away from major roadways and stationary area sources of pollution, where possible, or incorporating feasible, effective mitigation measures.

Policy HE-G.8: *CARE Communities focus.* Promote awareness of geographic areas subject to persistently poorer air quality and assist the Air District in monitoring and reducing emissions from all sources in CARE communities.

Policy HE-G.9: *Healthy infill development.* Promote measures and mitigations for infill development to protect residents from air and noise pollution, such as more stringent building performance standards, proper siting criteria, development and environmental review processes, and enhanced air filtration.

Policy HE-G.10: *Conservation*. Promote energy conservation and efficiency in homes, businesses, schools, and other infrastructure to reduce energy use and criteria pollutant and greenhouse gas emissions.

Stanford Community Plan

The Stanford Community Plan is a component of the Santa Clara County General Plan. The Stanford Community Plan serves as the general plan for the campus and articulates the goals, strategies, and policies for Stanford lands in unincorporated Santa Clara County. The Stanford Community Plan Chapter 7, Health and Safety, contains the following strategies and policies with regard to air quality:

Strategy #1: Manage Campus Growth and Land Use for Cleaner Air.

Policy SCP-HS 1: Limit campus growth and development to lands within the Academic Growth Boundary in order to minimize cumulative impacts on air quality.

Policy SCP-HS 2: Within the Academic Growth Boundary, emphasize concepts of appropriate integration of land uses, compact campus development patterns, and more efficient, higher density residential development to reduce automobile dependency and promote use of alternative transportation modes.

Strategy #2: Emphasize Transportation Alternatives and Transportation Demand Management to Reduce Automobile Dependency and Vehicle Emissions.

Policy SCP-HS 3: Maintain and enhance the use of transportation alternatives and demand management to the extent allowed by law for the purpose of reducing automobile dependency, reducing trip generation, and reducing vehicle emissions.

Policy SCP-HS 4: Promote the use of alternative fuel and propulsion systems for shuttle vehicles, other transit vehicles, construction and fleet vehicles.

Implementation Recommendation:

SCP-HS (i)1: Consider a program that would credit the use of electric, "hybrid" gas and electric, or other reduced-emission vehicles toward the "no net new commute trips" standard.

Strategy #3: Control Sources of Particulate Emissions.

Policy SCP-HS 5: Reduce particulate matter pollution originating from road and building construction. Require all best management practices and feasible control measures through project conditions and mitigations, as appropriate.

Implementation Recommendation:

SCP-HS (i)2: Require Stanford to use appropriate best management practices and other feasible mitigation for the reduction of particulate matter pollution during construction.

4.2.4 Environmental Impacts and Mitigation Measures

This section analyzes impacts related to air quality that could occur from implementation of the proposed project. It describes the methods used to determine impacts and lists the thresholds that were used to conclude whether an impact would be significant. Mitigation measures are identified as necessary to reduce or avoid significant impacts.

Significance Thresholds

The thresholds used to determine the significance of impacts related to air quality are based on Appendix G of the *CEQA Guidelines*. Implementation of the proposed project could have a significant impact on the environment if it would:

- Conflict with or obstruct implementation of the actual air quality plan;
- Result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors); or
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Methodology and Assumptions

The following analysis is based on guidance from the BAAQMD provided in the 2017 BAAQMD CEQA Air Quality Guidelines (BAAQMD, 2017a). The air district's guidelines identify different approaches to analyzing plans versus projects. The discussion below presents a

plan-level analysis to address implementation of the HEU and SCP. Specifically, this section starts with an assessment of consistency with the Clean Air Plan by comparing the HEU's and SCP's consistency with the strategy of reducing pollutant emissions from vehicle-miles traveled (VMT) by channeling future growth into urban communities where goods, services, and/or employment are close at hand and people have a range of viable transportation options. This section then evaluates criteria pollutants by comparing VMT increase to population increase. For health risk, the plan level analysis describes the BAAQMD's guidance, which calls for examining the impact of the environment on the project (i.e. how would existing sources of TAC and $PM_{2.5}$ affect new residents), and provide this information to inform the HEU and SCP, recognizing that the focus of CEQA is impacts of the project on the environment.[3] The analysis also assesses the addition of any odor sources anticipated as part of the plan.

In addition to assessing potential air quality impacts resulting from the HEU and SCP at a plan level as required by the BAAQMD guidance, the analysis considers the potential for significant impacts as a result of subsequent projects that may be constructed under the HEU and SCP. The analysis includes a qualitative discussion of criteria pollutants that may result from construction and operation of specific projects. A qualitative discussion of health risks that may result from construction and operation of specific projects is also provided, and is informed by quantitative analysis of risks associated with traffic increases (i.e. project operations) projected due to the HEU and SCP.

While the exact timing of development under the HEU and SCP is unknown and will ultimately be market driven, this analysis is based on the assumption that the projected development will occur by the year 2031 for modeling purposes, and emissions were estimated for this planning horizon. This analysis is based on projected land uses, traffic trips, and associated VMT information provided in the transportation analysis prepared by Hexagon (see also Section 4.14 of this EIR, *Transportation*).

