

IV.F Air Quality

IV.F.1 Introduction

This section addresses air quality impacts that could result from implementation of the Central SoMa Plan and from proposed changes in the Plan Area street network, including proposed street network changes that would extend beyond the boundaries of the Plan Area. This section discusses the existing air quality conditions in the Plan Area and vicinity, presents the regulatory framework for air quality management, and analyzes the potential for implementation of the proposed Plan, including the street network changes, to affect existing air quality conditions, both regionally and locally, due to activities that emit criteria and non-criteria air pollutants. It also analyzes the types and quantities of emissions that would be generated on a temporary basis due to construction activities as well as those generated over the long term due to development in the Plan Area. The analysis determines whether those emissions are significant in relation to applicable air quality standards and identifies feasible mitigation measures for significant adverse impacts. Emissions of greenhouse gases resulting from the proposed project's potential impacts on climate change and the State's goals for greenhouse gas emissions pursuant to Assembly Bill 32 were addressed in the Initial Study and determined to be less than significant (see Appendix B).

The study area for regional air quality impacts is the San Francisco Bay Area Air Basin (SFBAAB). The study area for localized air quality impacts is generally the same as for transportation impacts bounded by Market, Second, King and Sixth Streets (see Figure IV.D-1, Transportation Study Area). Some of the proposed streetscape improvements extend beyond the area of proposed land use changes, and because some transportation-related air quality effects of the proposed land use program may extend beyond the area to be rezoned, the study area for localized air quality impacts was expanded beyond the Plan Area boundaries. The study area also extends to Mission, 12th, and Bryant Streets on the west, and Folsom Street, The Embarcadero, and Bryant Street on the east, and Market, Second, and Sixth Streets on the north.

The analysis in this section is based on a review of existing air quality conditions in the region and air quality regulations administered by the United States Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and the Bay Area Air Quality Management District (BAAQMD). This analysis includes methodologies identified in the 2012 BAAQMD *CEQA Air Quality Guidelines* and the health risk assessment methodology published by the Office of Environmental Health Hazard Assessment (OEHHA) in 2015.^{252,253}

²⁵² BAAQMD, *California Environmental Quality Act Air Quality Guidelines*, May 2012. Available at http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Accessed October 12, 2016.

²⁵³ California Environmental Protection Agency, *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment*, February 2015. Available at <http://oehha.ca.gov/media/downloads/crn/2015guidancemanual.pdf>. Accessed October 12, 2016.

IV.F.2 Environmental Setting

The Plan Area is within the SFBAAB, which includes all of San Francisco, Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Napa counties, and the southern and southwestern portions, respectively, of Sonoma and Solano counties. BAAQMD is the regional agency responsible for air quality planning in the Air Basin.

Climate and Meteorology

The SFBAAB's moderate climate steers storm tracks away from the region for much of the year, although storms generally affect the region from November through April. San Francisco's proximity to the onshore breezes stimulated by the Pacific Ocean provides for generally good air quality in the Plan Area and the city as a whole.

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

Atmospheric conditions—such as wind speed, wind direction, and air temperature gradients—interact with the physical features of the landscape to determine the movement and dispersal of air pollutants regionally. The Plan Area lies within the Peninsula climatological subregion. Marine air traveling through the Golden Gate is a dominant weather factor affecting dispersal of air pollutants within the region. Wind measurements collected on the San Francisco mainland indicate a prevailing wind direction from the west and an average annual wind speed of 10.6 miles per hour.²⁵⁴ Increased temperatures create the conditions in which ozone formation can increase.

Ambient Air Quality - Criteria Air Pollutants

As required by the 1970 Federal Clean Air Act, the EPA initially identified six criteria air pollutants that are pervasive in urban environments and for which State and federal health-based ambient air quality standards have been established. EPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead are the six criteria air pollutants originally identified by EPA. Since that time, subsets of particulate matter have been identified for which permissible levels have been established. These include particulate matter of 10 microns in diameter or less (PM₁₀) and particulate matter of 2.5 microns in diameter or less (PM_{2.5}). Refer to Section IV.F.3, Regulatory Framework, for further detail with regard to specific pollutants and their attainment status within the SFBAAB with respect to State and federal air quality standards.

The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table IV.F-1, Summary of San Francisco Air**

²⁵⁴ <http://www.wrcc.dri.edu/htmlfiles/westwinddir.html#CALIFORNIA>. Accessed October 11, 2016.

Quality Monitoring Data (2011–2015), presents a five-year summary for the period 2011 to 2015 of the highest annual criteria air pollutant concentrations, collected at the air quality monitoring station operated and maintained by BAAQMD at Sixteenth and Arkansas Streets, in San Francisco's lower Potrero Hill area, which is the closest monitoring station to the Plan Area, one mile to the south. Table IV.F-1 also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (State or federal). Concentrations shown in bold indicate an exceedance of the standard. Table IV.F-1 does not include SO₂ because monitors are not required for the Bay Area as SFBAAB has never been designated as non-attainment for SO₂.

TABLE IV.F-1 SUMMARY OF SAN FRANCISCO AIR QUALITY MONITORING DATA (2011–2015)

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured ^a				
		2011	2012	2013	2014	2015
Ozone						
Days 1-Hour Standard Exceeded		0	0	0	0	0
Maximum 1-Hour Concentration (ppm)	>0.090 ppm ^b	0.070	0.069	0.069	0.079	0.085
Days 8-Hour Standard Exceeded		0	0	0	0	0
Maximum 8-Hour Concentration (ppm)	>0.070 ppm ^c	0.054	0.048	0.059	0.069	0.067
Carbon Monoxide (CO)						
Days 1-Hour Standard Exceeded		0	0	0	0	0
Maximum 1-Hour Concentration (ppm)	>20 ppm ^b	1.8	2.0	1.8	1.6	1.8
Days 8-Hour Standard Exceeded		0	0	0	0	0
Maximum 8-Hour Concentration (ppm)	>9 ppm ^b	1.2	1.2	1.4	1.2	1.3
Suspended Particulates (PM₁₀)						
Days 24-Hour Standard Exceeded		0	1	0	0	0
Maximum 24-Hour Concentration (µg/m ³)	>50 µg/m ^{3b}	46	51	44	36	47
Suspended Particulates (PM_{2.5})						
Days 24-Hour Standard Exceeded ^d		2	1	2	0	0
Maximum 24-Hour Concentration (µg/m ³)	>35 µg/m ^{3c}	47.5	35.7	48.5	33.2	35.4
Annual Average (µg/m ³)	>12 µg/m ^{3b,c}	9.5	8.2	10.1	7.7	7.6
Nitrogen Dioxide (NO₂)						
Days 1-Hour Standard Exceeded		0	1	0	0	0
Maximum 1-Hour Concentration (ppm)	>0.100 ppm ^c	0.093	0.124	0.073	0.084	0.071

SOURCE: BAAQMD, Bay Area Air Pollution Summary, 2011–2015. Available at: <http://www.baaqmd.gov/about-air-quality/air-quality-summaries>.

NOTES:

Bold values are in excess of applicable standard.

ppm = parts per million; µg/m³ = micrograms per cubic meter

- Number of days exceeded is for all days in a given year, except for particulate matter. PM₁₀ was monitored every six days prior to 2013 and every 12 days thereafter. Therefore the number of days exceeded is out of approximately 60 annual samples and 30 annual samples during these respective periods.
- State standard, not to be exceeded.
- Federal standard, not to be exceeded.
- Federal standard was reduced from 65 µg/m³ to 35 µg/m³ in 2006.

Ozone

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

Table IV.F-1 shows that, according to published data, the most stringent applicable standards (State one-hour standard of nine parts per hundred million [pphm] and the federal eight-hour standard of eight pphm) were not exceeded in San Francisco between 2011 and 2015. Measurements of ozone indicate hourly maximums ranging between 77 to 94 percent of the State standard, and maximum eight-hour ozone levels that are approximately 69 to 99 percent of the more stringent federal eight-hour standard.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as a result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table IV.F-1, the more stringent State CO standards were not exceeded between 2011 and 2015. Measurements of CO indicate hourly maximums ranging between eight and 10 percent of the more stringent State standard, and maximum eight-hour CO levels that are approximately 13 to 16 percent of the allowable eight-hour standard.

Particulate Matter (PM₁₀ and PM_{2.5})

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from man-made and natural sources. Particulate matter regulated by the State and Federal Clean Air Acts is measured in two size ranges: PM₁₀ for particles less than 10 microns in diameter, and PM_{2.5} for particles less than 2.5 microns in diameter. In the Bay Area, motor vehicles generate about one-half of the SFBAAB's particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to ARB, 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." ARB also reports that statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and

avoid hundreds of thousands of episodes of respiratory illness in California. Among the criteria pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, BAAQMD was reporting, in its *CEQA Air Quality Guidelines*, that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. High levels of particulate matter can exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions.

Table IV.F-1 shows that an exceedance of the State PM₁₀ standard occurred on one monitored occasion between 2011 and 2015 in San Francisco. It is estimated that the State 24-hour PM₁₀ standard of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) was exceeded on up to six days per year between 2011 and 2015.²⁵⁵ BAAQMD began monitoring PM_{2.5} concentrations in San Francisco in 2002. Unlike PM₁₀, PM_{2.5} is continuously monitored daily. The federal 24-hour PM_{2.5} standard was not exceeded until 2006, when the standard was lowered from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$. The federal 24-hour PM_{2.5} standard was exceeded on five days per year between 2011 and 2015.²⁵⁵ The State annual average standard was not exceeded between 2011 and 2015.

PM_{2.5} is of particular concern because epidemiologic studies have demonstrated that people who live near freeways and high-traffic roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and lung development in children.²⁵⁶

Nitrogen Dioxide

NO₂ is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO₂. Aside from its contribution to ozone formation, NO₂ can increase the risk of acute and chronic respiratory disease and reduce visibility. NO₂ may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. In 2010, EPA implemented a new 1-hour NO₂ standard presented in **Table IV.F-2, State and Federal Ambient Air Quality Standards and Attainment Status**. On November 15, 2012, the ARB approved a revision to the State Implementation Plan for implementing the 2010 federal NO₂ standards. All areas in California are designated as attainment/unclassified for the federal NO₂ standards.²⁵⁷ Table IV.F-1 shows that this new federal standard was exceeded on one day at the San Francisco station between 2011 and 2015.

EPA has also established requirements for a new monitoring network to measure NO₂ concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites are required in California, three of which will be in the Bay Area. These monitors are planned for Berkeley, Oakland, and San Jose. The Oakland station commenced operation in February 2014, and the San Jose station in August 2014. The Berkeley station is not yet operational but is due to begin monitoring by the end of 2016. The new

²⁵⁵ PM₁₀ was sampled every sixth day prior to 2013 and every 12 days thereafter; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table for years 2011 and 2012, and 12 times the numbers listed in the table for year 2013, 2014 and 2015.

²⁵⁶ San Francisco Department of Public Health, Assessment and Mitigation of Air Pollutant Health Effect from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review, May 2008, p. 7. Available at <http://www.sfhealthequity.org/component/jdownloads/summary/3-air/90-assessment-and-mitigation-of-air-pollutant-health-effects-from-intra-urban-roadways-guidance-for-land-use-planning-and-environmental-review?Itemid=62>.

²⁵⁷ ARB, State Implementation Plan Revision for Federal Nitrogen Dioxide Standard Infrastructure Requirements, October 2012. Available at <http://www.arb.ca.gov/desig/no2isip.pdf>.

monitoring data may result in a need to change area designations in the future. ARB will revise the area designation recommendations, as appropriate, once the new monitoring data become available.

TABLE IV.F-2 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS

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

SOURCES: Bay Area Air Quality Management District (BAAQMD), Standards and Attainment Status, 2012, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, accessed April 19, 2013; and EPA National Ambient Air Quality Standards, 2011, <http://www.epa.gov/air/criteria.html>, accessed April 19, 2013.

NOTES:

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

- SAAQS = State ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other State standards shown are values not to be equaled or exceeded.
- NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM₁₀ standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour PM_{2.5} standard is attained when the three-year average of the 98th percentile is less than the standard.
- The United States Environmental Protection Agency (EPA) revoked the national 1-hour ozone standard on June 15, 2005.
- This State 8-hour ozone standard was approved in April 2005 and became effective in May 2006.
- State standard = annual geometric mean; national standard = annual arithmetic mean.
- In June 2002, The California Air Resources Board (ARB) established new annual standards for PM_{2.5} and PM₁₀.
- Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Sulfur Dioxide

SO₂ is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO₂ has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.^{258, 259} Sulfur dioxide monitoring was terminated at the San Francisco station in 2009 because the State standard for SO₂ is being met in the Bay Area, and pollutant trends suggest that the SFBAAB will continue to meet this standard for the foreseeable future.

In 2010, the EPA implemented a new one-hour SO₂ standard presented in Table IV.F-2. The EPA has initially designated the SFBAAB as an attainment area for SO₂. Similar to the new federal standard for NO₂, the EPA has established requirements for a new monitoring network to measure SO₂ concentrations.²⁶⁰ No additional SO₂ monitors are required for the Bay Area because the SFBAAB has never been designated as non-attainment for SO₂ and no State Implementation Plan (SIP) or maintenance plans have been prepared for SO₂.²⁶¹

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, EPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 µg/m³ to 0.15 µg/m³. EPA revised the monitoring requirements for lead in December 2010. These requirements focus on airports and large urban areas resulting in an increase in 76 monitors nationally.²⁶² Lead monitoring stations in the Bay Area are located at Palo Alto Airport, Reid-Hillview Airport (San Jose) and San Carlos Airport. Non-airport locations for lead monitoring are Redwood City and San Jose.

Air Quality Index

The 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:

²⁵⁸ BAAQMD, *CEQA Guidelines*, p. B-2.

²⁵⁹ BAAQMD, *CEQA Air Quality Guidelines*, May 2011. Available at <http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx>; p. C-16.

²⁶⁰ EPA, Fact Sheet: Revisions to the Primary National Ambient Air Quality Standard, Monitoring Network, and Data Reporting Requirements for Sulfur Dioxide. Available at <http://www.epa.gov/air/sulfurdioxide/pdfs/20100602fs.pdf>

²⁶¹ BAAQMD, *2012 Air Monitoring Network Plan*, July 2013. Available at www.baaqmd.gov/Divisions/Technical-Services/Ambient-Air-Monitoring/AAMN-Plan.aspx; p. 30

²⁶² EPA, Fact Sheet Revisions to Lead Ambient Air Quality Monitoring Requirements, http://www.epa.gov/air/lead/pdfs/Leadmonitoring_FS.pdf.

- 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, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM₁₀ 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, including the BAAQMD, use the anticipated concentration measurements for each of the major pollutants, convert them into AQI numbers, and determine the highest AQI for each zone in a district.

Readings below 100 on the AQI scale would not typically affect the health of the general 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 Bay Area in decades.²⁶³ Historical BAAQMD data indicates that the SFBAAB experienced air quality in the Red level (unhealthy) on three days between the years 2010 and 2014. As shown in **Table IV.F-3, Air Quality Index Statistics for the San Francisco Bay Area Air Basin**, the SFBAAB had a total of 14 Orange-level (unhealthy for sensitive groups) days in 2010, 12 days in 2011, 8 days in 2012, 15 days in 2013, and 11 days 2014.

TABLE IV.F-3 AIR QUALITY INDEX STATISTICS FOR THE SAN FRANCISCO BAY AREA AIR BASIN

AQI Statistics for SFBAAB	Number of Days by Year				
	2010	2011	2012	2013	2014
Unhealthy for Sensitive Groups (Orange)	14	12	8	15	11
Unhealthy (Red)	1	0	0	1	1

SOURCE: Bay Area Air Quality Management District, 2016.

²⁶³ Bay Area Air Quality Management District, 2014. Website: sparetheair.org/Stay-Informed/Todays-Air-Quality/Air-Quality-Index.aspx.

Toxic Air Contaminants and Local Health Risks and Hazards

In addition to criteria air pollutants, plans and individual projects may directly or indirectly emit toxic air contaminants (TACs). TACs collectively refer to a diverse group of air pollutants that are capable of causing chronic (i.e., of long-duration) and acute (i.e., severe but short-term) adverse effects to human health, including carcinogenic effects. Human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike criteria air pollutants, TACs do not have ambient air quality standards but instead are regulated by BAAQMD 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 health risks.²⁶⁴

Exposure assessment guidance published by BAAQMD in January 2010 adopts the assumption that residences would be exposed to air pollution 24 hours per day, 350 days per year, for 70 years.²⁶⁵ Therefore, assessments of air pollutant exposure to residents typically result in the greatest adverse health outcomes of all population groups.

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.²⁶⁶ In addition to PM_{2.5}, diesel particulate matter (DPM) is also of concern. ARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans.²⁶⁷ 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.

In an effort to identify areas of San Francisco most adversely affected by sources of TACs, San Francisco partnered with BAAQMD to inventory and assess air pollution and exposures from mobile, stationary, and area sources within San Francisco. Areas with poor air quality, termed the "Air Pollutant Exposure Zone," were identified based on the following health-protective criteria: (1) excess cancer risk greater than 100 per one million population from the contribution of emissions from all modeled sources, or (2) cumulative PM_{2.5} concentrations greater than 10 µg/m³. The Air Pollutant Exposure Zone (APEZ) is expanded in certain geographic health vulnerable²⁶⁸ areas of the city, primarily the Bayview, Tenderloin, and much of the South of

²⁶⁴ In general, a health risk assessment is required if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. The applicant of the project that would emit TACs is then subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, estimating the increased risk of cancer as a result of exposure to one or more TACs.