Impacts and Mitigation Measures

Impacts

Impact AQ-1: The project would not conflict with or obstruct implementation of the 2017 Clean Air Plan. (*Less than Significant Impact*)

The most recently adopted air quality plan for the SFBAAB is the 2017 Clean Air Plan (BAAQMD, 2017d) (Clean Air Plan). The Clean Air Plan is a road map that demonstrates how the SFBAAB will implement all feasible measures to reduce ozone precursors (ROG and NO_X) and reduce transport of ozone and its precursors to neighboring air basins, in accordance with the requirements of the California Clean Air Act. It also provides a control strategy to reduce PM, air toxins, and GHGs. In determining consistency with the Clean Air Plan, this analysis considers whether the project would:

[3] This is pursuant to the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015.

- Support the primary goals of the Clean Air Plan;
- Include applicable control measures of the Clean Air Plan; and
- Avoid disrupting or hindering implementation of control measures identified in the Clean Air Plan.

The primary goals of the Clean Air Plan are to protect air quality and public health at the regional and local scale and protect the climate by reducing regional criteria air pollutant emissions and reducing local air quality-related health risks (by meeting state and national ambient air quality standards). To meet these goals, the Clean Air Plan includes 85 control measures aimed at reducing air pollutants in the SFBAAB (BAAQMD, 2017d). These control measures are grouped into the following sectors: stationary (industrial) sources, transportation, energy, buildings, agriculture, natural and working lands, and waste management. The vast majority of the control measures included in the Clean Air Plan do not apply directly to the HEU and SCP and their related subsequent projects because they target facilities or land uses that do not currently exist and would not be permitted in the Plan area (e.g., energy generation, waste management, agricultural, forest or pasture lands); vehicles or equipment that would not be employed in the Plan area (e.g., airplanes, farming equipment); and/or involve rulemaking or other actions under the jurisdiction of agencies not directly involved with design and approval of the Plan and its related actions. For example, the Agriculture, Natural and Working Lands, and Water measures address emissions sources not applicable to the HEU or SCP, but rather the air district's own programs and regional air quality planning and are less applicable to local agencies' decisions and projects. In addition, 40 of these measures address stationary sources (such as oil refineries and cement kilns, and large boilers used in commercial and industrial facilities) and will be implemented by the air district using its permit authority and are therefore not suited to implementation through local planning efforts.

Housing Element Update and Stanford Community Plan Update

The HEU would promote high-density, infill uses in many of the sites, would promote water and energy conservation, and the housing constructed as part of the HEU's implementation would be required to divert waste in accordance with applicable regulations. Many of these sites have access to nearby bus and light rail, Including Caltrain. While subsequent projects that may occur under the HEU and SCP are expected to increase demand for travel within the vicinity, safe and convenient pedestrian, transit, and bicycle access to and within the vicinity is necessary for the success of subsequent projects. In both cases, the new multifamily housing would have access to public transit options.

Combined, the HEU and SCP update would result in Stanford University providing the housing needed to accommodate future growth of academic or academic support uses directly on campus or other contiguous Stanford land-grant lands. This approach also expands the previous housed population from "students and faculty" to "undergraduate students, graduate students, faculty, staff, postgraduate fellows, and other workers." The provision of all needed housing to accommodate future development on campus and enhanced coordination between housing policies and transportation policies would facilitate a reduction in vehicle miles traveled (VMT),

as well as other negative impacts associated with commuting and local trips. This would be consistent with the goals of the Clean Air Plan.

The majority of the control measures identified in the Clean Air Plan fall under the implementation responsibility of the BAAQMD and would not be directly applicable to the development of the HEU or SCP. However, under both the HEU and SCP, construction of dense multifamily housing would support the implementation of transportation-, energy-, building-, waste-, and water conservation-related measures discussed in the Clean Air Plan and would not hinder its implementation. The relevant sectors are discussed further below.

Transportation Control Measures

The Transportation Control Measures concern improving transit systems, improving efficiency of the region's transportation system, encouraging residents and employees to exhibit "sustainable transportation behavior," improving bicycle and pedestrian facilities, and supporting high-density growth. By providing for multifamily housing on existing land near transit, both the HEU and SCP would support the implementation of the following Transportation Control Measures included in the Clean Air Plan:

- TR 3: Local and Regional Bus Service;
- TR 4: Local and Regional Rail Service;
- TR 5: Transit Efficiency and Use;
- TR 9: Bicycle and Pedestrian Access and Facilities; and
- TR 10: Land Use Strategies.

Housing developed on many of the HEU sites would be infill development concentrated in areas that are serviced by local and regional bus service, as well as regional rail services, which would contribute to increased transit use and efficiency within the region. The HEU would also support TR 10: Land Use Strategies, as development under the HEU scenarios would have a higher density near transit facilities than what is currently planned for those areas. This up-zoning would increase resident access to public services and transit, which would reduce VMT per capita, thereby reducing air quality emissions.

The SCP would provide additional housing for faculty, staff, and students on campus rather than further afield, and those persons would therefore have proximate access to Stanford University's transit system, allowing a reduction in VMT.

Energy Control Measures

The proposed project would also, through implementation of existing local, regional, and state policies, further the Clean Air Plan's Energy Control Measures. The focus of the Energy Control Measures included in the Clean Air Plan is decreasing the amount of electricity consumed in the SFBAAB, as well as decreasing the carbon intensity of the electricity used. More specifically, the Energy Control Measures included in the Clean Air Plan include:

- EN 1: Decarbonize Electricity Production; and
- EN 2: Decrease Electricity Demand.

Development under both the HEU and SCP would be required to comply with the most recent applicable standards included in Title 24, Part 6 (Building Energy Efficiency Standards for Residential and Nonresidential Buildings) and Title 24, Part 11 (CALGreen Code) of the California Code of Regulations. These standards are meant to reduce energy use and improve energy efficiency of development. In addition, Silicon Valley Clean Energy, a community choice aggregation, offers clean energy to County residents, and will be available to future residents of the development that would occur under the implementation of the proposed project.

Buildings Control Measures

The Clean Air Plan includes four Buildings Control Measures to improve the energy efficiency of existing buildings, promote the use of electricity and on-site renewable energy in existing and new buildings, and to ensure that new construction is designed to achieve zero net GHG emissions. The Buildings Control Measures that would be applicable to the proposed project scenarios include:

- BL 1: Green Buildings;
- BL 2: Decarbonize Buildings; and
- BL 4: Urban Heat Island Mitigation.

As discussed above, development under the proposed project would be required to comply with the requirements included in the Title 24 Building Energy Efficiency Standards and the CALGreen Code. Implementation of Title 24, Part 6 and Title 24, Part 11 of the California Code of Regulations would lead to energy-related improvements that would reduce emissions. Furthermore, as discussed under Impact AQ-4, subsequent projects that do not fall below the screening levels identified in the BAAQMD CEQA Guidelines, and that would generate operational emissions that would exceed the BAAQMD thresholds of significance, would be required to implement the tree planting requirements included in Mitigation Measure AQ-4b, identified below.

Waste Management Control Measures

The waste management sector generates GHG emissions from landfills and composting facilities, as well as a variety of air pollutants from waste decomposition in landfills and composting operations. Waste Management Control Measures are meant to reduce or capture methane emissions from landfills and composting facilities, divert organic materials from landfills, and increase waste diversion rates through efforts to reduce, reuse, and recycle. The Waste Management Control Measures that would be supported by the proposed project scenarios include the following:

- WA 3: Green Waste Diversion; and
- WA 4: Recycling and Waste Reduction.

Development resulting from the proposed project would be serviced by a waste hauler that offers residential and commercial composting services and that would be required to comply with the requirements of the California Integrated Waste Management Act and AB 341. Therefore, the proposed project would support the applicable Waste Management Control Measures of the Clean Air Plan.

Water Conservation Control Measures

Water use generates criteria air pollutant and toxic air contaminant emissions; therefore, the 2017 Clean Air Plan includes measures to reduce emissions from the water sector by encouraging water conservation, limiting GHG emissions from publicly owned treatment works (POTWs), and promoting the use of biogas recovery systems. The only Water Conservation Control Measure that would be applicable to development under the proposed project is:

- WR 2: Support Water Conservation.

As discussed under the Building Control Measures, the proposed project would be required to implement the requirements of the CALGreen Code which includes residential mandatory measures to improve water efficiency and conservation.

Conclusion

Overall, the proposed project would result in dense multifamily housing close to transit and bicycle/pedestrian facilities and would support the primary goals of the Clean Air Plan through continued implementation of numerous existing regulations that have been established for new developments throughout the County. Thus, both scenarios would support the goal of the Clean Air Plan to protect public health. The impact would be **less than significant**.

Mitigation Measures: None required.

Impact AQ-2: The project would not result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard. (*Less than Significant Impact*)

The significance of a plan's emissions of criteria air pollutants is based on consistency with regional air quality planning, including an evaluation of population growth and growth in VMT. For a proposed plan to result in a less-than-significant criteria air pollutants impact, an analysis must demonstrate that the plan's growth in VMT would not exceed the plan's population growth.

Housing Element Update and Stanford Community Plan Update

As discussed in Section 4.12, *Population and Housing*, population on the Stanford campus would increase by approximately 4,855 to 6,242 persons, based on a factor of 2.89 persons-per-household, which is the average number of persons per household in the project area as defined

by the Valley Transportation Authority (VTA) travel demand model.[4] Furthermore, if all of the identified sites in San José were developed at the proposed minimum and maximum densities to accommodate between 4,518 and 6,281 new housing units, the population of the unincorporated areas within the City would increase by approximately 13,057 to 18152 persons. Combined, the population of the County would increase by 17,912 to 24,394 persons as a result of the proposed project.