²⁶⁵ BAAQMD, *Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*, January 2010.

²⁶⁶ SFDPH, *Assessment and Mitigation of Air Pollutant Health Effects from Intra-Urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 2008.

²⁶⁷ California Air Resources Board, Fact Sheet, "The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines," October 1998.

²⁶⁸ Health vulnerable areas were identified as those Bay Area zip codes in the worst quintile of Bay Area Health Vulnerability Scores. San Francisco Departments of Public Health and Planning. *Memorandum Re: 2014 Air Pollutant Exposure Zone Map*, April 9, 2014.

Market (SoMa) area, including the northern part of the Plan Area, to be more protective, with the areas included in the APEZ based on a standard that is 10 percent more stringent than elsewhere in the city (i.e., areas where the excess cancer risk exceeds 90 in one million or the PM_{2.5} concentration exceeds 9 µg/m³). The APEZ also includes all parcels within 500 feet of a freeway. **Figure IV.F-1, Air Pollutant Exposure Zone in the Plan Area and Street Network Changes**, shows the location of the APEZ within and nearby the Plan Area. The APEZ is based on modeling that was prepared using a 20-meter by 20-meter receptor grid covering the entire city. The majority of the Plan Area is located within the APEZ, primarily because of high traffic volumes on Plan Area streets. There are also a number of individual sources of TACs in the Plan Area, including diesel generators, gasoline stations, auto body repair shops, and other light industrial activities.

Excess Cancer Risk

The greater than 100 per one million persons exposed (100 excess cancer risk) criterion for defining the Air Pollution Exposure Zone is based on EPA guidance for conducting air toxic analyses and making risk management decisions at the facility and community-scale level.²⁶⁹ As described by the BAAQMD, the EPA considers a cancer risk of 100 per million to be within the “acceptable” range of cancer risk. Furthermore, in the 1989 preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking,²⁷⁰ EPA states that it “... strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately one in one million and (2) limiting to no higher than approximately one in ten thousand [100 in one million] the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years.” The 100 per one million excess cancer risk is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on BAAQMD regional modeling.²⁷¹

In addition to monitoring criteria pollutants, both the BAAQMD and ARB operate TAC monitoring networks in the SFBAAB. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air and therefore tend to produce the most substantial risk. The nearest BAAQMD ambient TAC monitoring station to the Plan Area is the station at Sixteenth and Arkansas Streets in San Francisco. **Table IV.F-4, Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants Measured at BAAQMD Monitoring Station in 2015, 10 Arkansas Street, San Francisco**, shows ambient concentrations of carcinogenic TACs measured at the Arkansas Street station as well as the estimated cancer risks from a lifetime exposure (70 years) to these substances. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in San Francisco are similar to those for the region.

²⁶⁹ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 67.

²⁷⁰ 54 Federal Register 38044, September 14, 1989.

²⁷¹ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 67.

TABLE IV.F-4 ANNUAL AVERAGE AMBIENT CONCENTRATIONS OF CARCINOGENIC TOXIC AIR CONTAMINANTS MEASURED AT BAAQMD MONITORING STATION IN 2015, 10 ARKANSAS STREET, SAN FRANCISCO

Substance	Concentration	Cancer Risk per Million ^a
Gaseous TACs		
(ppb)		
Acetaldehyde	0.56	3 ^b
Benzene	0.1941	18
1,3-Butadiene	0.037	14
Carbon Tetrachloride	0.092	25
Formaldehyde	1.28	9 ^b
Perchloroethylene	0.011	0.6
Methylene Chloride	0.108	0.4
Chloroform	0.025	0.8
Trichloroethylene	0.01	0.1
Particulate TACs		
(ng/m ³)		
Chromium (Hexavalent)	0.045	7 ^b
Total Risk for All TACs		70.9

SOURCE: California Air Resources Board, *Ambient Air Toxics Summary-2014*. Available at <http://www.arb.ca.gov/adam/toxics/sitesubstance.html>.

NOTES:

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

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

b. 2014 data.

Roadway-Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases and also contribute to particulates by generating road dust and through tire wear. Epidemiologic studies have demonstrated that people living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. Air pollution monitoring conducted in conjunction with epidemiologic studies has confirmed that roadway-related health effects vary with modeled exposure to particulate matter and nitrogen dioxide. In traffic-related studies, the additional non-cancer health risk attributable to roadway proximity was seen within 1,000 feet of the roadway and was strongest within 300 feet.²⁷²

²⁷² California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005 (hereinafter "ARB Air Quality and Land Use Handbook"). Available at <http://www.arb.ca.gov/ch/handbook.pdf>.

Diesel Particulate Matter

The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources, such as trucks and buses, are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. The ARB estimated average Bay Area cancer risk from exposure to diesel particulate, based on a population-weighted average ambient diesel particulate concentration, at about 480 in one million as of the year 2000, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The statewide risk from DPM, as determined by ARB, declined from 750 in one million in 1990 to 570 in one million in 1995; by 2000, ARB estimated the average statewide cancer risk from DPM at 540 in one million.^{273, 274}

In 2000, ARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent ARB regulations apply to new trucks and diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same particulate exhaust emissions as one truck built in 1988.²⁷⁵ The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000. Despite notable emission reductions, ARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. ARB 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, ARB’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.²⁷⁶ Also see *San Francisco Health Code* Article 38 discussed in the Regulatory Framework below.

Fine Particulate Matter

In April 2011, EPA published *Policy Assessment for the Particulate Matter Review of the National Ambient Air Quality Standards*. In this document, EPA staff concludes that the current federal annual PM_{2.5} standard of 15 µg/m³ should be revised to a level within the range of 13 to 11 µg/m³, with evidence strongly supporting a standard within the range of 12 to 11 µg/m³. The APEZ for San Francisco is based on the health protective PM_{2.5} standard of 11 µg/m³, as supported by the EPA’s Particulate Matter Policy Assessment, although lowered to 10 µg/m³ to account for uncertainty in accurately predicting air pollutant concentrations using emissions modeling programs.

²⁷³ ARB, *California Almanac of Emissions and Air Quality – 2009 Edition*, Table 5-44 and Figure 5-12, <http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm>.

²⁷⁴ This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the American Cancer Society. (American Cancer Society, “Lifetime Probability of Developing or Dying from Cancer,” last revised July 13, 2009, available at http://www.cancer.org/docroot/CRI/content/CRI_2_6x_Lifetime_Probability_of_Developing_or_Dying_From_Cancer.asp.)

²⁷⁵ Pollution Engineering, *New Clean Diesel Fuel Rules Start*, July, 2006 Available at <http://www.pollutionengineering.com/articles/85480-new-clean-diesel-fuel-rules-start>.

²⁷⁶ California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005 (hereinafter “ARB Air Quality and Land Use Handbook”). Available at <http://www.arb.ca.gov/ch/handbook.pdf>.

Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, population subgroups with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases such as asthma and chronic obstructive pulmonary disease. The factors responsible for variation 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 air pollution.

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 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 areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions.

Land uses within the Plan Area are described in Section IV.A, Land Use and Land Use Planning. Residential uses exist throughout the Plan Area. There are no licensed child care centers located in the Plan Area, but several such facilities are located in close proximity, including facilities at 95 Hawthorne Street between Harrison and Folsom Streets, 303 Second Street at Folsom Street, 790 Folsom Street at Fourth Street, 375 Seventh Street (in the Bessie Carmichael Elementary School), and in the Federal Building at Seventh and Mission Streets.

Existing Stationary Sources of Air Pollution

BAAQMD's inventory of permitted stationary sources of emissions indicates that there are dozens of permitted stationary emission sources present within or near the Plan Area. These permitted stationary sources are primarily standby generators, gasoline stations, and other facilities such as auto body shops. These sources are included in the citywide modeling used to identify the APEZ.

Major Roadways Contributing to Air Pollution

BAAQMD guidance indicates that roadways with volumes exceeding 10,000 average annual daily traffic (AADT) may impact sensitive receptors if within 1,000 feet of any receptor. This traffic contributes to elevated concentrations of PM_{2.5}, DPM, and other contaminants emitted from motor vehicles near the street level. A review of average daily roadway volumes from the San Francisco County Transportation Authority traffic model indicates that roadways with more than 10,000 AADT in the Plan Area and vicinity include I-80, Market Street, Mission Street, Howard Street, Folsom Street, Harrison Street, Bryant Street, Brannon Street, Third Street, Fourth Street, Fifth Street, and Sixth Street. This concentration of high-volume roadways within

and proximate to the Plan Area is the primary reason that the majority of the Plan Area is identified as being within the APEZ.

Other Sources Contributing to Air Pollution

The southeastern portion of the Plan Area abuts the San Francisco Caltrain railyard, across Townsend Street. Substantial DPM emissions are generated at this location from diesel locomotive operations, which include a substantial amount of engine idling as trains await departure. Increased cancer risks from railroad operations at a location 100 feet northwest of the track in this area are as high as 48 in one million. This source is included in the citywide modeling used to identify APEZ.

Odors

Sources that typically generate odors include wastewater treatment and pumping facilities; landfills, transfer stations, and composting facilities; petroleum refineries, asphalt batch plants, chemical (including fiberglass) manufacturing, and metal smelters; painting and coating operations; rendering plants; coffee roasters and food processing facilities; and animal feed lots and dairies. With the exception of auto body shops with spray booths (and coffee roasters just outside the Plan Area), none of these uses exists in or near the Plan Area.

IV.F.3 Regulatory Framework

Federal Regulations

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 standards by the deadlines specified in the act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

The current attainment status for the SFBAAB, with respect to federal standards, is summarized in Table IV.F-2. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards, except for PM₁₀, PM_{2.5}, and NO₂, for which standards are exceeded periodically (see Table IV.F-1).

In June 2004, the SFBAAB was designated as a marginal nonattainment area for the national eight-hour ozone standard.²⁷⁷ EPA lowered the national eight-hour ozone standard from 0.80 to 0.75 parts per million (ppm)

²⁷⁷ <http://www.epa.gov/ozonedesignations/1997standards/timeline.htm>.

effective May 27, 2008. In April 2012, EPA designated the Bay Area as a marginal nonattainment²⁷⁸ region for the 0.75 ppm ozone standard established in 2008.²⁷⁹ The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM₁₀ and PM_{2.5}, for which the Bay Area is designated as “Unclassified” and non-attainment, respectively. “Unclassified” is defined by the Clean Air Act as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. The SFBAAB is designated as an attainment area with respect to the federal annual average PM_{2.5} standard.

State Regulations

Although the Federal Clean Air Act established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there are many differences between the State and national ambient air quality standards, as shown in Table IV.F-2. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

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

Toxic Air Contaminants

In 2005, ARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The regulations generally limit idling of commercial motor vehicles (including buses and trucks) within 100 feet of a school or residential area for more than five consecutive minutes or periods aggregating more than five minutes in any one hour. Buses or vehicles also must turn off their engines upon stopping at a school and must not turn on their engines more than 30 seconds before beginning to depart from a school. Also, State law Senate Bill 352 was adopted in 2003 and limits locating public schools within 500 feet of a freeway or busy traffic corridor (*Education Code* Section 17213; *Public Resources Code* Section 21151.8).

ARB has also adopted rules for new diesel trucks and for off-road diesel equipment. Along with rules adopted by the EPA, these regulations have resulted in substantially more stringent emissions standards for new diesel trucks and new off-road diesel equipment, such as construction vehicles. Effective January 2011, both EPA and ARB adopted so-called Interim Tier 4 standards for new equipment with diesel engines of 175 hp or greater. The interim Tier 4 emissions standards for particulate matter are about 85 percent more restrictive than

²⁷⁸ “Marginal nonattainment area” refers to those areas where the fourth highest reading over any 24-hour period in the past 3 years exceeds the 8-hour national ambient air quality standard for ozone at concentrations of between 0.076 and 0.086 ppm.

²⁷⁹ EPA, 2008 Ground-level Ozone Standards — Region 9 Final Designations, April 2012 www.epa.gov/ozonedesignations/2008standards/final/region9f.htm.

previous emissions standards (Tier 2 or Tier 3, depending on the size of the engine²⁸⁰) for these larger off-road engines. As a result, use of engines that meet the interim Tier 4 standards would reduce diesel exhaust emissions by approximately 85 percent, compared to new engines produced under the previous standards. Tier 2 or Tier 3 engines (for larger equipment, those manufactured since 2006) can achieve generally the same reduction through retrofitting by installation of a diesel particulate filter (an ARB-certified Level 3 Verified Diesel Emissions Control System). Beginning in 2014, ARB regulations require off-road equipment fleets to begin gradual replacement of older engines with newer, cleaner engines, the installation of exhaust filters on remaining older engines, or some combination of the two to achieve fleet-wide emissions reductions. Because only a certain percentage of each fleet's engines must be replaced or retrofitted on an annual or periodic basis to achieve the required emissions reductions, and because fleet turnover of heavy-duty off-road equipment takes many years, the full effect of the regulations on emissions reduction is not anticipated to be realized for some 20 years.

Regarding equipment already in use, ARB adopted rules for in-use off-road diesel vehicles—including construction equipment—in 2007. Those rules also limit idling to five minutes, require a written idling policy for larger vehicle fleets, and require that fleet operators provide information on their engines to ARB and label vehicles with an ARB-issued vehicle identification number. The off-road rules require the retrofit or replacement of diesel engines in existing equipment. This “repowering” was originally to be required beginning in 2010 (for the largest fleets). However, in 2010, ARB delayed the start of repowering to 2014 for large fleets, 2017 for medium-sized fleets, and 2019 for small fleets.²⁸¹ ARB stated that the delayed implementation was justified because the recession had dramatically reduced emissions, and because the board staff found that the data on which the original rule was based had overestimated emissions. According to ARB, under the revised rules, DPM emissions from off-road equipment will decrease by more than 40 percent from 2010 levels by the year 2020, and by 2030, they will decrease by more than 75 percent.²⁸²

Regional and Local Regulations

Bay Area Air Quality Planning

Air quality plans developed to meet Federal requirements are referred to as State Implementation Plans. The Federal and State Clean Air Acts require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the State PM₁₀ standard). The *2010 Bay Area Clean Air Plan* was adopted on September 15, 2010, by the BAAQMD, in cooperation with the Metropolitan Transportation Commission (MTC), the Bay Conservation and Development Commission (BCDC), and the Association of Bay Area Governments (ABAG). The *2010 Clean Air Plan* outlines a multi-pollutant approach for addressing ozone, particulate matter, air toxics, and greenhouse gas emission reductions in a single, integrated

²⁸⁰ For most construction equipment other than that with extremely powerful engines (greater than 750 horsepower), Tier 2 and Tier 3 emissions standards are the same with respect to particulate matter. Therefore, cancer risk from diesel particulate matter—a subset of all particulate matter—is essentially the same for Tier 2 and Tier 3 engines.

²⁸¹ Fleet size is based on total horsepower (hp): large fleets are those with more than 5,000 hp, medium fleets have 2,501 to 5,000 hp, and small fleets are those with less than 2,500 hp.

²⁸² California Air Resources Board, “Staff Report: Initial Statement of Reasons for Proposed Rulemaking: Proposed Amendments to the Regulation for In-Use Off-Road Diesel-Fueled Fleets and the Off-Road Large Spark-Ignition Fleet Requirements,” October 2010, p. 44. Available at <http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadisor.pdf>.

strategy. The primary objectives of the plan are to improve local and regional air quality, protect public health, and minimize climate change impacts. The *2010 Clean Air Plan* replaces the Bay Area *2005 Ozone Strategy*, adopted in 2006.

The *2010 Clean Air Plan* updates the *2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone; provide a control strategy to reduce ozone, particulate matter, toxic air contaminants, and greenhouse gases in a single, integrated plan; review progress in improving air quality in recent years; and establish emission control measures to be adopted or implemented in the near future. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2010 Clean Air Plan* also represents the Bay Area’s most recent triennial assessment of the region’s strategy to attain the State one-hour ozone standard.²⁸³ The *2010 Clean Air Plan* is currently in the process of being updated with a Final Draft expected to be circulated in November 2016.

The BAAQMD is the regional agency with jurisdiction over the nine-county region located in the SFBAAB. ABAG, MTC, county transportation agencies, cities and counties, and various non-governmental organizations also participate in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs. BAAQMD is responsible for attaining and/or maintaining air quality in the region within federal and State air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the region and to develop and implement strategies to attain the applicable federal and State standards. BAAQMD 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. BAAQMD also regulates new or expanding stationary sources of toxic air contaminants and requires air toxic control measures (ATCM) for many sources emitting TACs.

San Francisco Construction Dust Control Ordinance

San Francisco Health Code Article 22B and *San Francisco Building Code* Section 106.A.3.2.6 collectively constitute the Construction Dust Control Ordinance (adopted in July 2008). The ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from the Department of Building Inspection (DBI). For projects over one-half acre and within 1,000 feet of sensitive receptor(s) (e.g., residences and group living quarters, schools, child care centers, and hospitals and other health-care facilities), and other projects as deemed necessary by the Director of Public Health, the Dust Control Ordinance requires that the project sponsor submit a Dust Control Plan, with a goal of minimizing visible dust, for approval by the San Francisco Department of Public Health (DPH) prior to issuance of a building permit by DBI. Such larger

²⁸³ BAAQMD, *2010 Clean Air Plan*. Available at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx>.

projects must also identify a compliance monitor and that person must be available at all times during construction activities.

Building permits will not be issued without written notification from the Director of Public Health that the applicant has a site-specific Dust Control Plan, unless the Director waives the requirement. The Construction Dust Control Ordinance requires project sponsors and contractors responsible for construction activities to control construction dust on the site or implement other practices that result in equivalent dust control that are acceptable to the Director of Public Health.

Dust suppression activities may include watering of all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water must be used if required by Article 21, Sections 1100 et seq. of the *San Francisco Public Works Code*.

Pursuant to *Health Code* Article 22B, Section 1247, all departments, boards, commissions, and agencies of the City and County of San Francisco (the City) that authorize construction or improvements on land under their jurisdiction under circumstances where no building, excavation, grading, foundation or other permits are required to be obtained under the *Building Code* shall adopt rules and regulations to ensure that the same dust control requirements that are set forth in this article are followed.

San Francisco Regulations Regarding Exposure of Sensitive Uses to Air Pollution

Health Code Article 38

San Francisco adopted Article 38 of the *San Francisco Health Code* in 2008, and amended it in 2014, to protect new sensitive uses from existing sources of air pollution by requiring enhanced ventilation and filtration systems in certain areas of the city. The recent amendments make the *Health Code* and *Building Code* consistent with the results of the air quality modeling undertaken to identify the City's APEZ. As revised in 2014, Article 38 applies to all development that includes "sensitive uses," as defined in the *Health Code*, including all residential units; adult, child and infant care centers; schools; and nursing homes. The revised Article 38 considers all existing sources of TACs and PM_{2.5}, and requires "enhanced ventilation," including filtration of outdoor air, for all such projects located in the APEZ. The filtration requirement of Article 38 specifies Minimum Efficiency Reporting Value (MERV) 13 or equivalent, based on American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 52.2, and requires DPH to confer with other City departments and report to the Board of Supervisors concerning technologies it has identified or evaluated that may comply with the requirements of the *Health Code*. Article 38 also requires periodic updating of the Air Pollutant Exposure Zone Map (about every five years) to account for changes in sources of TACs and PM_{2.5} emissions or updated health risk quantification methodologies.

Clean Construction Ordinance

The City's Clean Construction Ordinance (*San Francisco Environment Code* Chapter 25 and *San Francisco Administrative Code* Section 6.25, as amended March 2015), applicable to City-funded projects that require the use of heavy off-road equipment for 20 days or more that are within 1,000 feet of any residence, school, child care center, health facility, or similar sensitive receptor, requires implementation of measures to reduce diesel emissions generated at publicly funded construction sites and thereby related potential health risks.

Specifically, for projects within the APEZ (see p. IV.F-9), the ordinance requires the use of diesel engines that meet or exceed either EPA or ARB Tier 2 off-road emission standards, and that are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy (VDECS). Additionally, the ordinance prohibits the use of portable diesel engines where alternative sources of power are available (i.e., requires use of available utility-provided electricity in lieu of a diesel generator), limits idling of diesel engines, requires that equipment be properly maintained and tuned, and mandates submittal to the authorizing City department of a Construction Emissions Minimization Plan prior to the start of work. Waivers to the equipment requirements may be granted only if compliance is not feasible or in case of emergency. For projects outside the APEZ, the ordinance requires the use of biodiesel fuel grade B20²⁸⁴ or higher for off-road diesel equipment and use of Tier 2 or similar off-road equipment.

Regulation of Odors

BAAQMD Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. The regulation limits the “discharge of any odorous substance which causes the ambient air at or beyond the property line...to be odorous and to remain odorous after dilution with four parts of odor-free air.” The BAAQMD must receive odor complaints from 10 or more complainants within a 90-day period in order for the limitations of this regulation to go into effect. If this criterion has been met, an odor violation can be issued by the BAAQMD if a test panel of people can detect an odor in samples collected periodically from the source.

IV.F.4 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR, implementation of the proposed project would have a significant impact related to air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Result in a cumulative air quality impact in combination with past, present and reasonably foreseeable future projects in the vicinity; or
- Create objectionable odors affecting a substantial number of people.

²⁸⁴ B20 is a mixture of 20 percent biodiesel and 80 percent petroleum.

Approach to Analysis

The Plan is a regulatory program and would result in new planning policies and controls for land use to accommodate additional jobs and housing. With exception to the street network changes and open space improvements, the Plan itself would not result in direct physical changes to the existing environment. Indirect effects from the Plan could result as subsequent development projects allowed under the Plan could replace existing residences and businesses, or increase space for residences or businesses in the Plan Area.

In *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369 (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, except where the project would significantly exacerbate an existing environmental condition. Accordingly, the significance criteria above related to exposure of sensitive receptors to substantial pollutant concentrations is relevant only to the extent that the project significantly exacerbates air quality conditions. The impact is considered significant if the Plan, or implementation of individual development projects pursuant to the Plan including proposed street network changes and open space improvements, would significantly exacerbate existing or future air quality conditions.

The thresholds of significance discussed below are based on substantial evidence identified in Appendix D of the 2011 BAAQMD CEQA Guidelines²⁸⁵ and its 2009 Justification Report²⁸⁶ and are therefore used as the basis for determining criteria air pollutant and odor air quality impacts under CEQA. As discussed below, the BAAQMD CEQA Guidelines identify different significance thresholds for plans versus projects. The analysis below contains both a plan-level and project-level analysis to address implementation of the Plan and subsequent activities anticipated under the Plan.

Central SoMa Plan (Program-Level Analysis)

As noted above, the Plan is a regulatory program that would not itself result in direct physical impacts to air quality; however, indirect effects could result from specific development projects allowed under the Plan, including the street network changes and open space improvements. The Plan includes specific projects that, if the plan is approved, could result in direct physical changes and those are addressed at the project level. The policy framework and rezoning is addressed at a program level. The following describes how plan-level air quality impacts are evaluated in this EIR and are based on the BAAQMD CEQA Guidelines for plan-level analysis.

Criteria Air Pollutants

The significance thresholds for assessment of a planning document, such as the proposed Plan, involve an evaluation of whether:

- The plan would be consistent with the control measures contained in the current regional air quality plan (the *2010 Clean Air Plan*), would support the primary objectives of that plan and would not hinder implementation of that plan; the plan's growth in vehicle miles traveled (VMT) do not exceed the plan's population growth; and the plan would not cause localized CO impacts.

²⁸⁵ Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, updated May 2011. Table 3-1.

²⁸⁶ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, pp. 22-76.

If the foregoing questions can be answered in the affirmative, the proposed Plan would not:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation; nor
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).

Consistency with Clean Air Plan

The most recently adopted air quality plan for the SFBAAB is the *2010 Clean Air Plan* (CAP). The 2010 CAP is a road map that demonstrates how the San Francisco Bay Area will achieve compliance with the State ozone standards as expeditiously as practicable and how the region will reduce the transport of ozone and ozone precursors to neighboring air basins. In determining consistency with the *2010 Clean Air Plan*, this analysis considers whether the project would (1) support the primary goals of the CAP, (2) include applicable control measures from the CAP, and (3) avoid disrupting or hindering implementation of control measures identified in the CAP. To meet the primary goals, the CAP recommends specific control measures and actions. These control measures are grouped into various categories and include stationary and area source measures, mobile source measures, transportation control measures, land use measures, and energy and climate measures. The CAP recognizes that to a great extent, community design dictates individual travel mode, and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and greenhouse gases from motor vehicles is to channel future Bay Area growth into urban communities where goods and services are close at hand, and people have a range of viable transportation options. To this end, the *2010 Clean Air Plan* includes 55 control measures aimed at reducing air pollution in the SFBAAB.

Vehicle Miles Traveled and Population Growth Analysis

The threshold of significance for evaluation 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 less than significant criteria air pollutant impacts, an analysis must demonstrate that the plan's growth in VMT would not exceed the plan's population growth.

Local Carbon Monoxide Analysis

The BAAQMD has demonstrated, based on modeling, that in order to exceed the California ambient air quality standard of 9.0 ppm (eight-hour average) or 20.0 ppm (one-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles per hour at affected intersections (or 24,000 vehicles per hour where vertical and/or horizontal mixing is limited). Projects that do not result in 44,000 vehicles per hour in combination with background traffic (or 24,000 vehicles per hour where applicable), would not have the potential to result in a significant CO impact. The Plan-level analysis assesses the potential for the proposed project to result in intersections exceeding these screening criteria.

Separate from the above analysis, this EIR also analyzes the potential that street network changes, open space improvements, and one or more subsequent individual development projects could be of sufficient magnitude to result in a project-specific air quality impact resulting from the project's criteria pollutant emissions using

the project-level significance thresholds shown in **Table IV.F-5, Criteria Air Pollutant Significance Thresholds**, p. IV.F-24.

Community Risk and Hazard Impacts

This analysis responds to the criterion that asks whether the proposed Plan would:

- Expose sensitive receptors to substantial pollutant concentrations.

The threshold of significance used to evaluate community health risks and hazards from new sources of TACs is based on the potential for the proposed Plan to substantially affect the geography and severity of the APEZ at sensitive receptor locations. Only very large projects would have the potential to substantially affect the geography and severity of an APEZ, so these potential impacts are best addressed at the Plan level. If the Plan would result in sensitive receptor locations meeting the APEZ criteria that otherwise would not without the plan and the Plan would result in a PM_{2.5} concentration above 0.3 µg/m³ or an excess cancer risk greater than 10.0 per million, a significant plan impact would occur. The 0.3 µg/m³ PM_{2.5} concentration and the excess cancer risk of 10.0 per million persons exposed are the levels below which the BAAQMD considers new sources not to make a considerable contribution to cumulative health risks.²⁸⁷ For those locations already meeting the APEZ criteria, a lower significance standard is required to ensure that the plan's contribution to existing health risks would not be significant. In these areas, if the Plan's PM_{2.5} concentration exceeds 0.2 µg/m³ or results in an excess cancer risk greater than 7.0 per million, a significant impact would occur.²⁸⁸

Odors

The Plan would result in a significant impact with respect to odors if it would:

- Create objectionable odors affecting a substantial number of people.

For odors, a proposed land use plan must identify the location of existing and planned odor sources. The proposed land use plan must also include policies to reduce potential odor impacts if such sources are anticipated from the plan. Typical odor sources of concern include wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, auto body shops, rendering plants, and coffee roasting facilities. BAAQMD identifies a screening distance for new sources of potential odors, such as wastewater treatment plants, landfills and transfer stations, refineries, asphalt and chemical plants, food processing facilities, and the like, of one or two miles, depending on use. In general, such setback distances would avoid the potential for significant odor impacts.

²⁸⁷ Bay Area Air Quality Management District, *California Environmental Quality Act Guidelines Update, Proposed Air Quality CEQA Thresholds of Significance*, May 3, 2010. Available at www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Proposed_Thresholds_Report_%20May_3_2010_Final.ashx?la=en.

²⁸⁸ A 0.2 µg/m³ increase in PM_{2.5} would result in a 0.28 percent increase in non-injury mortality or an increase of about twenty-one excess deaths per 1,000,000 population per year from non-injury causes in San Francisco. This information is based on Jerrett M et al., *Spatial Analysis of Air Pollution and Mortality in Los Angeles*, *Epidemiology* 16 (2005): 727–736. The excess cancer risk has been proportionally reduced to result in a significance criteria of 7 per million persons exposed.

Subsequent Development Projects, Proposed Street Network Changes and Open Space Improvements (Project-level Analysis)

Criteria Air Pollutants and Precursors

For project-level analysis, such as that associated with the proposed street network changes and open space improvements, as well as for subsequent individual development projects in the Plan Area, the City relies on quantitative thresholds of significance for criteria air pollutant analyses. **Table IV.F-5, Criteria Air Pollutant Significance Thresholds**, summarizes these thresholds of significance. A discussion of each threshold is provided below.

TABLE IV.F-5 CRITERIA AIR POLLUTANT SIGNIFICANCE THRESHOLDS

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (pounds/day)	Average Daily Emissions (pounds/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82	82	15
PM _{2.5}	54	54	10
Fugitive Dust	Construction Dust Ordinance	Not Applicable	

Ozone Precursors

As discussed previously, the SFBAAB is currently designated as nonattainment for ozone, PM₁₀, and PM_{2.5}. The potential for an individual project to result in a cumulatively considerable net increase in criteria air pollutants, which may contribute to an existing or projected air quality violation, is based on the State and federal Clean Air Acts' emissions limits for stationary sources. The federal New Source Review program was created under the federal Clean Air Act to ensure that stationary sources of air pollution are constructed in a manner that is consistent with attainment of federal health based ambient air quality standards. Similarly, to ensure that new stationary sources do not cause or contribute to a violation of an air quality standard, BAAQMD Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above a specified emissions limit must offset those emissions. For ozone precursors, ROG and NO_x, the offset emissions level is an annual average of 10 tons per year (or 54 lbs. per day).²⁸⁹ These levels represent emissions below which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.

Although this regulation applies to new or modified stationary sources, land use development projects result in ROG and NO_x emissions as a result of increases in vehicle trips, architectural coating, and construction activities. Therefore, the above thresholds can be applied to the construction and operational phases of

²⁸⁹ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 17.

development projects, as well as the proposed street network changes and open space improvements. Projects that result in emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a cumulatively considerable net increase in ROG and NO_x emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction phase emissions.

Particulate Matter

The BAAQMD has not established an offset limit for PM_{2.5} and the current federal Prevention of Significant Deterioration (PSD) offset limit of 100 tons per year for PM₁₀ is too high and would not be an appropriate significance threshold for the Bay Area considering the nonattainment status of PM₁₀. However, the federal New Source Review emissions limits for stationary sources in nonattainment areas provide for appropriate thresholds. For PM₁₀ and PM_{2.5}, the emissions limit under New Source Review is 15 tons per year (82 pounds per day) and 10 tons per year (54 pounds per day), respectively. These emissions limits represent levels at which a source is not expected to have an impact on air quality.²⁹⁰ Similar to ozone precursor thresholds identified above, land use development projects typically result in particulate matter emissions as a result of increases in vehicle trips, space heating and natural gas combustion, landscape maintenance, and construction activities; construction of the proposed street network changes and open space improvements would likewise result in such emissions. Therefore, the above thresholds can be applied to the construction and operational phases of a development project and to the construction of the street network changes and open space improvements. Those projects that result in emissions below the New Source Review emissions limits would not be considered to contribute to an existing or projected air quality violation or result in a cumulatively considerable net increase in PM₁₀ and PM_{2.5} emissions. Because construction activities are temporary in nature, only the average daily thresholds are applicable to construction-phase emissions.

Other Criteria Pollutants

Regional concentrations of CO in the Bay Area have not exceeded the State standards in the past 11 years and SO₂ concentrations have never exceeded the standards. The primary source of CO emissions from development projects is vehicle traffic. Construction-related SO₂ emissions represent a negligible portion of the total basin-wide emissions and construction-related CO emissions represent less than five percent of the Bay Area total basin-wide CO emissions.²⁹¹ As discussed previously, the SFBAAB is in attainment for both CO and SO₂. The potential for subsequent development projects to result in significant CO impacts is addressed at the Plan level, as discussed above, and additional analysis is not required. The proposed street network changes and open space improvements would not result in substantial emissions of CO or SO₂, and quantitative analysis is also not required.

Fugitive Dust

Fugitive dust²⁹² emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites significantly controls fugitive dust.²⁹³

²⁹⁰ Ibid., p. 16.

²⁹¹ Ibid., p. 27.

²⁹² "Fugitive dust" is dust that is generated during construction and that escapes from a construction site.

Individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to 90 percent.²⁹⁴ The BAAQMD has identified a number of BMPs to control fugitive dust emissions from construction activities.²⁹⁵ San Francisco's Construction Dust Control Ordinance requires a number of fugitive dust control measures to ensure that construction projects do not result in visible dust. Compliance with the Construction Dust Control Ordinance is the basis for determining the significance of fugitive dust emissions.

Compliance with the Construction Dust Control Ordinance ensures that projects that result in fugitive dust emissions during construction would neither:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation; nor
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors); nor
- Expose sensitive receptors to substantial pollutant concentrations.

Health Risks and Hazards

Construction activities typically require the use of heavy-duty diesel vehicles and equipment, which emit DPM, designated a TAC. Development projects that require heavy-duty diesel vehicles and equipment, as well as projects that include stationary sources, such as a diesel backup generator, would result in emissions of DPM and possibly other TACs that may affect nearby sensitive receptors. Construction-phase TACs, however, would be temporary, and current health risk modeling methodologies are associated with longer-term exposure periods of 9, 30, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities, resulting in difficulties with producing accurate modeling results.²⁹⁶

However, within the APEZ additional emissions would adversely affect populations that are already at a higher risk for adverse long-term health risks. Therefore, projects within the APEZ require special consideration to determine whether a project's activities would add emissions to areas already adversely affected by poor air quality.

Consistency with Applicable Air Quality Plan

As discussed previously, the BAAQMD has published the *2010 Clean Air Plan*, representing the most current applicable air quality plan for the SFBAAB. Consistency with this plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan. In determining whether a proposed project would conflict with the *Clean Air Plan*, three criteria are evaluated:

²⁹³ Western Regional Air Partnership, *WRAP Fugitive Dust Handbook*, September 7, 2006. Available at http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf.