Based on the output from the travel demand model, daily VMT associated with the proposed project would increase by approximately 8.4 percent compared to the 2040 No Project scenario, as shown in **Table 4.2-7**. The 2040 proposed project growth in service population (residents plus jobs) shown in Table 4.2-7 would be approximately 15.8 percent higher than the 2040 No Project scenario. Because the growth in VMT would be less than the growth in population, the proposed project would result in a *less-than-significant* impact with respect to regional criteria air pollutants.

TABLE 4.2-7
PROJECT VMT VERSUS SERVICE POPULATION GROWTH

	2040 No Project	2040 Project	Difference between No Project and Project	% Increase
Service Population	156,370	181,087	24,717	15.8%
VMT[a]	4,832,413	5,240,096	407,683	8.4%

NOTES:

a VMT data provided by Hexagon, as presented in Section 4.14 of this EIR, *Transportation*.

Conclusion

As discussed above, implementation of the project would result in growth in VMT that would be less than the growth in service population and would result in a less-than-significant impact with respect to regional criteria air pollutants. For this reason, implementation of the proposed project would result in a **less-than-significant** impact with respect to regional emissions of criteria air pollutants and no mitigation measures are required.

Mitigation Measures: None required.

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[4] The VTA model serves as the primary travel demand forecasting tool for the County. The model is a mathematical representation of travel within the nine Bay Area counties, as well as Santa Cruz, San Benito, Monterey, and San Joaquin counties. The base model structure was developed by the Metropolitan Transportation Commission (MTC) and further refined by the City/County Association of Governments and Santa Clara Valley Transportation Authority for use within San Mateo County and Santa Clara County.

Impact AQ--3: Construction and operation of individual development projects following adoption of the project could result in a cumulatively considerable net increase in criteria pollutants for which the region is in nonattainment status under an applicable federal, state, or regional ambient air quality standard. (*Significant and Unavoidable Impact, with Mitigation*)

Housing Element Update and Stanford Community Plan Update

While a plan-level analysis is not required to assess project-related emissions, construction and operation of subsequent projects would result in criteria air pollutant emissions, the effects of which are analyzed here to anticipate potential impacts that may be identified in subsequent project-specific environmental reviews and apply mitigation measures where necessary. This analysis first discusses potential emissions from project construction, and then potential emissions from project operation.

Implementation of the project would allow for development of new residential uses. Emissions generated during construction activities would include exhaust emissions from the use of heavy-duty off-road diesel equipment, on-road diesel trucks, and employee vehicles, as well as fugitive emissions associated with earth-disturbing activities and other demolition and construction work.

Construction Emissions

Construction Dust

Activities that generate dust include excavation and equipment and vehicle movement across unpaved construction sites. Dust can be an irritant causing watering eyes or irritation to the lungs, nose, and throat. Demolition, excavation, grading, and other construction activities can cause wind-blown dust that adds PM_{10} and $PM_{2.5}$ to the local atmosphere. The BAAQMD has taken a qualitative approach to addressing fugitive dust emissions during construction, such that any project that implements the BAAQMD Basic Construction Mitigation Measures Recommended for All Projects (Best Management Practices) would not result in a significant impact with respect to fugitive dust. **Mitigation Measure AQ-3a: Best Management Practices**, provided below, specifies BAAQMD recommended measures and would apply to all individual projects to address construction dust.

Construction Equipment Exhaust

The BAAQMD CEQA Air Quality Guidelines includes screening criteria based on development type and size to determine if construction or operational emissions from individual projects would likely result in a cumulatively considerable net increase in non-attainment criteria air pollutants. [5] A project that exceeds the screening criteria may require a detailed air quality assessment to determine whether criteria air pollutant emissions would exceed significance thresholds (BAAQMD, 2017b). Projects below the screening criteria would not require future analysis, and the criteria pollutant impact from those projects are presumed to be less than significant.

Subsequent projects that would exceed the screening sizes have the potential to generate emissions of criteria air pollutants that could contribute a cumulatively considerable amount of

[5] For example, the construction-related screening size for mid-rise apartments is 240 dwelling units, per Table 3-1 in the BAAQMD CEQA Guidelines.

non-attainment pollutants. These projects may require substantial ground disturbance, require extremely compressed construction schedules, and require specialty equipment, all of which could lead to exceedance of the significance thresholds. Thus, subsequent projects that exceed the BAAQMD screening criteria would require a detailed air quality assessment to determine whether criteria air pollutant emissions would exceed significance thresholds.

Because the specific characteristics of each subsequent project and the required construction equipment information (year and duration of construction, equipment type, operating hours, horsepower, etc.) are not currently known, **Mitigation Measure AQ-3b: Emission Reduction Measures for Subsequent Projects Exceeding the Significance Thresholds for Criteria Pollutants,** provided below, requires a quantitative analysis of projects exceeding the BAAQMD's screening criteria, and implementation of emission reduction measures if significance thresholds for criteria pollutants are exceeded.