²⁹⁴ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009; p. 27.

²⁹⁵ BAAQMD, *CEQA Air Quality Guidelines*, May 2012. Available at http://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en; pp. 8-3 – 8-4.

²⁹⁶ BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, p. 29.

(1) whether the project implements the applicable control measures in the *Clean Air Plan*; (2) whether the project would disrupt or hinder implementation of any of these control measures; and (3) whether the project would support the primary goals of the *Clean Air Plan*.

Odors

As noted above, BAAQMD identifies a screening distance for new sources of potential odors, such as wastewater treatment plants, landfills and transfer stations, refineries, asphalt and chemical plants, food processing facilities, and the like, of one or two miles, depending on use.

Cumulative Air Quality Impacts

Regional air quality impacts are by their very nature cumulative impacts. Emissions from past, present and future projects contribute to adverse regional air quality impacts on a cumulative basis, and no single project is sufficiently large to result in nonattainment of ambient air quality standards. As described above, the project-level thresholds for criteria air pollutants are based on levels at which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulatively significant regional air quality impacts.

With respect to localized health risks and hazards, as described above on Page IV.F-26, the significance thresholds represent a cumulative impact analysis as this analysis considers all known sources that may result in adverse health impacts. The cumulative health risk analysis in this EIR also evaluates the incremental effect of the Plan's increase in vehicle traffic, in addition to growth in background traffic under 2040 cumulative conditions, consistent with the transportation analysis.

Consistency with the 2010 Clean Air Plan (Program- and Project-Level Analysis)

Impact AQ-1: Development under the Plan, including the proposed open space improvements and proposed street network changes, would not conflict with or obstruct implementation of the 2010 Clean Air Plan. (Less than Significant)

As noted above, consistency with the *2010 Clean Air Plan* is evaluated using a three-step process that assesses the following: whether the Plan would implement the applicable control measures in the *Clean Air Plan*; whether the Plan would disrupt or hinder implementation of any of these control measures; and whether the Plan would support the primary goals of the *Clean Air Plan*.

The *Clean Air Plan* contains 55 control measures aimed at reducing air pollution in the Bay Area. Some (18) of these measures address stationary sources (such as printing facilities and cement kilns, but also include residential and commercial heating systems), and will be implemented by the BAAQMD using its permit authority and are therefore not suited to implementation through local planning efforts.²⁹⁷ The remaining 37

²⁹⁷ For example, Stationary Source Measures 11 and 12 will ultimately require that new furnaces in the Air Basin emit lower levels of NO_x.

measures are grouped into Transportation, Mobile Source, Land Use and Local Impact, and Energy and Climate measures. These measures are discussed in detail below.²⁹⁸

The control measures most applicable to the Plan are the 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. As discussed below, the Plan would address many of these transportation measures. The Plan, through implementation of existing City policies and new programs in the Plan, would also further the *Clean Air Plan's* Energy and Climate Measures. The Land Use and Local Impact and Mobile Source measures primarily address the BAAQMD's own programs and regional air quality planning, and are less applicable to local agencies' decisions and projects. However, one of these measures, Land Use Measure (LUM) 1, Goods Movement, is intended to "reduce human exposure to diesel emissions from goods movement in the near term" and "develop and support long-range strategies and partnerships to reduce emissions from the movement of freight in the Bay Area," and is discussed below.²⁹⁹

Transportation Control Measures in the *2010 Clean Air Plan* are identified in **Table IV.F-6, Consistency of the Plan with Transportation Control Measures of the 2010 Clean Air Plan**, p. IV.F-29. Inasmuch as the transportation measures are generally those most applicable to an individual plan or development project, the table identifies each measure or group of measures and correlates the measures to specific elements of the Plan or explains why the strategy does not apply to the Plan. As indicated in the table, the Plan directly addresses many of the Transportation Control Measures, particularly those that emphasize higher-density development, a mix of uses, and increased transit ridership and pedestrian and bicycle use. Based on the analysis in Table IV.F-5, implementation of the Plan would promote implementation of, and in some cases go beyond, these measures. Therefore, the Plan would be consistent with the applicable Transportation Control Measures in the *2010 Clean Air Plan*.

Energy and Climate Measures, newly added in the *2010 Clean Air Plan*, are "designed to reduce ambient concentrations of criteria pollutants, reduce emissions of carbon dioxide (CO₂) and protect our climate" by promoting energy conservation and efficiency in buildings and renewable energy; reducing "urban heat island" effects by increasing reflectivity of roofs and parking lots; and promoting shade tree planting.³⁰⁰ Many of the City plans and programs that achieve consistency with and promote these measures are identified in the City's *Greenhouse Gas Reduction Strategy*. In general, consistency with these measures is directly promoted by the City's energy-efficiency requirements and programs, including the San Francisco Green Building Requirements for Energy Efficiency, Stormwater Management, Water Reduction, Renewable Energy, Solid Waste, and Construction and Demolition Debris Recycling, all of which are contained in the 2013 *San Francisco Green Building Code*, as well as the street tree planting requirement of Article 16 of the *San Francisco Public Works Code*, the City's Urban Forestry Ordinance. Subsequent development projects in the Plan Area would be required to comply with these City requirements, and therefore the Plan would be consistent with the Energy and Climate Control Measures in

²⁹⁸ Eighteen other measures are included in a list of measures for further study and are not yet identified as feasible for implementation under the *2010 Clean Air Plan*.

²⁹⁹ BAAQMD, *2010 Clean Air Plan*, September 2010. Available at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx>; p. D-1.

³⁰⁰ BAAQMD, *2010 Clean Air Plan*, September 2010. Available at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx>; p. 4-10.

the 2010 Clean Air Plan. Subsequent development projects in the Plan Area may also be subject to Plan proposals concerning sustainability, discussed in length in Goal VI of the Plan. Additionally, the Plan proposes a number of circulation and streetscape improvements, including specific street network changes, such as bicycle lanes and cycle tracks, widened sidewalks, transit lanes and bus bulbs, all of which are intended to increase the attractiveness of alternative travel modes, thereby potentially leading to a reduction in vehicle emissions.

TABLE IV.F-6 CONSISTENCY OF THE PLAN WITH TRANSPORTATION CONTROL MEASURES OF THE 2010 CLEAN AIR PLAN

2010 CAP Control Measure	Elements of the Plan Consistent with the Measure or Explanation of Non-Applicability
Transportation Control Measures (TCMs)	
TCM A-1 and A-2: Improve Local and Regional Bus and Rail Services	<p>The Plan, in conjunction with the SFMTA's recently approved Muni Forward, proposes to configure transit routes to adequately serve the Plan Area and redesign streets that serve transit to lessen the impact of traffic on transit performance. The Plan proposes to establish dedicated transit lanes on portions of Fourth, Folsom, Harrison, and Bryant Streets, in order to enhance transit travel times and reliability. Additionally, the Plan would upgrade existing and planned dedicated transit lanes with self-enforcing mechanisms such as curbs, channelizers, and colored or textured pavements to discourage or prevent use by unauthorized private vehicles.</p> <p>Phase 2 of Measure TCM-A-1 includes partial funding for Muni's Van Ness Avenue Bus Rapid Transit project, northwest of the Plan Area. Phase 2 of Measure TCM-A-2 includes partial funding for the Muni Metro Central Subway now under construction in the Plan Area and for the downtown extension and systemwide electrification of Caltrain and the new Transbay Transit Center, just to the east. All of these projects are within or near the Plan Area.</p>
TCM B-1 through B-4: Improve Transportation System (freeways and arterials; transit; express lanes; goods movement) Efficiency	<p>These measures address infrastructure improvements to increase operational efficiencies, such as common fare payment systems, and are geared primarily toward regional agencies, such as the Metropolitan Transportation Commission and Caltrans. The Plan seeks to accommodate the variety of Plan Area transportation needs by concentrating and facilitating transit in the Plan Area.</p>
TCM C-1: Voluntary Employer-Based Trip Reduction Programs	<p>San Francisco employers operate (or contract for) numerous shuttle bus services, many of which serve parts of the Plan Area. The City's Commuter Benefits Ordinance (Section 421 of the <i>Environment Code</i>) requires that employers with more than 20 employees provide pre-tax purchase of transit passes, employer-paid passes, or employer-provided transit. The Plan proposes to employ Transportation Demand Management (TDM) measures to encourage a mode shift away from private automobile use. TDM measures would also be required as mitigation for traffic noise impacts (see Section IV.E, Noise and Vibration).</p>
TCM C-2: Safe Routes to School and Safe Routes to Transit	<p>This measure funds pedestrian and bicycle improvements. Bessie Carmichael Middle School, at 824 Harrison Street, is within the Plan Area, and Bessie Carmichael Elementary School, on Seventh Street near Harrison Street, is just west of the Plan Area. The Plan proposes improvements to pedestrian and bicycle circulation, including improvements aimed at increasing pedestrian safety such as wider sidewalks, crosswalks and new signalized mid-block crossings.</p>
TCM C-3: Ridesharing Services and Incentives	<p>Through the 511 commuter information program, preferential vanpool parking, guaranteed ride home in emergencies, and carpool parking permits are provided in San Francisco. The <i>Planning Code</i> (Section 166) requires that car-share parking be provided in new parking garages. (See also the next measures.)</p>
TCM C-4 and C-5: Public Outreach/Education and Smart Driving	<p>These measures concern efforts to influence commuters' and drivers' behavior and are not directly relevant to the Plan. However, certain subsequent development projects in the Plan Area would be required under <i>Planning Code</i> Section 163 to participate in transportation brokerage services to facilitate the use of transit, ridesharing, and other means of minimizing the use of single-occupant vehicles in commuting. As discussed under TCM C-1, the Plan proposes application of TDM programs and features.</p>

TABLE IV.F-6 CONSISTENCY OF THE PLAN WITH TRANSPORTATION CONTROL MEASURES OF THE 2010 CLEAN AIR PLAN

2010 CAP Control Measure	Elements of the Plan Consistent with the Measure or Explanation of Non-Applicability
TCM D-1 and D-2: Improvements to Bicycle and Pedestrian Facilities and Access.	<p>Objective 4.1 of Goal IV of the Plan is to “Provide a safe, convenient, and attractive walking environment on all streets in the Plan Area.” The Plan proposes the following:</p> <ul style="list-style-type: none"> • Upgrade sidewalks to meet the standards in the Better Streets Plan where possible, provide corner sidewalk extensions to enhance pedestrian safety at crosswalks, and add street trees and furnishing wherever possible. • Provide additional midblock crosswalks across major streets. The Plan proposes new pedestrian crosswalks throughout the Plan Area. • Several signalized intersections of major streets in the Plan Area prohibit pedestrians from crossing one leg of the intersection. The Plan recommends opening certain locations with currently closed crosswalks. <p>Goal IV, Objective 2 of the Plan is to “Make cycling a safe and convenient transportation option throughout the Plan Area for all ages and abilities.”</p>
TCM D-3: Local Land Use Strategies (to encourage higher density and mixed uses).	<p>The Plan would continue the mixed-use character of the Plan Area and would provide for increased density of development by means of selective increases in height limits. In addition, consistent with other rezoning undertaken recently in San Francisco, the zoning districts proposed for the Plan Area would have no maximum residential density; instead, density would be limited by height and bulk controls. The Plan also removes restrictive zoning, allowing for a greater mix of uses.</p>
TCM E-1: Value Pricing Strategies	<p>This measure primarily addresses congestion pricing, which is in effect on Bay Area bridges that charge higher tolls during rush hour. The measure also references a proposal for “cordon pricing” that has been proposed for downtown San Francisco. This is not proposed as part of the Plan.</p>
TCM E-2: Promote Parking Policies to Reduce Motor Vehicle Travel	<p>The <i>Planning Code</i> currently requires that new off-street parking provided for uses other than residential units and hotels in most of the Plan Area north of Harrison Street be priced so as to discourage long-term commuter parking, while still providing adequate short-term parking. <i>Planning Code</i> Section 155(g) requires that the cost for four hours of parking be no more than four times the rate charged for the first hour, and that the rate charged for eight or more hours of parking be no less than 10 times the rate charged for the first hour. Further, weekly or monthly discounts are prohibited. <i>Planning Code</i> Section 167 requires that residential parking be priced separately from dwelling units themselves, capturing the real cost for parking. Moreover, parking is not required under the <i>Planning Code</i> in most use districts in the Plan Area, with specified maximum numbers of parking spaces that may be provided. The Plan would maintain these requirements.</p>
TCM E-3: Implement Transportation Pricing Reform	<p>While not directly applicable to the Plan, this measure calls for increasing the cost of driving to reflect “external” costs such as air pollution. Higher gasoline taxes or other taxes or fees would be necessary to implement this measure. With the Plan’s emphasis on pedestrian and bicycle travel, the Plan Area is positioned to benefit from such potential changes.</p>

SOURCE: 2010 Clean Air Plan; Environmental Science Associates, 2014.

While the land use changes proposed in the Plan are expected to increase demand for travel in the Plan Area, safe and convenient pedestrian, transit, and bicycle access to and within the Plan Area is necessary for the success of the envisioned land uses. The Plan includes the following objectives and policies to improve pedestrian, transit, and cycling conditions on major streets in and near the Plan Area:

- Provide a safe, convenient, and attractive walking environment on all the streets in the Plan Area.
- Ensure that transit serving the Plan Area is adequate, reliable and pleasant.

- Make cycling a safe and convenient transportation option throughout the Plan Area for all ages and abilities.
- Encourage mode shift away from private automobile usage.
- Prohibit new curb cuts on key major streets and limit them elsewhere.

Land Use and Local Impact Control Measures, also newly added in the *2010 Clean Air Plan*, are “designed to (1) promote mixed-use, compact development to reduce motor vehicle travel and emissions, and (2) ensure that we plan for focused growth in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions.”³⁰¹ These measures include reducing DPM and greenhouse gas emissions from trucks; development of an “indirect source review rule” primarily aimed at reducing emissions from transportation and from construction equipment by imposing limitations on emissions from a particular site; updating the BAAQMD *CEQA Air Quality Guidelines* and enhancing the district’s review of CEQA documents to help new projects reduce emissions; assisting local governments in adopting “smart growth” land use patterns to reduce mobile source emissions, exposure of persons to TACs, and emissions related to energy use and waste disposal; reducing and tracking health risk in communities disproportionately affected by exposure to air pollution; and enhancing the district’s air quality monitoring program. Although most of the Land Use and Local Impact Control Measures address BAAQMD programs and are not directly applicable to the Plan, the Plan would further the district’s goals of reducing emissions from commuter travel by increasing development density in proximity to transit.

As noted above, LUM 1, Goods Movement, is intended to reduce exposure to diesel emissions from the movement of freight. The measure is particularly aimed at neighborhoods, like the Plan Area (along with most of the eastern half of the city), that the BAAQMD’s Community Air Risk Evaluation program has identified as being generally exposed to higher levels of TACs than are other communities. Regional implementation actions set forth under this measure include collaboration among stakeholders to reduce truck emissions; identification of strategies to shift some freight traffic from trucks to rail and barge; improving the efficiency of the regional freight distribution system; implementing best practices in warehousing and distribution; advocating for fees on cargo containers to fund air quality mitigation; and undertaking demonstration projects. At the local level, implementation actions include collaborative enforcement of regulations on truck idling, operation of truck refrigeration units, cargo handling equipment and the like; outreach to and incentive programs for truck operators; installation of signage, including truck route signs identifying suitable routes in and around communities affected by poor air quality; and centralization of truck services and overnight parking. The recently approved Western SoMa Plan proposed installation of truck route signs on Harrison and Bryant Streets, which also extend into the Plan Area, to encourage trucks to avoid other streets. Because these streets provide freeway access, and because they are generally less residential in nature than other major streets (i.e., excluding mid-block alleys) in the Plan Area, truck routes in the area would be consistent with control measure LUM 1. Although the Plan does not explicitly propose designation of truck routes or posting of signage, the proposed street network changes include reductions in vehicle capacity and an increase in bicycle and pedestrian facilities, notably on Folsom Street, which could have the effect of shifting some truck traffic to Harrison and Bryant Streets, particularly if Howard and Folsom Streets are converted to two-way

³⁰¹ BAAQMD, *2010 Clean Air Plan*, September 2010. Available at <http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx>.

traffic. In light of the foregoing, the Plan would be consistent with the Land Use and Local Impact Control Measures in the *2010 Clean Air Plan*.

Mobile Source Control Measures (MSMs) are those intended to reduce emissions by accelerating the replacement of older, dirtier vehicles and equipment through programs such as the BAAQMD's Vehicle Buy-Back and Smoking Vehicle Programs, as well as promoting advanced-technology vehicles. Such region-wide measures are not directly applicable to the Plan, although it is noted that the City is cooperating in the implementation of MSM A-2 (Zero-Emission Vehicles and Plug-In Hybrids) by installing electric vehicle charging stations; the implementation of MSM A-3 (Green Fleets) by incorporation into the City vehicle fleet of both hybrid vehicles and vehicles that use biodiesel fuel and by requiring, through amendment of the *Police Code*, reductions in greenhouse gas emissions by city taxis, which also reduces tailpipe emissions generally; and the implementation of MSM C-1 (Construction and Farm Equipment) by requiring, through its Clean Construction Ordinance (see p. IV.F-19), that most equipment on City-contracted construction projects use lower-emission diesel engines, particularly when proximate to sensitive receptors. The Plan would not conflict with any of these measures, and therefore the Plan would be consistent with the MSMs in the *2010 Clean Air Plan*.

Moreover, the Plan would not otherwise disrupt or hinder implementation of the *Clean Air Plan* by, for example, precluding extension or expansion of bicycle paths or routes (on the contrary, the Plan contains measures to enhance existing and planned bicycle lanes and to provide bicycle facilities and infrastructure in the Plan Area; precluding extension of a transit line (the Plan aims to enhance transit use); or provision of excessive parking beyond parking requirements (the Plan includes a policy to "Limit the parking in new development").

Finally, to demonstrate consistency with the *2010 Clean Air Plan*, a plan should support the primary goals of the *Clean Air Plan*, which are as follows:

- Attain air quality standards;
- Reduce population exposure and protect public health in the Bay Area; and
- Reduce greenhouse gas emissions and protect the climate.

With regard to attainment of air quality standards, the Plan would be consistent with the *2010 Clean Air Plan* through implementation of its policies. Specifically, the Plan identifies reduction of air pollution and greenhouse gases as regional and local factors that contribute to the need for the Plan.

As described above, the Plan would strongly support a large number of the applicable control measures in the *2010 Clean Air Plan* that are intended to help the Bay Area attain State and federal air quality standards. As discussed above, under Regulatory Framework, Article 38 of the *San Francisco Health Code* is intended to prevent future air quality health impacts to new residential uses near high-volume roadways and other areas of relatively higher exposure to poor air quality. New development in the Plan Area would be subject to this requirement, and therefore the Plan would protect public health through required adherence to *Health Code* Article 38.

Greenhouse gas emissions associated with the proposed Plan were discussed in the Initial Study where it is determined that the Plan would be consistent with the Greenhouse Gas Reduction Strategy, and therefore would result in less-than-significant impacts with regard to greenhouse gas emissions.

In light of the above, the Plan including subsequent development projects, proposed street network changes and open spaces improvements would be consistent with the *2010 Clean Air Plan* control measures, would not hinder implementation of the plan, and would support the primary goals of the plan; this impact would be *less than significant*.

Mitigation: None required.

Criteria Air Pollutants (Program-Level Plan Analysis)

Impact AQ-2: The Plan would not violate an air quality standard or contribute substantially to an existing or projected air quality violation, or result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard. (Less than Significant)

As discussed in the Approach to Analysis section, in order for a proposed plan to result in less than significant criteria air pollutant impacts, an analysis must demonstrate that the plan would be consistent with the control measures contained in the current regional air quality plan (the *2010 Clean Air Plan*), would support the primary objectives of that plan and would not hinder implementation of that plan; the plan's growth in VMT would not exceed the plan's population growth; and the plan would not cause localized CO impacts.

As demonstrated in Impact AQ-1, the Plan would be consistent with the control measures contained in the *2010 Clean Air Plan*, would support the primary objectives of that plan and would not hinder implementation of the plan. The remainder of the analysis addresses the Plan's growth in VMT and population and potential for localized CO impacts. This analysis is based on the plan-level thresholds identified by the BAAQMD in their CEQA Air Quality Guidelines.

Growth in Vehicle Miles Traveled Compared to Growth in Population

Growth projections prepared by the San Francisco Planning Department (and discussed under Analysis Assumptions in the Overview subsection of Chapter IV, Environmental Setting, Impacts, and Mitigation Measures) indicate that with implementation of the Plan, Plan Area residential population would increase from approximately 12,000 in 2010 to 37,500, by 2040, the analysis horizon year. This represents an increase of 213 percent. Additionally, employment is projected to grow from about 45,600 under existing conditions to approximately 109,200 by 2040, an increase of 139 percent. The combined population-employment ("service population") increase with implementation of the Plan, would therefore be approximately 154 percent $([37,500 + 109,200] \div [12,000 + 45,600] = 2.54, \text{ or an increase of } 154 \text{ percent from existing})$. Based on output from the County Transportation Authority travel demand model, daily VMT to and from the Plan Area would increase by approximately 77 percent by 2040, from approximately 987,000 to about 1.751 million. Because the growth in vehicle miles would be less than the growth in "service population," the Plan would result in a less-than-significant impact with respect to regional criteria air pollutants. In addition, the Plan includes goals and policies that would apply to development within the Plan Area. These policies would reduce criteria pollutant emissions, compared to other potential development in the city or in the region, by providing for additional high-density mixed-use development in an area with the most extensive array of transit service in the Bay Area, and by improving pedestrian and bicycle access within, to, and from the Plan Area. The Plan seeks to

improve transit, pedestrian, and bicycle accessibility and connections, thereby minimizing the need for automobile travel. The transportation analysis for the Plan reveals that VMT, as well as vehicle trip generation, would be substantially less than would be anticipated for a comparable level of development elsewhere in the Bay Area. In light of the analysis above, implementation of the Plan would result in a *less-than-significant* impact with respect to regional emissions of criteria air pollutants.

Carbon Monoxide

Unlike other criteria pollutants, whose effects are regional, CO impacts are evaluated locally. However, the BAAQMD generally recommends intersection-specific modeling of CO concentrations only for intersections where traffic volumes would exceed 44,000 vehicles per hour, based on modeling of vehicle emissions demonstrating that below this volume of traffic CO concentrations would not exceed the applicable State air quality standards. Based on the traffic analysis completed for the Plan, the maximum with Plan peak-hour traffic volume at any of the study intersections in the transportation study area (Sixth Street at Brannan Street) would be 5,920 vehicles, and the maximum at any of the study intersections would be 7,610 vehicles under 2040 cumulative conditions (also at Sixth and Brannan Streets). Therefore, modeling of CO concentrations is not required, and the Plan would not be anticipated to exceed the State one-hour or eight-hour CO standards. Therefore, impacts related to CO would also be *less than significant*.

As demonstrated in the above analysis, the Plan would be consistent with the control measures contained in the current regional air quality plan (the *2010 Clean Air Plan*), would support the primary objectives of the *2010 Clean Air Plan* and would not hinder implementation of the *2010 Clean Air Plan*. Additionally, the rate of growth in VMT with implementation of the Plan would not exceed the Plan's rate of population growth and the Plan would not cause localized CO impacts. Therefore, the Plan would not violate an air quality standard or contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase of any non-attainment criteria pollutant.

Mitigation: None required.

Criteria Air Pollutants (Project-level Analysis)

Impact AQ-3: Operation of subsequent individual development projects in the Plan Area and street network changes, but not proposed open space improvements, would violate an air quality standard, contribute to an existing or projected air quality violation, and/or result in a cumulatively considerable net increase of criteria pollutants for which the project region is in nonattainment under an applicable federal or State ambient air quality standard. (Significant and Unavoidable with Mitigation)

As noted above under Approach to Analysis, the significance of criteria air pollutant impacts from individual projects is determined through a quantitative comparison of a project's criteria pollutant emissions to the project-level significance thresholds. It is possible that individual development projects or the street network changes, if large enough, could result in significant effects related to emissions of criteria air pollutants, even if the overall plan is determined to have a less-than-significant impact. The BAAQMD, in its *CEQA Air Quality Guidelines* (May 2011) developed screening criteria to determine if operational emissions from projects would violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively

considerable net increase in criteria air pollutants. 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.³⁰² The screening criteria for land uses expected in the Plan Area are shown in Table IV.F-7, **Operational Criteria Air Pollutant Screening for Expected Plan Area Uses**.

TABLE IV.F-7 OPERATIONAL CRITERIA AIR POLLUTANT SCREENING FOR EXPECTED PLAN AREA USES

Land Use	Screening Size for Operational Criteria Pollutants (Pollutant of Concern in Parentheses)
Apartment/Condo, low-rise	451 du (ROG)
Apartment/Condo, mid-rise	494 du (ROG)
Apartment/Condo, high-rise	510 du (ROG)
Retirement community	487 du (ROG)
Congregate care facility	657 du (ROG)
Day-care center	53 ksf (NO _x)
Place of worship	439 ksf (NO _x)
City park	2613 acres (ROG)
Health club	128 ksf (NO _x)
Quality restaurant	47 ksf (NO _x)
High turnover restaurant	33 ksf (NO _x)
Fast food rest. w/ drive thru	6 ksf (NO _x)
Hotel	489 rooms (NO _x)
Retail store	83 ksf (NO _x)
Supermarket	42 ksf (NO _x)
General office building	346 ksf (NO _x)
Pharmacy/drugstore	48 ksf (NO _x)
Medical office building	117 ksf (NO _x)
Warehouse	864 ksf (NO _x)
General light industry	541 ksf (NO _x)
Manufacturing	992 ksf (NO _x)

SOURCE: Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, updated May 2011. Table 3-1.

NOTES:
 du = dwelling units; ksf = thousand square feet; NO_x = oxides of nitrogen; ROG = reactive organic gases
 Screening levels include indirect and area source emissions, but not backup generators or industrial sources.

Consequently, the potential exists for individual development projects within the Plan Area to generate vehicle trips and other operational emissions, such as emissions from natural gas combustion, landscape maintenance activities, and painting that would result in a significant increase in criteria air pollutants. As set

³⁰² Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, updated May 2011. Table 3-1.

forth in Table IV.F-6, the Plan includes or would further a number of *Clean Air Plan* Transportation Control Measures that would be expected to minimize vehicle trips. Additionally, the *Planning Code* contains requirements applicable to individual development projects that would serve to reduce vehicle trips, compared to conditions without such requirements. These include, but are not limited to, limits on permitted parking (Section 151.1); pricing non-residential parking to discourage long-term parking (Section 155(g)); provision of showers/lockers in new or renovated commercial projects (Section 155.3) and bicycle parking in commercial and residential projects (Sections 155.4 and 155.5); provision of on-site transportation brokerage services in larger office projects (Section 163); provision of car-share parking (Section 166); separating the cost of residential parking from the cost of a dwelling unit (Section 167); payment of a Transportation Sustainability Fee (Section 411A); and provision of on-site child care³⁰³ in office and hotel projects (Section 414). The City's *Environment Code* Section 421 mandates that larger employers provide transit, transit passes, or financial incentives for transit use (Section 421), which also has the potential to reduce vehicle travel. Additionally, the *San Francisco General Plan* and the *City Charter* contain numerous policy directives aimed at reducing auto trips, not the least of which is the City's Transit First Policy (Section 16.102 of the *Charter*). However, it is not possible to precisely quantify the reduction in vehicle trips that these code provisions and policies together would attain. Thus, in the absence of specific development proposals within the Plan Area, individual projects that would exceed the BAAQMD screening criteria are assumed to have the potential to result in emissions that could exceed applicable significance thresholds.

In regard to proposed street network changes, these projects would include conversion of Howard and Folsom Streets to accommodate additional travel modes including bicycles and transit, reduction in travel lanes and installation of transit only lanes and bicycle facilities on Third Street and Fourth Street, creation of transit only lanes on Bryant Street and Harrison Street and minor reconfiguration to Brannan Street. The street network changes would not generate new vehicle trips, but would result in additional vehicle delays throughout the Plan Area because they would reduce the number of mixed-flow lanes. As discussed in Section IV.D, Transportation and Circulation, the average delay per vehicle at intersections in the transportation study area would increase with the addition of vehicle trips associated with development under the Plan plus implementation of the proposed street network changes. The number of transportation study area intersections operating with an average delay of more than 55 seconds per vehicle during the AM peak hour would increase from 3 of 36 intersections analyzed under existing conditions to 21 intersections under the Howard/Folsom One-way Option, and during the PM peak hour from 19 of 80 intersections analyzed under existing conditions to 39 intersections under the Howard/Folsom One-way Option.

Increased delays at affected intersections from the proposed street network changes would result in slower vehicle speeds and would increase vehicle emissions, resulting in increased criteria air pollutant emissions than would occur during free-flowing traffic conditions. Given the number of proposed street network changes, it is conservatively judged that the street network changes would result in significant criteria air pollutant emissions as a result of slower moving vehicle speeds (and greater associated emissions).

In light of the above, the air quality impacts of subsequent individual projects and the street network changes would therefore be considered significant. Implementation of **Mitigation Measures M-NO-1a, Transportation Demand Management (TDM) for Development Projects**, in Section IV.E, Noise and Vibration, and **M-AQ-3a,**

³⁰³ This provision may be satisfied by an in-lieu fee, which would not necessarily result in the same trip reduction benefit.

Education for Residential and Commercial Tenants Concerning Low-VOC Consumer Products, M-AQ-3b, Reduce Operational Emissions, and M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps, below, would reduce this impact, but the feasibility or effectiveness of mitigation measures identified below is unknown at this time; therefore, the air quality impacts associated with long-term development and proposed street network changes would be considered *significant and unavoidable*. For projects that would exceed BAAQMD operational screening criteria, the following mitigation measures are applicable.

Mitigation Measures

Implement **Mitigation Measure M-NO-1a, Transportation Demand Management (TDM) for Development Projects**. (See Section IV.E, Noise and Vibration.)

Mitigation Measure M-AQ-3a: Education for Residential and Commercial Tenants Concerning Low-VOC Consumer Products. Prior to receipt of any building permit and every five years thereafter, the project sponsor shall develop electronic correspondence to be distributed by email or posted on-site annually to tenants of the project that encourages the purchase of consumer products and paints that are better for the environment and generate less VOC emissions. The correspondence shall encourage environmentally preferable purchasing and shall include contact information and links to SF Approved.³⁰⁴

Mitigation Measure M-AQ-3b: Reduce Operational Emissions. Proposed projects that would exceed the criteria air pollutant thresholds in this EIR shall implement the additional measures, as applicable and feasible, to reduce operational criteria air pollutant emissions. Such measures may include, but are not limited to, the following:

- For any proposed refrigerated warehouses or large (greater than 20,000 square feet) grocery retailers, provide electrical hook-ups for diesel trucks with Transportation Refrigeration Units at the loading docks.
- Use low- and super-compliant VOC architectural coatings in maintaining buildings. “Low-VOC” refers to paints that meet the more stringent regulatory limits in South Coast Air Quality Management District Rule 1113; however, many manufacturers have reformulated to levels well below these limits. These are referred to as “Super-Compliant” architectural coatings.
- Implement **Mitigation Measure M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps**.
- Other measures that are shown to effectively reduce criteria air pollutant emissions onsite or offsite if emissions reductions are realized within the SFBAAB. Measures to reduce emissions onsite are preferable to offsite emissions reductions.

Significance after Mitigation: The above measures are required for future individual development projects in the Plan Area that would exceed BAAQMD screening criteria. However, without specific detail on the size and extent of these projects, it is not possible to estimate emissions or the effectiveness or feasibility of the mitigation measure. Additionally, local government has no authority over vehicle emissions standards, which are established by federal and State law. Existing emissions laws and regulations, including the federal Corporate Average Fuel Economy requirements and California’s Clean Car (Pavley) Standards to reduce greenhouse gas

³⁰⁴ SF Approved (sfapproved.org) is administrated by the San Francisco Department of Environment staff, who identifies products and services that are safer and better for the environment (e.g., those that are listed as “Required” or “Suggested”).

emissions, would result in declining vehicle emissions over time. However, no feasible mitigation exists for criteria air pollutant emissions resulting from slower vehicle speeds (and increased idling times) that may occur as a result of the proposed street network changes. Consequently, this impact is conservatively identified as *significant and unavoidable with mitigation*. It should be noted that the identification of this significant impact does not preclude the finding of future less-than-significant impacts for subsequent projects that comply with applicable screening criteria or meet applicable thresholds of significance.

Open Space Improvements

The proposed open space improvements would not be of sufficient magnitude to draw large numbers of users from outside the immediate neighborhood; that is, all the improvements—generally, in the form of greening and related enhancements to mid-block streets and alleys, along with the potential for one or more neighborhood-serving parks—would not be city- or regional-serving in scale. Accordingly, the proposed open space improvements would be expected to generate little, if any, motor vehicle travel and thus would not result in substantial vehicular emissions. Given the relatively limited size of use of the proposed open space improvements, the use of fertilizers and other gardening and maintenance products would, likewise, not result in area-source emissions in excess of the significance criteria on p. IV.F-24. For these reasons, operational criteria air pollutant emissions from the open space improvements would be *less than significant*.

Conclusion

Individual development projects, including proposed street network changes, if large enough, could result in significant criteria air pollutant emissions. Without specific detail regarding the size and extent of each project, the feasibility of mitigation measures identified above to fully offset each subsequent project's significant criteria pollutant impact is unknown. Consequently, this impact is conservatively identified as *significant and unavoidable with mitigation*. Operational criteria air pollutant emissions from the open space improvements would be *less than significant*.

Impact AQ-4: Development under the Plan, but not the proposed street network changes and open space improvements, would result in construction activities that could violate an air quality standard, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard. (Less than Significant with Mitigation)

Implementation of the Plan alone would not directly result in construction related-emissions. However, for the purposes of the Plan-level analysis, it is recognized that construction of subsequent development projects would result in criteria pollutant emissions, the effects of which are analyzed here. The potential impacts of construction-related emissions from the proposed street network changes and open space improvements would result in criteria pollutant emissions, which are also assessed here.