Operational Emissions

Subsequent projects that could occur under the project would generate vehicle trips and other operational emissions, such as emissions from landscape maintenance activities, painting, and the use of consumer products. Sufficient detail about subsequent projects is not currently known. However as discussed above, BAAQMD established screening criteria to determine if operational emissions from projects would result in a cumulatively considerable net increase in criteria air pollutants (BAAQMD, 2017b). A project that exceeds the operational screening criteria would require a detailed air quality assessment to determine whether criteria air pollutant emissions would exceed significance thresholds.

Most subsequent projects' operational emissions are not anticipated to exceed the thresholds of significance. This is because the majority of operational emissions from residential development are from gasoline-powered passenger vehicles, which do not emit a substantial amount of NO_X. Some VOCs would be emitted from personal product and solvent use (i.e., consumer products), but these emissions typically do not exceed thresholds for small and mid-size projects. Vehicles also emit fugitive $PM_{2.5}$ in the form of road dust, brake wear, and tire wear.

Impact AQ-2 demonstrated that VMT growth would be less than population growth, based on the type of proposed development that involves dense multifamily housing close to transit and bicycle/pedestrian facilities, and concluded that the operational criteria pollutant emissions from the project would be less than significant as a result. It is expected that the operational emissions from each subsequent project would also be less than significant.

Only the largest projects would potentially exceed the thresholds. Nonetheless, because subsequent projects under the proposed project could exceed the air district's screening criteria, each subsequent project that exceeds the screening levels included in the CEQA Air Quality Guidelines would require a quantitative analysis to determine if criteria air pollutant emissions are below significance thresholds (BAAQMD, 2017b). **Mitigation Measure AQ-3b: Emission Reduction Measures for Subsequent Projects Exceeding the Significance Thresholds for Criteria Pollutants,** provided below, requires a quantitative analysis of projects exceeding the

BAAQMD's screening criteria, and implementation of emission reduction measures if significance thresholds for criteria pollutants are exceeded**.**

Mitigation Measures

Mitigation Measure AQ-3a: Best Management Practices.

All projects, regardless of size, shall implement best management practices to reduce construction impacts, particularly fugitive dust, to a less-than-significant level. Specifically, the project sponsor shall require all construction plans to specify implementation of the following best management practices:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure AQ-3b: Emission Reduction Measures for Subsequent Projects Exceeding the Significance Thresholds for Criteria Pollutants.

Project sponsors proposing projects that exceed BAAQMD screening levels shall prepare a project-level criteria air pollutant assessment of construction and operational emissions at the time the project is proposed. The project-level assessment could include a comparison of the project with other similar projects where a quantitative analysis has been conducted, or a project-specific criteria air pollutant analysis to determine whether the project exceeds the air district's criteria air pollutant thresholds.

In the event that a project-specific analysis finds that the project could result in significant construction and/or operational criteria air pollutant emissions that exceed significance thresholds, the project sponsor shall implement the following emission reduction measures to the degree necessary to reduce the impact to less than significance thresholds and shall implement other feasible measures as needed to reduce the impact to less than the significance thresholds.

Clean Construction Equipment.

1) Diesel off-road equipment shall have engines that meet the Tier 4 Final off-road emission standards, as certified by CARB, as required to reduce the emissions to less than the thresholds of significance shown in Table 2-1 of the BAAQMD CEQA Guidelines (BAAQMD 2017b). This requirement shall be verified through submittal of an equipment inventory that includes the following information: (1) Type of Equipment, (2) Engine Year and Age, (3) Number of Years Since Rebuild of Engine (if applicable), (4) Type of Fuel Used, (5) Engine HP, (6) Verified Diesel Emission Control Strategy (VDECS) information if applicable and other related equipment data. A Certification Statement is also required to be made by the Contractor for documentation of compliance and for future review by the air district as necessary. The Certification Statement must state that the Contractor agrees to compliance and acknowledges that a violation of this requirement shall constitute a material breach of contract.

2) The County may waive the equipment requirement above only under the following unusual circumstances: if a particular piece of off-road equipment with Tier 4 Final standards is technically not feasible or not commercially available; the equipment would not produce desired emissions reduction due to expected operating modes; installation of the equipment would create a safety hazard or impaired visibility for the operator; or there is a compelling emergency need to use other alternate off-road equipment. If the County grants the waiver, the contractor shall use the next cleanest piece of off-road equipment available, as detailed in **Table 4.2-8**, below.

TABLE 4.2-8
OFF ROAD EQUIPMENT COMPLIANCE STEP DOWN APPROACH

Compliance Alternative	Engine Emissions Standard	Emissions Control
1	Tier 4 Interim	N/A
2	Tier 3	ARB Level 3 VDECS
3	Tier 2	ARB Level 3 VDCES

3) For purposes of this mitigation measure, “commercially available” shall mean the availability of Tier 4 Final engines similar to the availability for other large-scale construction projects in the region occurring at the same time and taking into consideration factors such as (i) potential significant delays to critical-path timing of construction for the project and (ii) geographic proximity to the project site of Tier 4 Final equipment.

4) Table 4.2-8 describes the Off-Road Compliance Step Down approach. If engines that comply with Tier 4 Final off-road emission standards are not commercially available, then the Contractor shall meet Compliance Alternative 1. If off-road equipment meeting Compliance Alternative 1 are not commercially available, then the Project

sponsor shall meet Compliance Alternative 2. If off-road equipment meeting Compliance Alternative 2 are not commercially available, then the Project sponsor shall meet Compliance Alternative 3 as demonstrated below.

5) The project sponsor shall require the idling time for off-road and on-road equipment be limited to no more than 2 minutes, except as provided in exceptions to the applicable state regulations regarding idling for off-road and on-road equipment. Legible and visible signs shall be posted in multiple languages (English, Spanish, Chinese) in designated queuing areas and at the construction site to remind operators of the 2-minute idling limit.

Electric Vehicle Charging – Operational Emissions. The project sponsor shall demonstrate compliance with EV charging requirements in Tier 2 CalGreen standards in effect at the time of project review (consistent with GHG mitigation measure 4.71b). The installation of all EV charging equipment shall be included on the project drawings submitted for the construction-related permits or on other documentation submitted to the County.

Significance After Mitigation: With implementation of Mitigation Measure AQ-3a, construction dust impacts of subsequent projects would be reduced to less than significant with mitigation by incorporating best management practices promulgated by the BAAQMD.

However, even with implementation of Mitigation Measure AQ-3b, it cannot be stated with certainty that construction and operational criteria air pollutant impacts associated with all subsequent projects would be reduced to less-than-significant levels. As discussed above, only large construction projects that exceed the screening sizes in Table 3-1 of the Air Quality CEQA Guidelines, projects with substantial ground disturbance, specialty construction equipment, or compressed and highly intensive construction schedules would be expected to exceed emissions significance thresholds. Nevertheless, due to this uncertainty, criteria pollutant emissions from construction and operation of subsequent projects that could be developed under the project would be **significant and unavoidable with mitigation**. The identification of this significant and unavoidable impact does not preclude the finding of a less-than-significant or less-than-significant-with-mitigation impact for subsequent projects that are below the applicable screening criteria or that meet the criteria air pollutant thresholds of significance with implementation of Mitigation Measure AQ-3b.

Impact AQ-4: The HEU and SCP would not result in exposure of new sensitive receptors to substantial pollutant concentrations. (*Non-CEQA Impact*)

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The BAAQMD significance criteria for exposure to sensitive receptors from health risks due to emissions of TAC and PM2.5 resulting from adoption of a plan considers the following:

- Presence of sensitive receptors around existing and planned sources of TACs (including adopted Risk Reduction Plan areas) and,
- Presence of sensitive receptors within 500 feet from all freeways and high-volume roadways

The greatest source of TACs near the HEU or SCP planning areas would be any freeway or high-volume roadway. These would include I-680, I-280, SR-17, Bascom, Camden, Capitol, Leigh, Moorpark, and Toyon Avenues, Hostetter, McKee, Quarry, Tully, and White Roads, San Carlos Street, and Stevens Creek Boulevard. There are no other major sources of TACs or Risk Reduction Plan areas near either the HEU or SCP sites.

Also, no new TAC sources are planned as part of the HEU or SCP. According to these criteria, effects would be adverse if the plan would introduce sensitive receptors in the vicinity of existing and planned sources of TACs, such as freeways and high-volume roadways. However, in the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015, the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's users or residents. Nonetheless, this analysis considers the potential for new receptors to be exposed to TAC emissions from any of the above roads and freeways for informational purposes. Some of the housing opportunity sites in the HEU area are within 500 feet of these roads and freeways, and new HEU residential sensitive receptors could be developed, occupied, and subsequently exposed to TAC emissions from them.

The housing sites are dispersed across the County, some of which would place new sensitive receptors near an existing source of TACs. High-volume roadways, as defined by BAAQMD, are freeways or arterial roadways with greater than 10,000 vehicles per day (BAAQMD, 2017b). The following sites are near high-volume roadways or freeways, based on average daily traffic data provided in the transportation analysis:

San José Sites:

- Central San José adjacent to San Carlos Street – a high volume roadway.
- Southwest Central San José near SR-17 and I-280.
- Northeast San José in between I-680 and Capitol Avenue – a high-volume roadway and freeway.
- East San José sites not near freeway or major roadways except the sites adjacent to McKee Road.
- South San José cross streets of Leigh Avenue and Camden Avenue.

Stanford Sites:

- Western edge of Stanford University, Sand Hill Road.
- Northern part of Stanford University, Quarry Road adjacent to Arboretum Road, also adjacent to Highway 82.

Table 4.2-9 presents roads near housing opportunity sites with 10,000 vehicles per day or more.