Subsequent Development Projects

Implementation of the Plan would allow for development of new office, residential, retail, and other uses, at a greater intensity than is currently allowed under existing land use controls. Most development projects in the

Plan Area would entail demolition and removal of existing structures and/or parking lots, excavation, and site preparation and construction of new buildings. Emissions generated during construction activities would include exhaust emissions from heavy duty construction equipment, trucks used to haul construction materials to and from sites, and worker vehicle emissions, as well as fugitive dust emissions associated with earth-disturbing activities and other demolition and construction work.

Construction Dust

Activities that generate dust include building and parking lot demolition, excavation, and equipment 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 particulate matter to the local atmosphere. Depending on exposure, adverse health effects can occur due to this particulate matter in general and also due to specific contaminants such as lead or asbestos that may be constituents of soil.

In response, the San Francisco Board of Supervisors approved a series of amendments to the *San Francisco Building Code* and *Health Code* generally referred to as the Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008) with the intent of reducing the quantity of dust generated during site preparation, demolition and construction work in order to protect the health of the general public and of onsite workers, minimize public nuisance complaints, and avoid orders to stop work by DBI.

The Ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from DBI. The Director of DBI may waive this requirement for activities on sites less than one-half acre that are unlikely to result in any visible wind-blown dust.

For project sites over one-half acre, the Dust Control Ordinance requires that the project sponsor submit a Dust Control Plan for approval by the San Francisco Department of Public Health. DBI will not issue a building permit without written notification from the Director of Public Health that the applicant has a site-specific Dust Control Plan, unless the Director waives the requirement.

The site-specific Dust Control Plan requires the project sponsor to submit a map to the Director of Public Health showing all sensitive receptors within 1,000 feet of the site; wet down areas of soil at least three times per day; provide an analysis of wind direction and install upwind and downwind particulate dust monitors; record particulate monitoring results; hire an independent, third-party to conduct inspections and keep a record of those inspections; establish shut-down conditions based on wind, soil migration, etc.; establish a hotline for surrounding community members who may be potentially affected by project-related dust; limit the area subject to construction activities at any one time; install dust curtains and windbreaks on the property lines, as necessary; limit the amount of soil in haul trucks to the size of the truck bed and secure with a tarpaulin; enforce a 15-mile-per-hour speed limit for vehicles entering and exiting construction areas; sweep affected streets with water sweepers at the end of the day; install and utilize wheel washers to clean truck tires; terminate construction activities when winds exceed 25 miles per hour; apply soil stabilizers to inactive areas; and sweep off adjacent streets to reduce particulate emissions. The project sponsor would be required to designate an individual to monitor compliance with these dust control requirements.

Compliance with the regulations and procedures set forth in the San Francisco Dust Control Ordinance would ensure that potential dust-related construction air quality impacts would be reduced to a *less-than-significant* level.

Construction Equipment Exhaust

Larger projects in the Plan Area could potentially generate emissions of criteria air pollutants that would exceed the significance criteria on p. IV.F-24. An analysis of construction emissions using CalEEMod was conducted for typical high-rise residential and office land uses, assuming construction in 2016 (a worst case year as improvements to the construction equipment fleet in future years would result in lesser emissions). High rise residential developments in excess of 500 units would have the potential to result in construction-related ROG emissions in excess of 54 pounds per day.³⁰⁵ General office developments in excess of 825,000 square feet would also have the potential to result in construction-related ROG emissions in excess of 54 pounds per day. The amount of construction period emissions would vary depending on project characteristics. For example, a project proposing less than 500 units or 825,000 square feet of non-residential use that requires substantial excavation (e.g., due to contaminated soils and/or to accommodate below-grade parking) may also exceed the construction significance criteria. Construction of subsequent individual development projects that exceed the criteria air pollutant significance thresholds would result in a *significant* impact.

Mitigation Measures

Mitigation Measure M-AQ-4a: Construction Emissions Analysis. Subsequent development projects that do not meet the applicable screening levels or that the Planning Department otherwise determines could exceed one or more significance thresholds for criteria air pollutants shall undergo an analysis of the project's construction emissions. If no significance thresholds are exceeded, no further mitigation is required. If one or more significance thresholds are exceeded, Mitigation Measure M-AQ-4b would be applicable to the project.

Mitigation Measure M-AQ-4b: Construction Emissions Minimization Plan. If required based on the analysis described in Mitigation Measure M-AQ-4a or as required in Impact AQ-6 the project sponsor shall submit a Construction Emissions Minimization Plan (Plan) to the Environmental Review Officer (ERO) for review and approval by an Environmental Planning Air Quality Specialist. The Plan shall be designed to reduce air pollutant emissions to the greatest degree practicable.

The Plan shall detail project compliance with the following requirements:

1. All off-road equipment greater than 25 horsepower and operating for more than 20 total hours over the entire duration of construction activities shall meet the following requirements:
 - a) Where access to alternative sources of power is available, portable diesel engines shall be prohibited;

³⁰⁵ The criteria of 500 units of residential uses or 825,000 square feet of office use is based on CalEEMod version 2013.2.2 year 2016 construction with the default construction equipment and construction phasing that would result in emissions of one or more criteria pollutants from project operation that would approach the significance thresholds.

- b) All off-road equipment shall have:
- i. Engines that meet or exceed either U.S. Environmental Protection Agency or California Air Resources Board Tier 2 off-road emission standards (or Tier 3 off-road emissions standards if NO_x emissions exceed applicable thresholds), *and*
 - ii. Engines that are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy (VDECS)³⁰⁶, *and*
 - iii. Engines shall be fueled with renewable diesel (at least 99 percent renewable diesel or R99).
- c) Exceptions:
- i. Exceptions to 1(a) may be granted if the project sponsor has submitted information providing evidence to the satisfaction of the ERO that an alternative source of power is limited or infeasible at the project site and that the requirements of this exception provision apply. Under this circumstance, the sponsor shall submit documentation of compliance with 1(b) for onsite power generation.
 - ii. Exceptions to 1(b)(ii) may be granted if the project sponsor has submitted information providing evidence to the satisfaction of the ERO that a particular piece of off-road equipment with an ARB Level 3 VDECS (1) is technically not feasible, (2) would not produce desired emissions reductions due to expected operating modes, (3) installing the control device would create a safety hazard or impaired visibility for the operator, or (4) there is a compelling emergency need to use off-road equipment that are not retrofitted with an ARB Level 3 VDECS and the sponsor has submitted documentation to the ERO that the requirements of this exception provision apply. If granted an exception to 1(b)(ii), the project sponsor shall comply with the requirements of 1(c)(iii).
 - iii. If an exception is granted pursuant to 1(c)(ii), the project sponsor shall provide the next-cleanest piece of off-road equipment as provided by the step down schedule in Table M-AQ-4:

TABLE M-AQ-4B OFF-ROAD EQUIPMENT COMPLIANCE STEP-DOWN SCHEDULE*

Compliance Alternative	Engine Emission Standard	Emissions Control
1	Tier 2**	ARB Level 2 VDECS
2	Tier 2	ARB Level 1 VDECS

* How to use the table. If the requirements of 1(b) cannot be met, then the project sponsor would need to meet Compliance Alternative 1. Should the project sponsor not be able to supply off-road equipment meeting Compliance Alternative 1, then Compliance Alternative 2 would need to be met.

** Tier 3 off road emissions standards are required if NO_x emissions exceed applicable thresholds.

- iv. Exceptions to 1(b)(iii) may be granted if the project sponsor has submitted information providing evidence to the satisfaction of the ERO that a renewable diesel

³⁰⁶ Equipment with engines meeting Tier 4 Interim or Tier 4 Final emission standards automatically meet this requirement, therefore VDECS would not be required.

is not commercially available in the SFBAAB. If an exception is granted pursuant to this section, the project sponsor shall provide another type of alternative fuel, such as biodiesel (B20 or higher).

2. The project sponsor shall require the idling time for off-road and on-road equipment be limited to no more than two 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 two minute idling limit.
3. The project sponsor shall require that construction operators properly maintain and tune equipment in accordance with manufacturer specifications.
4. The Plan shall include estimates of the construction timeline by phase with a description of each piece of off-road equipment required for every construction phase. Off-road equipment descriptions and information may include, but is not limited to, equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation. For the VDECS installed: technology type, serial number, make, model, manufacturer, ARB verification number level, and installation date and hour meter reading on installation date. For off-road equipment not using renewable diesel, reporting shall indicate the type of alternative fuel being used.
5. The Plan shall be kept on-site and available for review by any persons requesting it and a legible sign shall be posted at the perimeter of the construction site indicating to the public the basic requirements of the Plan and a way to request a copy of the Plan. The project sponsor shall provide copies of Plan as requested.
6. *Reporting.* Quarterly reports shall be submitted to the ERO indicating the construction phase and off-road equipment information used during each phase including the information required in Paragraph 4, above. In addition, for off-road equipment not using renewable diesel, reporting shall indicate the type of alternative fuel being used.

Within six months of the completion of construction activities, the project sponsor shall submit to the ERO a final report summarizing construction activities. The final report shall indicate the start and end dates and duration of each construction phase. For each phase, the report shall include detailed information required in Paragraph 4. In addition, for off-road equipment not using renewable diesel, reporting shall indicate the type of alternative fuel being used.

7. *Certification Statement and On-site Requirements.* Prior to the commencement of construction activities, the project sponsor shall certify (1) compliance with the Plan, and (2) all applicable requirements of the Plan have been incorporated into contract specifications.

It should be noted that for specialty equipment types (e.g., drill rigs, shoring rigs and concrete pumps) it may not be feasible for construction contractors to modify their current, older equipment to accommodate the particulate filters, or for them to provide newer models with these filters pre-installed. Therefore, alternative compliance options are provided for in Mitigation Measure M-AQ-4b.

Significance after Mitigation: Implementation of Mitigation Measures M-AQ-4a and M-AQ-4b would ensure that construction-related emissions would be less than significant. Requiring Tier 3 construction equipment

can reduce construction emissions of ROG and NO_x by 14 and 36 percent, respectively while emissions of diesel particulate matter can be reduced by 89 to 94 percent with Level 3 VDECS compared to equipment with engines meeting no emission standards. Renewable diesel R100 has the potential to reduce particulate matter emissions by about 30 percent and NO_x emissions by 10 percent.³⁰⁷ Because construction emissions are assessed based on average daily emissions over the entirety of the construction period, and given the parcel sizes in the Plan Area,³⁰⁸ this level of reduction would be sufficient to ensure that even for larger projects in the Plan Area, construction related emissions would be below significance thresholds. Therefore, impacts associated with construction equipment exhaust emissions of criteria pollutants that would result from implementation of the Plan are considered *less than significant with mitigation*.

Street Network Changes

As described in Chapter II, Project Description, this EIR analyzes proposed street network changes at a project-specific level of detail. The proposed improvements would support pedestrian and cycling modes and lessen the impact of traffic on transit performance, while accommodating regional and through traffic on a limited number of streets where necessary. Proposals have been developed for Folsom, Howard, Third, Fourth, Harrison, Bryant, and Brannan Streets, extending as far west as Eleventh Street (in the case of Howard and Folsom Streets) and east to The Embarcadero (Folsom Street only). The proposals for these streets include wider sidewalks, upgraded and new transit lanes, cycle tracks, and travel lane reductions, as described in detail in Chapter II. Air quality-related effects of these improvements are analyzed here.

Construction activities to implement the street network changes would be subject to the Construction Dust Control Ordinance aimed at reducing the quantity of dust generated during site preparation, demolition and construction work in order to protect the health of the general public and of onsite workers, minimize public nuisance complaints, and avoid orders to stop work by DBI; in particular, Section 1247 makes the ordinance specifically applicable to construction on City property even where no *Building Code* permit requirement is triggered. The Ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from DBI. Compliance with the regulations and procedures set forth in the San Francisco Dust Control Ordinance would ensure that potential dust-related construction air quality impacts from the street network changes would be reduced to a less-than-significant level.

To calculate criteria air pollutant emissions associated with construction of these street network changes, the Planning Department performed an analysis that assumed that one block of streetscape construction could be completed in a single day to provide a conservative (i.e., higher) estimate of the daily emissions from construction activities.³⁰⁹ Streetscape improvements on a block-by-block basis were identified based on the information provided by the Department's Citywide Planning division. For each block, treatments (e.g., sidewalk widening, raised bicycle lanes, etc.) with a certain width that run continuously throughout the corridor were

³⁰⁷ California Environmental Protection Agency, *Staff Report: Multimedia Evaluation of Renewable Diesel*, May 2015. This document is available at http://www.arb.ca.gov/fuels/multimedia/meetings/RenewableDieselStaffReport_Nov2013.pdf.

³⁰⁸ Parcel size limits the amount of construction equipment and grading area at any one time.

³⁰⁹ San Francisco Planning Department, *Memorandum Regarding Criteria Pollutant Calculations for Central SoMa Construction Scenarios* from E. Jaszewski San Francisco Planning Department to E. Purl Planning Coordinator, June 23, 2014.

multiplied by 910 feet (a typical SoMa area block length, including intersection) to determine the construction area for each treatment. These results were then entered into the Department's Construction Criteria Pollutant Calculator under the appropriate treatment type. Emissions from streetscape construction on Brannan Street between Second and Sixth Streets resulted in the highest average daily emissions. Construction emissions from proposed streetscape improvements on the other corridors (Howard, Folsom, Harrison, Bryant, Third, and Fourth Streets) would be below the emissions levels expected for streetscape improvements proposed along Brannan Street. Therefore, streetscape improvements proposed for each block of Brannan Street would represent the average daily construction emissions expected. These worst-case construction-related emissions are presented in **Table IV.F-8, Average Daily Construction-Related Emissions**, and, as indicated in the table, would be less than significant. While it is not expected that lane painting would occur concurrently with construction improvements, the data in Table IV.F-8 conservatively assumes that they would.

TABLE IV.F-8 AVERAGE DAILY CONSTRUCTION-RELATED EMISSIONS

	Average Daily Construction Emissions (pounds/day)			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Construction (Brannan Street)	2.7	24	1.3	1.2
Lane Painting	11	NA	NA	NA
Total	13.7	24	1.3	1.2
Significance Threshold	54	54	82	54
Above Threshold?	No	No	No	No

SOURCE: San Francisco Planning Department, 2014.

As shown in Table IV.F-8, construction criteria pollutant emissions from street network changes would be *less than significant*.

Mitigation: None required.

Open Space Improvements

Similar to subsequent development projects and street network changes, open space improvements would be required to comply with the Construction Dust Control Ordinance. Therefore, construction dust impacts would be less than significant.

Most of the proposed open space improvements, including greening and related enhancements to mid-block streets and alleys, would be of a magnitude comparable to the construction activities required for the street network changes, discussed above. Therefore, impacts of construction of these proposed open space improvements is effectively described by the impact analysis of the proposed street network changes, and would be less than significant with respect to criteria pollutants.

The Plan does include consideration of one larger open space, on the block bounded by Fourth, Fifth, Bryant, and Brannan Streets, at least in part on 1.4 acres of land owned by the SFPUC. In 2012, the Planning Department analyzed air quality impacts of the renovation of the 6.1-acre Minnie and Lovie Ward Playfields in the Oceanview district. This project involved demolition of the existing playfields; grading and utility trenching; installation of concrete curbs, walkways, fencing and light poles and their footings; installation of artificial turf,

and tree trimming, removal, and replacement over a proposed eight-month construction schedule. Maximum (peak-day) criteria pollutant emissions were found to be less than 60 percent of any of the significance thresholds on p. IV.F-24.³¹⁰ Furthermore, screening criteria were developed for typical City park land uses in CalEEMod, assuming construction in 2016 (a worst case year as improvements to the construction equipment fleet in future years would result in lesser emissions). Development of City parks of less than 20 acres would have construction-related ROG and NO_x emissions of less than 54 pounds per day³¹¹. Because the proposed park in the Plan Area (and any other potential new open space that might subsequently be proposed in, or adjacent to, the Plan Area) would be considerably smaller than the size of Minnie and Lovie Ward Playfields and the 20-acre parcel size screening criteria, and the general nature of site work would be comparable, criteria pollutant emissions from construction of open space improvements would be *less than significant*.

Mitigation: None required.

Conclusion

Mitigation Measure M-AQ-4a: Construction Emissions Analysis and Mitigation Measure M-AQ-4b: Construction Emissions Minimization Plan would substantially reduce criteria air pollutant emissions resulting from construction that may occur as a result of subsequent development projects. Consequently, this impact is identified as *less than significant with mitigation*. Construction-related criteria air pollutant emissions from street network changes and the open space improvements would be *less than significant*.

Community Risk and Hazard Impacts (Program-Level Plan Analysis and Analysis of Subsequent Development Projects, Street Network Changes, and Open Space Improvements)

Impact AQ-5: Development under the Plan, including proposed street network changes, would result in operational emissions of fine particulate matter (PM_{2.5}) and toxic air contaminants that would result in exposure of sensitive receptors to substantial pollutant concentrations. (Significant and Unavoidable with Mitigation)

As discussed in above on p. IV.F-9, the City has modeled air pollution from all known sources and has identified areas with poor air quality, known as the APEZ. The Plan, including subsequent development projects, would emit TACs and PM_{2.5} as a result of vehicle trips and stationary sources. Emissions of PM_{2.5} and other TACs could affect existing and future residences or other sensitive receptors, the effects of which are analyzed below.