TABLE 4.2-9
AVERAGE DAILY TRAFFIC VOLUMES IN SANTA CLARA COUNTY GREATER THAN 10,000 VEHICLES PER DAY

Roadway	Major Cross	Location	Both Direction ADT	
			2040 No Project	2040 Plus Project
Bascom Avenue	north of San Carlos Street	between Olive Avenue and Forest Avenue	34,362	35,015
Bascom Avenue	south of Fruitdale Avenue	between Maywood Avenue and Lindaire Avenue	36,991	37,661
Camden Avenue	west of Leigh Avenue	between New Jersey Avenue and Leigh Avenue	55,939	56,196
Capitol Avenue	north of Hostetter Road	between I-680 and Hostetter Road	27,347	30,002
Hostetter Road	west of Capitol Avenue	between I-680 and Capitol Avenue	30,968	33,333
Hostetter Road	east of Capitol Avenue	between Capitol Ave and Peachwood Drive	22,338	22,338
Leigh Avenue	south of Camden Avenue	between Camden Avenue and Weeth Drive	15,287	15,243
McKee Road	west of White Road	between Challenger Avenue and White Road	32,529	33,112
McKee Road	east of La Pala Drive	between La Pala Drive and Delia Street	18,778	19,131
Moorpark Avenue	west of Thornton Way	between SR 17 and Thornton Way	48,504	49,898
Quarry Road	west of El Camino Real	between Campus Dr and El Camino Real	17,073	17,073
San Carlos Street	east of Bascom Avenue	between Vaughn Avenue and Arleta Avenue	33,482	34,108
San Carlos Street	east of Leigh Avenue	between Leigh Avenue and Richmond Avenue	31,002	31,443
Stevens Creek Blvd	west of Bascom Avenue	between Bascom Avenue and Bradley Avenue	24,542	24,909
Toyon Avenue	north of McKee Road	between Cortese Circle and McKee Road	10,320	10,316
Tully Road	east of White Road	between White Road and Buckhill Court	18,459	18,459
White Road	south of Hills Drive	between White Court and Westboro Drive	32,130	34,739
White Road	north of Hills Drive	between Florence Court and Rose Avenue	28,341	30,875
White Road	north of McKee Road	between Kentridge Drive and McKee Road	19,448	19,826
White Road	north of Tully Road	between Tully Road and Cunningham Lake Avenue	27,109	36,946

SOURCE:

*Based factoring historical counts using the typical 1% annual growth.

The Title 24 Building Code requires low-rise residential buildings and larger to install Minimum Efficiency Reporting Value (MERV) 13 enhanced filtration. MERV 13 air filtration is capable of removing 80 percent of particulate matter, thereby reducing an individual's exposure to air pollution (ASHRAE Standard 52.2; AHRI Standard 680). Nevertheless, the condition of approval below is recommended to further reduce the impact of TAC emissions on the HEU's new sensitive receptors that would be within 500 feet of the above roads and freeways.

> **Condition of Approval to Reduce Exposure to Air Pollution – Toxic Air Contaminants:** The HEU shall require all new sensitive receptors constructed within 500 feet of roads or freeways with greater than 10,000 average vehicles per day to install mechanical ventilation systems capable of achieving the protection from particulate matter ($PM_{2.5}$) equivalent to that associated with a MERV 16 filtration (as defined by American Society of Heating, Refrigerating and Air-Conditioning Engineers [ASHRAE] standard 52.2). As part of implementing this condition, an ongoing maintenance plan for the building's HVAC filtration system is required.

Impact AQ-5: Construction and operation of individual development projects following adoption of the project would result in emissions of fine particulate matter ($PM_{2.5}$) and TACs that could result in exposure of sensitive receptors to substantial pollutant concentrations. (*Less than Significant Impact, with Mitigation*)

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Construction and operation of individual projects that are constructed following adoption of the HEU or SCP could expose sensitive receptors to levels of TACs and $PM_{2.5}$ that could lead to potentially significant health risk impacts.

For construction of subsequent development projects, sufficient detail about their type and location is not currently known to allow a quantitative analysis of health risks at sensitive receptors resulting from construction activities. For example, construction TAC emissions from subsequent projects are based on project-specific construction equipment use and schedule information that is not available currently.

Health Risks from Construction of Subsequent Projects

The specific characteristics of each subsequent project and the required construction equipment information (year and duration of construction, equipment type, operating hours, horsepower, etc.) are not known, and therefore it is not possible to assess whether construction-related TAC emissions would result in health risks in excess of the significance thresholds described above. As a result, Mitigation Measure 4.2-5a, presented below would require subsequent multi-family projects within 1,000 feet of sensitive receptors to undergo a project-level assessment at the time the project is proposed.

Construction and operation of multifamily development projects allowed by the proposed project could expose existing sensitive receptors near the sites to levels of TACs and $PM_{2.5}$ that could lead to potentially significant health risk impacts. As discussed under Impact AQ-2, projects that are below the BAAQMD screening sizes are not expected to have a significant impact from

criteria pollutant emissions. However, for health risks, the severity of the impact depends on the proximity of the emissions-generating activity to sensitive receptors, meteorological conditions, and the duration of exposure, making screening infeasible. Therefore, a health risk assessment would be required to determine whether health risk levels associated with construction of a specific project would exceed significance thresholds of 10 in one million cancer risk and 0.3 $\mu g/m^3$ annual $PM_{2.5}$ concentrations at nearby sensitive receptors.