Indirect Plan-Generated Mobile Source Emissions

At present, and as stated in the Environmental Setting, above, the vast majority of the Plan Area is located within the City's identified APEZ, an area where air pollutant levels exceed health protective standards. In

³¹⁰ San Francisco Planning Department, *Minnie and Lovie Ward Playfields Renovation Final Mitigated Negative Declaration* (Case No. 2011.0148E), September 20, 2012.

³¹¹ The threshold of 20 acres or more of city parkland is based on CalEEMod version 2013.2.2 year 2016 construction with the default construction equipment and construction phasing that would result in emissions of one or more criteria pollutants from project construction that would approach the City's significance thresholds.

addition, Plan-generated traffic and the proposed street network changes would add or relocate vehicle emissions that could substantially change the geographic extent and severity of the APEZ.

While there are two packages of street network changes contemplated, with the primary difference between the two being either a one-way or two-way configuration of Folsom and Howard Streets, the set of street network changes assuming a one-way configuration of Folsom and Howard Streets is anticipated to yield the most conservative overall (i.e., “worst case”) localized air pollutant impact based on a sensitivity analysis of traffic volumes prepared by the Planning Department.³¹² A scenario assuming implementation of the proposed zoning (use and height and bulk district) changes (without the street network changes) is anticipated to result, generally, in lower overall health risk impacts and a scenario assuming implementation of the zoning changes with a two-way configuration of Howard and Folsom Streets would result in air quality impacts similar to the one-way configuration of Howard and Folsom Streets. Consequently, a health risk assessment was conducted to estimate the incremental change in excess cancer risks and localized PM_{2.5} concentrations that would result from Plan-generated traffic assuming a one-way configuration of Howard and Folsom Streets.

The health risk assessment involved the use of the AERMOD air quality model to evaluate concentrations of DPM, Total Organic Gases (TOG), and PM_{2.5} along Plan Area streets. This allows for calculation of cancer risk (based on DPM from diesel vehicles and TOG from gasoline vehicles) and PM_{2.5} concentration. The modeling was conducted based on the “worst case” scenario described above. Other modeling parameters included 2008 BAAQMD meteorological data from the air district’s Mission Bay station; United States Geological Survey elevation data, vehicle emissions rates adjusted for San Francisco’s variation in traffic volumes throughout the day, a source release height of 2.5 meters and a source vertical dimension of 2.3 meters, and a ground-floor receptor height (0 meters). These parameters were consistent with those employed in the citywide modeling conducted previously and described above on p. IV.F-9. The analysis also incorporated updated health risk parameters from the Office of Environmental Health Hazard Assessment (OEHHA) that were adopted in 2015³¹³ and therefore not included in the existing citywide health risk modeling or APEZ. Results of the modeling were overlaid on top of the citywide modeling results (which were adjusted to account for updated OEHHA health risk guidelines) to determine whether the proposed project would substantially change the geographic extent or severity of the exposure zone, as defined in the Approach to Analysis subsection, p. IV.F-9.³¹⁴

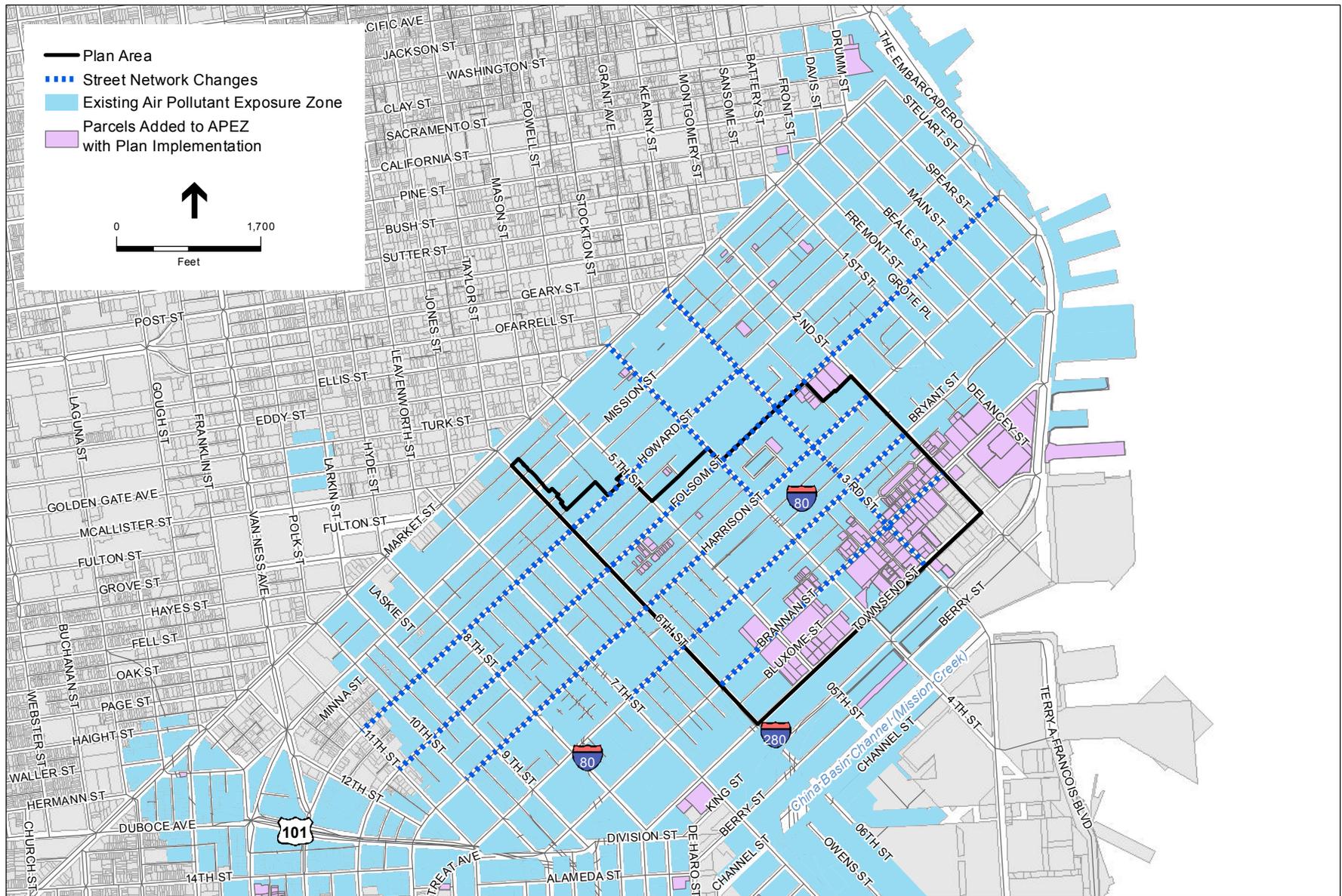
The results of the assessment indicate that Plan traffic would incrementally expand the geographic extent of the APEZ, adding to the APEZ all of the approximately 40 parcels north of the I-80 freeway that are currently outside the zone (these parcels are largely concentrated near Second and Folsom Streets and along Shipley Street between Fifth and Sixth Streets), and also adding to the APEZ a large number of parcels south of the freeway, including South Park. **Figure IV.F-2, Parcels Newly Added to Air Pollutant Exposure Zone with Plan Implementation**, depicts the additional parcels that would meet the APEZ criteria in comparison to the existing APEZ.³¹⁵

³¹² San Francisco Planning Department, *Central Corridor Sensitivity Analysis Methodology*, Memorandum from Erik Jaszewski to Elizabeth Purl, Environmental Planning, November 8, 2013.

³¹³ The updated health risk parameters from OEHHA require prior cancer risk calculations to be multiplied by a factor of 1.3744. This factor accounts for various changes in breathing rates and other exposure parameters.

³¹⁴ Environ International, *Air Quality Technical Report, Central SoMa Plan*, October 2014.

³¹⁵ Many parcels within the Plan Area would meet the APEZ criteria using the updated OEHHA exposure parameters without the additional emissions from plan-generated traffic.



SOURCE: City of San Francisco, 2016; ESA, 2016

Case No. 2011.1356E: Central SoMa Plan

Figure IV.F-2

Parcels Newly Added to Air Pollutant Exposure Zone with Plan Implementation

As a result of Plan-generated traffic, including the proposed street network changes, excess cancer risk within the Air Pollutant Exposure Zone would increase by as much as 226 in a million and PM_{2.5} concentrations would increase by up to 4.54 µg/m³ at individual receptor points. These levels substantially exceed the thresholds identified in the Approach to Analysis subsection.

Therefore, Plan-generated traffic would significantly affect both the geography and severity of health risks within, and proximate to, the Plan Area.

Mitigation Measure M-NO-1a, Transportation Demand Management (TDM), in Section IV.E, Noise and Vibration, would reduce vehicle emissions by reducing vehicle trips. As stated in that Section, Mitigation Measure M-NO-1a includes identification of a project TDM Coordinator, provision of transportation and trip planning information to building occupants, and components that encourage bicycles, car share, and transit, reduce parking, allow for City access for data collection, and TDM program monitoring. Additionally, as discussed in Impact AQ-3, the *Planning Code* contains requirements applicable to individual development projects that would serve to reduce vehicle trips, compared to conditions without such requirements. Section 421 of the City's *Environment Code* mandates that larger employers provide transit, transit passes, or financial incentives for transit use (Section 421), which also has the potential to reduce vehicle travel. Additionally, the *San Francisco General Plan* and the *City Charter* contain numerous policy directives aimed at reducing auto trips, not the least of which is the City's Transit First Policy (Section 16.102 of the *Charter*). However, the efficacy of these requirements and mitigation measures to reduce tailpipe emissions cannot be quantified because it is uncertain the degree to which these measures would reduce the number of vehicle trips, and resulting tailpipe emissions. Because vehicle emissions are regulated at the State and federal level, and no additional feasible mitigation measures have been identified to reduce vehicle emissions in the Plan Area, Plan-generated traffic would result in a *significant and unavoidable* impact.

Stationary and Non-Permitted Sources

Both existing and new stationary sources as well as other non-permitted sources in the Plan Area result in potential health risks (primarily lifetime cancer risk) to sensitive receptors, which would be expected to consist mostly of persons living in residential projects developed in the Plan Area.³¹⁶ As noted in the Environmental Setting, above, existing known stationary sources have been included in the modeling conducted for the APEZ. Additionally, the major non-permitted source of TACs in the vicinity of the Plan Area is the Caltrain station at Fourth and Townsend Streets, along with the Caltrain tracks that extend west along the south side of Townsend Street before turning south at Seventh Street. Emissions from the Caltrain station and tracks are also included in the APEZ dispersion modeling conducted by the BAAQMD and the City.³¹⁷

³¹⁶ Under recently updated health risk assessment protocols published by OEHHA in 2015 and BAAQMD in 2016, lifetime cancer risks to residents are calculated based on assumed exposure for 24 hours per day over a 30-year period, with additional risk factors included for infants and children because of their greater sensitivity. In contrast, employee risks are normally calculated based on exposure for 8 hours per day over 25 years. Therefore, for the same receptor location, resident risks are always higher than worker risks, and residents are considered "sensitive receptors," while workers generally are not. Other sensitive receptors likely to be found in the Plan Area include children and infants at child-care centers, of which there are several in the Plan Area. Hotel occupants are not considered sensitive receptors because they are transient, meaning they are exposed to risks at a particular location for only a few days at a time under most circumstances. These updated protocols have also increased breathing rate assumptions for sensitive receptors.

³¹⁷ Environ International, *Project and Plan-Level Health Risk Analysis: Western SoMa Community Plan, Rezoning of Adjacent Parcels and 350 8th Street Project, San Francisco, California*, May 2012.

Subsequent development projects in the Plan Area would result in potential health risks for sensitive receptors (primarily residents) in or near the Plan Area if these projects were to include sources of TACs. Among these sources would be diesel-powered emergency generators, which are required to be installed in taller buildings (generally, those with occupiable floors above 75 feet in height, in accordance with Section 2702.2.15 of the *San Francisco Building Code* [2013], adopted from the *California Building Code* without modification). Operation of these generators could expose nearby sensitive receptors to elevated concentrations of TACs and PM_{2.5}, although it would be speculative to try to quantify or otherwise analyze in detail those emissions, absent any detailed design proposals. Other potential sources of TACs include new gasoline stations and auto body shops, cogeneration (combined heat and electricity) facilities (possibly only for larger projects), as well as other specific commercial activities that emit TACs. Most new stationary sources, including backup generators, would require a permit from the BAAQMD, and BAAQMD permit requirements would generally reduce emissions from such sources. For example, all stationary engines greater than 50 horsepower require a BAAQMD permit and diesel engines must comply with a State-mandated TAC control measure for such engines, which is administered by BAAQMD. In general, BAAQMD will not issue a permit for a stationary diesel engine that would result in a cancer risk greater than ten in one million for the maximally exposed receptor. However, within the APEZ, additional emissions of TACs would be a significant impact, given that these areas already have poorer air quality and increased health vulnerability from air pollution. **Mitigation Measures M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps; M-AQ-5b, Siting Uses that Emit Particulate Matter (PM_{2.5}), Diesel Particulate Matter, or Other Toxic Air Contaminants; and M-AQ-5d, Land Use Buffers around Active Loading Docks**, would reduce this impact to *less than significant* by ensuring that emissions from new sources of TACs are reduced to the extent feasible. Generators with Tier 4 engines emit 75 to 85 percent fewer DPM and PM_{2.5} emissions than Tier 2 engines, while emissions of diesel particulate matter can be reduced by 89 to 94 percent with Level 3 VDECS compared to equipment with engines meeting no emission standards. Furthermore, renewable diesel R100 has the potential to reduce particulate matter emissions by about 30 percent and NO_x emissions by 10 percent.³¹⁸

Exposure of Sensitive Receptors

As noted in the Environmental Setting, the City's APEZ is established based on emissions from all sources of TACs and PM_{2.5}, including both mobile and stationary sources and as discussed in the Regulatory Framework, *San Francisco Health Code* Article 38 protects new sensitive land uses from sources of air pollution by requiring that within the APEZ, these uses incorporate enhanced ventilation systems, including MERV 13 filtration, into building design and construction. MERV 13 air filtration is capable of removing 80 percent of particulate matter, thereby reducing an individual's exposure to air pollution. For projects proposing new sensitive land uses, most locations in the Plan Area are within the APEZ and would be required to install the enhanced filtration required by *Health Code* Article 38.

However, as discussed above, indirect traffic generated by the project, as well as the reconfiguration of the street network in the Plan Area would add and relocate vehicle emissions that would change the geographic extent and severity of the APEZ, significantly exacerbating existing localized air quality conditions. With plan traffic, the additional parcels discussed above and identified in Figure IV.F-2 would meet the APEZ criteria.

³¹⁸ California Environmental Protection Agency, *Staff Report: Multimedia Evaluation of Renewable Diesel*, May 2015. Available at http://www.arb.ca.gov/fuels/multimedia/meetings/RenewableDieselStaffReport_Nov2013.pdf.

These parcels are currently not subject to *Health Code* Article 38; therefore, new sensitive use projects proposed on these lots would be exposed to substantial pollutant concentrations resulting from Plan-generated traffic, a significant impact. As discussed in the Regulatory Framework, Article 38 requires DPH to periodically update the analysis and mapping identifying the APEZ. **Mitigation Measure M-AQ-5c, Update Air Pollution Exposure Zone for San Francisco Health Code Article 38**, would require DPH to update the APEZ in accordance with updated health risk guidelines adopted by OEHHA in 2015 and to take into account traffic generated by the Plan. Additionally, **Mitigation Measure M-AQ-5d, Land Use Buffers around Active Loading Docks**, would require sensitive receptors to be located as far away from truck activity areas as possible. These measures would reduce this impact to less than significant.

Mitigation Measures

Implement **M-NO-1a: Transportation Demand Management for New Development Projects**.

Mitigation Measure M-AQ-5a: Best Available Control Technology for Diesel Generators and Fire Pumps. All diesel generators and fire pumps shall have engines that (1) meet Tier 4 Final or Tier 4 Interim emission standards, or (2) meet Tier 2 emission standards and are equipped with a California Air Resources Board Level 3 Verified Diesel Emissions Control Strategy. All diesel generators and fire pumps shall be fueled with renewable diesel, R99, if commercially available. For each new diesel backup generator or fire pump permit submitted for the project, including any associated generator pads, engine and filter specifications shall be submitted to the San Francisco Planning Department for review and approval prior to issuance of a permit for the generator or fire pump from the San Francisco Department of Building Inspection. Once operational, all diesel backup generators and Verified Diesel Emissions Control Strategy shall be maintained in good working order in perpetuity and any future replacement of the diesel backup generators, fire pumps, and Level 3 Verified Diesel Emissions Control Strategy filters shall be required to be consistent with these emissions specifications. The operator of the facility shall maintain records of the testing schedule for each diesel backup generator and fire pump for the life of that diesel backup generator and fire pump and provide this information for review to the Planning Department within three months of requesting such information.

Mitigation Measure M-AQ-5b: Siting of Uses that Emit Particulate Matter (PM_{2.5}), Diesel Particulate Matter, or Other Toxic Air Contaminants. To minimize potential exposure of sensitive receptors to diesel particulate matter or substantial levels of toxic air contaminants as part of everyday operations from stationary or area sources (other than the sources listed in M-AQ-5a), the San Francisco Planning Department shall require, during the environmental review process of such projects, but not later than the first project approval action, the preparation of an analysis by a qualified air quality specialist that includes, at a minimum, a site survey to identify residential or other sensitive receptors within 1,000 feet of the project site. For purposes of this measure, sensitive receptors are considered to include housing units; child care centers; schools (high school age and below); and inpatient health care facilities, including nursing or retirement homes and similar establishments. The assessment shall also include an estimate of emissions of toxic air contaminants from the source and shall identify all feasible measures to reduce emissions. These measures shall be incorporated into the project prior to the first approval action.