Operational emissions would be predominantly generated by new vehicle trips, expected to be mainly gasoline-powered passenger vehicles, which do not emit a substantial amount of TACs. However, vehicles emitting fugitive $PM_{2.5}$ in the form of road dust, brake wear, and tire wear, could exceed BAAQMD's $PM_{2.5}$ concentration significance threshold. In general, only a large volume of traffic on a roadway adjacent to residences would have the potential to exceed the annual $PM_{2.5}$ concentration threshold.

Mitigation Measures

Mitigation Measure AQ-5a: Emission Reduction Measures for Subsequent Projects Exceeding the Significance Thresholds for Health Risks associated with TAC Emissions.

Project sponsors proposing projects within 1,000 feet of sensitive receptors, including residences, schools, day care centers, and hospitals, shall prepare a project-level health risk assessment at the time the project is proposed. The project-level assessment could include a comparison of the project with other similar sized projects located a similar distance from receptors where a quantitative analysis has been conducted, or a project-specific analysis to determine whether the project exceeds the air district's health risk thresholds.

If a project-specific analysis finds that the project could result in health risks that exceed significance thresholds, the project sponsor shall implement the clean construction equipment requirement of Mitigation Measure AQ-3b to the degree necessary to reduce the impact to less than significance thresholds and shall implement other feasible measures as needed to reduce the impact to less than the significant thresholds.

Significance After Mitigation: Mitigation measure AQ-5a would reduce TAC emissions from off-road, diesel construction equipment. Tier 4 Final off-road engines emit 80 to 90 percent less DPM than Tier 2 engines. This mitigation measure would be implemented to the extent necessary (e.g., all Tier 4 final construction equipment) to reduce construction health risk impacts associated with all subsequent projects to **less-than-significant** levels and would require additional emission reduction measures if necessary.

Impact AQ-6: The project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. (*Less than Significant Impact*)

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The BAAQMD CEQA Guidelines identifies land uses that have potential to generate continuous odorous impacts and odor complaints during operation. These land uses include wastewater treatment plants, landfills, confined animal facilities, composing stations, food manufacturing

plants, refineries, and chemical plants (BAAQMD, 2017b). However, development that could arise from implementation of the proposed project would be residential and would not include land uses that are identified by the BAAQMD as common odor sources. During construction of the developments that may arise with implementation of the project, the use of diesel-powered vehicles and equipment could temporarily generate localized odors, which would cease upon completion of potential individual projects and would not result in a significant odor impact. Therefore, implementation of the project would have a **less-than-significant** impact with respect to odor sources.

Mitigation Measure: None required.

Cumulative Impacts

The SFBAAB is a nonattainment area for both the federal and state ozone standards; therefore, a cumulative air quality impact already exists. Additional emissions of ozone precursors NO_X or ROG over threshold amounts would further degrade air quality related to ozone. Impact AQ-2 evaluates whether the project's contribution to this significant impact would be considerable and concludes that the impact would be significant and unavoidable after mitigation. For this reason, no further analysis of cumulative criteria pollutants is necessary.

Impact AQ-7: The project, in conjunction with cumulative sources, would not result in exposure of sensitive receptors to substantial levels of fine particulate matter ($PM_{2.5}$) and TACs under cumulative conditions. (*Less than Significant Impact*)

The largest, existing source of TACs and $PM_{2.5}$ in the vicinity of the housing opportunity sites are I-680, I-280, and SR 17. Those existing emissions result in cancer risks and annual average $PM_{2.5}$ concentrations that exceed the BAAQMD's cumulative thresholds at locations within 500 feet of them. These cumulative thresholds are:

- Cancer risk probability > 100 in one million;
- Chronic, non-cancer hazard index > 10;
- Acute, non-cancer hazard index > 10; and
- Annual average $PM_{2.5}$ concentration > 0.8 $\mu g/m^3$.

Both cumulative traffic volumes in the 2040 No Project condition and project-related traffic will incrementally increase the existing emissions and health risks resulting from these freeways that are above the thresholds of significance, resulting in a cumulatively significant impact.

However, given that the vast majority of the cumulative impact is from existing sources and that an extremely small percentage of the total risk would be attributed to the project, and that the project's risks would be below project-level significance thresholds with mitigation (as shown in Impact AQ-4), the project's contribution to the cumulative impact would not be considerable, and this impact would be **less than significant**.

Impact AQ-8: The project, in combination with cumulative projects, would not combine with other sources of odors that would adversely affect a substantial number of people. (*Less than Significant Impact*)

Impact AQ-6 describes the potential of odorous emissions from the project. Development would be residential and would not include land uses that are identified by the BAAQMD as common odor sources. Therefore, operation of the project would not generate objectionable odors and there is no potential for the project to combine with cumulative projects to result in a significant cumulative odor impact. Therefore, this impact would be **less than significant**.

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