Mitigation Measure M-AQ-5c: Update Air Pollution Exposure Zone for San Francisco Health Code Article 38. The Department of Public Health is required to update the Air Pollution Exposure Zone Map in *San Francisco Health Code* Article 38 at least every five years. The Planning Department shall

coordinate with the Department of Public Health to update the Air Pollution Exposure Zone taking into account updated health risk methodologies and traffic generated by the Central SoMa Plan.

Mitigation Measure M-AQ-5d: Land Use Buffers around Active Loading Docks. Locate sensitive receptors as far away as feasible from truck activity areas including loading docks and delivery areas.

Significance after Mitigation: Mitigation Measures M-AQ-5a and M-AQ-5b would reduce emissions of PM_{2.5} and other TACs from new stationary sources to less-than-significant levels. Mitigation Measure M-AQ-5c and M-AQ-5d would protect new sensitive land uses from emissions associated with truck activity areas and on sites not currently subject to Article 38, reducing exposure of new sensitive land uses from Plan-generated traffic emissions to *less than significant*.

Mobile sources generated by the Plan would significantly affect the geography and severity of the Air Pollutant Exposure Zone. Mitigation Measure M-NO-1a, Transportation Demand Management for New Development Projects, in Section IV.E, Noise and Vibration, would reduce the number of vehicle trips generated by the Plan, but because the degree to which trips (and thereby emissions) could be reduced by these measures cannot be reliably estimated, and because vehicle emissions are regulated at the State and federal level and local jurisdictions are preempted from imposing stricter emissions standards for vehicles, and because no other feasible mitigations are available, the impact of traffic-generated TACs on existing sensitive receptors would be *significant and unavoidable*.

As explained in Impact AQ-3, the proposed open space improvements would not be of sufficient magnitude to draw large numbers of users from outside the immediate neighborhood. Accordingly, the proposed open space improvements would be expected to generate little, if any, motor vehicle travel and thus would make a *less-than-significant* contribution to vehicular emissions.

Impact AQ-6: Development under the Plan, including proposed open space improvements and street network changes, would result in construction activities that could expose sensitive receptors to substantial levels of fine particulate matter (PM_{2.5}) and toxic air contaminants generated by construction equipment. (Less than Significant with Mitigation)

Subsequent Development Projects

Diesel-powered construction equipment generates emissions of DPM, which is identified as a carcinogen by ARB. As noted in the Significance Criteria discussion of health risks, on p. IV.F-21, construction-phase emissions of TACs are temporary and do not easily lend themselves to health risk modeling, which normally relies on longer-term exposure periods. Therefore, project-level analyses of construction activities have a tendency to produce overestimated assessments of long-term health risks. However, within the APEZ, as discussed above, additional construction activity would adversely affect populations that are already at a higher risk for adverse long-term health risks from existing sources of air pollution. The Plan would also indirectly generate additional vehicle trips that would result in additional parcels meeting the APEZ criteria, as shown in Figure IV.F-2. Construction activities using off-road diesel equipment and vehicles in these areas would expose sensitive receptors to substantial levels of air pollution, a significant impact. Accordingly, subsequent development projects within the APEZ and on lots identified in Figure IV.F-2 as being newly within the Exposure Zone would be subject to **Mitigation Measure M-AQ-6a, Construction Emissions**

Minimization Plan, which would reduce this impact to a less-than-significant level. Mitigation Measure M-AQ-6a identifies the locations where a Construction Emissions Minimization Plan is required to reduce health risk effects from construction emissions.

While emission reductions from limiting idling, educating workers and the public, and properly maintaining equipment are difficult to quantify, other measures, specifically the requirement for equipment with Tier 2 engines and Level 3 Verified Diesel Emission Control Strategy (VDECS), can reduce construction emissions by 89 to 94 percent compared to equipment with engines meeting no emission standards and without a VDECS. Emissions reductions from the combination of Tier 2 equipment with level 3 VDECS is almost equivalent to requiring only equipment with Tier 4 Final engines. Furthermore, renewable diesel R100 has the potential to reduce particulate matter emissions by about 30 percent and NO_x emissions by 10 percent.³¹⁹ Therefore, compliance with Mitigation Measure M-AQ-6 would reduce construction emissions impacts to nearby sensitive receptors to a less-than-significant level.

Mitigation Measures

Mitigation Measure M-AQ-6a: Construction Emissions Minimization Plan. All projects within the Air Pollutant Exposure Zone and newly added Air Pollutant Exposure Zone lots identified in Figure IV.F-2 shall comply with M-AQ-4b, Construction Emissions Minimization Plan.

Significance after Mitigation: Implementation of Mitigation Measure M-AQ-6a would reduce construction diesel emissions by 89 to 95 percent compared to construction equipment with no emissions controls and would reduce the impact to a *less-than-significant* level.

Street Network Changes and Open Space Improvements

Public projects such as the proposed street network changes and open space improvements would be subject to the conditions of the Clean Construction Ordinance. This ordinance requires implementation of measures to reduce diesel emissions generated at publicly funded construction sites and thereby related potential health risks. Specifically, the ordinance requires that City-funded projects employing heavy off-road equipment for 20 days or more that are within 1,000 feet of a sensitive receptor and within the APEZ use diesel engines that meet or exceed either EPA or ARB Tier 2 off-road emission standards and be retrofitted with an ARB Level 3 VDECS. Additionally, the ordinance prohibits the use of portable diesel engines where alternative sources of power are available (i.e., requires use of available utility-provided electricity in lieu of a diesel generator), limits idling of diesel engines, requires that equipment be properly maintained and tuned, and mandates submittal to the authorizing City department of a Construction Emissions Minimization Plan prior to the start of work. Waivers to the equipment requirements may be granted only if compliance is not feasible or in case of emergency. For projects outside the APEZ, the ordinance requires the use of biodiesel fuel grade B20 or higher for off-road diesel equipment and use of Tier 2 or similar off-road equipment. However, as discussed above, the plan would indirectly generate additional vehicle trips that would result in additional areas meeting the APEZ health risk criteria as shown in Figure IV.F-2. Construction activities on, or adjacent to, these parcels would adversely affect populations already at a higher risk for adverse long-term health risks, a

³¹⁹ California Environmental Protection Agency, *Staff Report: Multimedia Evaluation of Renewable Diesel*, May 2015. Available at http://www.arb.ca.gov/fuels/multimedia/meetings/RenewableDieselStaffReport_Nov2013.pdf.

significant impact. **Mitigation Measure M-AQ-6b** would apply the more stringent clean construction requirements to those areas, reducing the impact to *less than significant with mitigation*.

Mitigation Measures

Mitigation Measure M-AQ-6b: Implement Clean Construction Requirements. Construction of street network changes and open space improvements adjacent to newly added air pollution exposure zone lots identified in Figure IV.F-2 shall comply with the Clean Construction requirements for projects located within the APEZ.

Significance after Mitigation: Mitigation Measure M-AQ-6b would apply the more stringent requirements for clean construction equipment within the areas that would meet the APEZ criteria under existing plus project conditions and would reduce this impact to *less than significant*.

Conclusion

Mitigation Measures M-AQ-6a, Construction Emissions Minimization Plan, and M-AQ-6b, Implement Clean Construction Requirements, would reduce TAC emissions resulting from construction that may occur as a result of subsequent development projects and proposed street network changes and open space improvements. Consequently, this impact is identified as *less than significant with mitigation*.

Impact AQ-7: Implementation of the Plan would not expose a substantial number of people to objectionable odors affecting a substantial number of people. (Less than Significant)

As stated under Environmental Setting, above, likely potential sources of odors in the Plan Area are generally limited to auto body shops. Some people may find odors from restaurants objectionable at times, although restaurants are unlikely to generate a substantial number of complaints. Additionally, BAAQMD Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. Sources that typically generate odors such as wastewater treatment and pumping facilities; landfills, transfer stations, and composting facilities; petroleum refineries, asphalt batch plants, chemical (including fiberglass) manufacturing, and metal smelters; painting and coating operations; rendering plants; coffee roasters and food processing facilities are generally not present in the Plan Area. Given the limited number of land uses in the Plan Area that would likely be associated with odorous emissions, as described in the Environmental Setting, and given that few, if any, major new odor sources are likely to be developed in the Plan Area, odor impacts would be *less than significant*.

Mitigation: None required.

IV.F.5 Cumulative Impacts

Impact C-AQ-1: Development under the Plan, including proposed street network changes, but not open space improvements, in combination with past, present, and reasonably foreseeable future projects in the vicinity, under cumulative 2040 conditions, would contribute considerably to criteria air pollutant impacts. (Significant and Unavoidable with Mitigation)

BAAQMD considers criteria air pollutant impacts to be cumulative by nature. As indicated in Impact AQ-4, implementation of Mitigation Measures M-AQ-4a and M-AQ-4b would ensure that construction-related emissions would be less than significant. Accordingly, the Plan would not result in a cumulatively considerable contribution of criteria air pollutants from construction. Additionally, the proposed street network and open space improvements would not result in construction-related criteria air pollutants in excess of the project-level significance thresholds, and would therefore not make a considerable contribution to this cumulative impact.

Operational criteria air pollutant emissions of the Plan (assessed using the Plan-level thresholds from the BAAQMD), addressed individually and cumulatively in Impacts AQ-1 and AQ-2 would not make a considerable contribution to regional emissions of criteria air pollutants, given the Plan's consistency with the *Clean Air Plan*, the modest growth in VMT compared to population growth as well as not resulting in intersection volumes that would trigger a concern with regard to localized CO concentrations. However, as discussed under Impact AQ-3, subsequent individual development projects and proposed street network changes could emit criteria air pollutants or result in increased vehicle delays thereby increasing vehicle emissions in excess of the project-level significance criteria, resulting in a considerable contribution to cumulative air quality impacts. Subsequent projects with the potential to result in a considerable contribution to cumulative air quality impacts would be required to implement the transportation demand management actions identified in **Mitigation Measure M-NO-1a, Transportation Demand Management (TDM)**, in Section IV.E, Noise and Vibration. Certain subsequent development projects could also be subject to **M-AQ-3a, Education for Residential and Commercial Tenants Concerning Low-VOC Consumer Products**, **M-AQ-3b, Reduce Operational Emissions**, and **M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps**. However, because it cannot be stated with certainty that mitigation would reduce cumulative criteria air pollutant impacts to less-than-significant levels; this impact is considered significant and unavoidable with mitigation. Potential open space improvements in the Plan Area would be considerably smaller in size and less than 20 acres, and would therefore not make considerable contribution to criteria pollutant emissions. Therefore cumulative operational criteria air pollutant impacts from open space improvements would be *less than significant*.

Mitigation: Implement **Mitigation Measures M-NO-1a, Transportation Demand Management (TDM) for Development Projects**, in Section IV.E, Noise and Vibration, and **M-AQ-3a, Education for Residential and Commercial Tenants Concerning Low-VOC Consumer Products**, **M-AQ-3b, Reduce Operational Emissions**, and **M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps**; **M-AQ-4a, Construction Emissions Minimization**; and **M-AQ-4b, Construction Emissions Reduction Plan**.

Significance after Mitigation: Even with implementation of these mitigation measures, impacts with respect to subsequent development projects in the Plan Area and proposed street network changes under 2040

cumulative conditions would be *significant and unavoidable*. As noted in Impact AQ-3, however, the identification of this significant impact does not preclude the finding of future less-than-significant impacts for subsequent projects that comply with applicable screening criteria or meet applicable thresholds of significance.

Impact C-AQ-2: Development under the Plan, including the proposed street network changes, but not open space improvements, in combination with past, present, and reasonably foreseeable future projects in the vicinity, would result in exposure of sensitive receptors to substantial levels of fine particulate matter (PM_{2.5}) and toxic air contaminants under 2040 cumulative conditions. (Significant and Unavoidable with Mitigation)

As described above in Impact AQ-5, the Plan would indirectly result in traffic emissions and emissions from stationary sources that would have a significant effect on sensitive receptors. These emissions would contribute considerably to cumulative health risk effects within the Plan Area and vicinity. Therefore, the Plan would result in a significant cumulative impact with respect to PM 2.5 and TAC emissions.

The results of the cumulative health risk assessment indicate that Plan-generated traffic would increase the geographic extent of the APEZ under 2040 cumulative conditions, compared to existing conditions. However, because of anticipated decreases in emissions with improved vehicle efficiency and emissions controls, the anticipated APEZ in 2040 would be smaller than would the APEZ modeled for existing plus project conditions. **Figure IV.F-3, Parcels Newly Added to Air Pollutant Exposure Zone with Plan Implementation (2040)**, p. IV.F-56, graphically depicts the additional parcels that would meet the APEZ criteria under cumulative plus project conditions in comparison to the existing APEZ.

Within the APEZ, Plan-generated traffic would increase excess cancer risk by more than seven per one million persons exposed, while PM_{2.5} concentrations would increase by up to 0.17 µg/m³ at individual receptor points. As explained in the Approach to Analysis, an increased cancer risk greater than seven per million persons exposed within the APEZ would be a significant impact. The noise analysis identifies Mitigation Measure M-NO-1a, Transportation Demand Management (TDM), in Section IV.E, Noise and Vibration, which would reduce vehicle emissions through transportation demand management and other measures. Additionally, as discussed in Impact AQ-3, the *Planning Code* contains requirements applicable to individual development projects that would serve to reduce vehicle trips, compared to conditions without such requirements. Section 421 of the City's *Environment Code* mandates that larger employers provide transit, transit passes, or financial incentives for transit use (Section 421), which also has the potential to reduce vehicle travel. Additionally, the *San Francisco General Plan* and the *City Charter* contain numerous policy directives aimed at reducing auto trips, not the least of which is the City's Transit First Policy (Section 16.102 of the Charter). However, the efficacy of these measures to reduce tailpipe emissions cannot be quantified because it is uncertain the degree to which these measures would reduce the number of vehicle trips. Therefore, Plan-generated traffic would significantly affect both the geography and severity of health risks within the Plan Area under 2040 cumulative conditions, resulting in a considerable contribution to cumulative health risk impacts. The proposed street network changes would not generate new vehicle trips but would relocate vehicle trips, thereby potentially exacerbating this impact.

The proposed open space improvements would not be of sufficient magnitude to draw large numbers of users from outside the immediate neighborhood and would be expected to generate little, if any, motor vehicle travel. Therefore, the proposed open space improvements would not make a considerable contribution to cumulative health risk impacts.

As described above in Impact AQ-6, development under the Plan would result in construction activities that could expose sensitive receptors to substantial levels of fine particulate matter and TACs generated by construction equipment, particularly from diesel emissions. However, implementation of Mitigation Measure M-AQ-6a, Construction Emissions Minimization Plan, would require all projects within the APEZ and newly added APEZ lots identified in Figure IV.F-2 to comply with Mitigation Measure M-AQ-4b, Construction Emissions Minimization Plan. This would reduce construction diesel emissions by 89 to 95 percent, reducing the impact to less than significant. Therefore, construction emissions would not make a considerable contribution to cumulative health risk impacts. The proposed open space improvements and street network changes would be required to comply with the Clean Construction Ordinance. However, the more stringent clean construction requirements only apply to parcels in the existing APEZ. Therefore, construction of street network changes and open space improvements adjacent to newly added parcels as shown on Figure IV.F-2 would result in significant health risk impacts to adjacent sensitive receptors. Mitigation Measure M-AQ-6b would require implementation of the more stringent requirements of the Clean Construction Ordinance for construction on or adjacent to the newly added parcels shown in Figure IV.F-2. Therefore, with implementation of M-AQ-6b, construction of open space improvements and street network changes would not make a considerable contribution to cumulative health risks.

Mitigation: Implement Mitigation Measures M-NO-1a: Transportation Demand Management for New Development Projects; M-AQ-4b, Construction Emissions Minimization Plan; M-AQ-5a, Best Available Control Technology for Diesel Generators and Fire Pumps; M-AQ-5b, Siting of Uses that Emit Particulate Matter (PM_{2.5}), Diesel Particulate Matter, or Other Toxic Air Contaminants; M-AQ-5c, Update Air Pollution Exposure Zone for *San Francisco Health Code Article 38*; and M-AQ-6b, Implement Clean Construction Requirements. As discussed above, the Department of Public Health is required to update the Air Pollutant Exposure Zone map at least every five years in accordance with *San Francisco Health Code Article 38*. The updated mapping would capture parcels that could be added to the APEZ as a result of future traffic. Mitigation Measures M-AQ-4b, M-AQ-5a, and M-AQ-6b would apply to the Air Pollutant Exposure Zone of *San Francisco Health Code Article 38* in effect at the time subsequent development projects are proposed.

Significance after Mitigation: Even with implementation of these mitigation measures, cumulative impacts with respect to subsequent development projects and proposed street network changes, and emissions of TACs generated by development occurring pursuant to the Plan under 2040 cumulative conditions would result in significant cumulative impacts to existing sensitive receptors and this impact would be *significant and unavoidable with mitigation*.

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