3.3 - Air Quality/Greenhouse Gas Emissions

This section describes the existing air quality setting and potential effects from Project implementation on the Project Site and its surrounding area. FirstCarbon Solutions performed air quality analysis for the Project. The air quality analysis included qualitative assessment of plan compliance and greenhouse gas (GHG) emissions modeling. California Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to quantify Project-related emissions. The air quality analysis, including model output, is provided in Appendix B, Air Quality/Greenhouse Gas Supporting Data.

3.3.1 - Environmental Setting

Air Basin

The Project Site is located in the Tassajara Valley area of incorporated Contra Costa County, which lies entirely within the San Francisco Bay Area Air Basin (Air Basin). The Air Basin is approximately 5,600 square miles in area and consists of nine counties that surround the San Francisco Bay, including all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties; the southwestern portion of Solano County; and the southern portion of Sonoma County. Its terrain and geographical location determine the distinctive climate of the Air Basin, as the Air Basin is a coastal plain with connecting valleys and low hills. The local agency with jurisdiction over air quality in the Air Basin is the Bay Area Air Quality Management District (BAAQMD).

Air Pollutants

For reasons described below in the Regulatory Framework section, the criteria pollutants of greatest concern for the Project vicinity are ozone, PM_{10}, and $PM_{2.5}$. Carbon monoxide is of less concern in the Air Basin because it is classified as an attainment area for this pollutant. Table 3.3-4 summarizes the most relevant effects from exposure, the properties, and the sources of the pollutants. Also shown are national and California ambient air quality standards.

Toxic Air Contaminants

In addition to the criteria pollutants, discussed below, the toxic air contaminants (TACs), also known as hazardous air pollutants (HAPs), are another group of pollutants of concern. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts are not expected to occur. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the state and federal governments have set ambient air quality standards.

According to the California Almanac of Emissions and Air Quality, the majority of the estimated health risk from TACs for the State of California can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM) from diesel-fueled engines.

Diesel Particulate Matter

The ARB identified the PM emissions from diesel-fueled engines as a TAC in August 1998 under California's TAC program. The State of California, after a 10-year research program, determined in 1998 that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic (long-term) health risk. The California Office of Environmental Health Hazard Assessment (OEHHA) recommends using a 70-year exposure duration for determining residential cancer risks. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40 percent of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units.

Asbestos

Asbestos is listed as a TAC by the California ARB and a hazardous air pollutant (HAP) by the United States Environmental Protection Agency (EPA). Naturally occurring asbestos areas are identified by the type of rock found in the area. Asbestos-containing rocks found in California are ultramafic rocks, including serpentine rocks. Crushing or breaking these rocks, through construction or other means, can release asbestos form fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma.

According to the California Division of Mines and Geology, naturally occurring asbestos has been known to be present in 44 of California's 58 counties, including Contra Costa County. Based on the map provided by the Division of Mines and Geology, the nearest known location of naturally occurring asbestos is at least 7 miles north of the Project Site.

Because of the age of the existing on-site buildings, there is a possibility that potentially hazardous buildings materials such as asbestos-containing materials and lead-based paint may be encountered during demolition of on-site structures. If present, removal of these materials by contractors licensed to remove and handle these materials in accordance with all applicable federal, state, and local laws and regulations would need to occur. Mitigation Measure (MM) HAZ-1, requires testing for asbestos and lead and subsequent removal if found.

Greenhouse Gases

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way as glass traps heat in a greenhouse. The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs. GHGs are released by the combustion of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect. Just as the glass in a greenhouse lets heat from sunlight in and reduces the heat escaping, GHGs such as carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the

greenhouse effect, the Earth would be a frozen globe; thus, although an excess of GHGs results in global warming, the naturally occurring greenhouse effect is necessary to keep our planet at a comfortable temperature.

Carbon Dioxide (CO_2)

In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and evaporation from the oceans. Anthropogenic sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production and deforestation. Anthropogenic sources of CO_2 amount to over 30 billion tons per year, globally. Natural sources release substantially larger amounts of CO_2. Nevertheless, natural removal processes, such as photosynthesis by land and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and, consequently, the gas is building up in the atmosphere.

Methane (CH_4)

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH_4 in California.

Nitrous Oxide (N_2O)

Nitrous oxide is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion produce N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California.

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6)

HFCs are primarily used as substitutes for ozone depleting substances regulated under the Montreal Protocol (1987), an international treaty that was approved on January 1, 1989 and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion. PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no primary aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry leads to greater use of PFCs.

The magnitude of the impact on global warming differs among the GHGs. The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP), expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalents (CO_2e). HFCs, PFCs, and SF_6 have a greater "global warming potential" than CO_2. In other words, these other GHGs have a greater contribution to global warming than CO_2 on a per-

mass basis. However, CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere. For example, BAAQMD estimates that CO_2 made up about 92 percent of the total emission of the six gases listed above in 2007 in the Bay Area (BAAQMD 2010).

Local Air Quality

Meteorology acts on the emissions released into the atmosphere to produce pollutant concentrations. These airborne pollutant concentrations are measured throughout California at air quality monitoring sites. The California Air Resources Board (ARB) operates a statewide network of monitors. Data from this network are supplemented with data collected by local air districts, other public agencies, and private contractors.

The air quality monitoring station closest to the Project Site is the Livermore-Rincon Avenue Air Monitoring Site, which is located approximately 7.7 miles southeast of the Project Site in Alameda County. Table 3.3-1 summarizes the recorded ambient air data at the representative monitoring stations for years 2011 through 2013 (most current data available). As Table 3.3-1 shows, the recorded data show exceedances of the California standards for ozone (1-hour, and 8-hour), PM_{10} (24-hour), and national standards for 8-hour ozone and $PM_{2.5}$ (24-hour and annual) on multiple occasions from 2011 through 2013. No exceedances of either the state or national standards were recorded for NO_2, CO, or SO_2.

Table 3.3-1: Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2011	2012	2013
Ozone	1 Hour	Max 1 Hour (ppm)	**0.115**	**0.102**	**0.096**
		Days > State Standard (0.09 ppm)	3	2	3
	8 Hour	Max 8 Hour (ppm)	**0.085**	**0.090**	**0.077**
		Days > State Standard (0.07 ppm)	9	4	2
		Days > National Standard (0.075 ppm)[1]	2	3	1
CO[1]	8 Hour	Max 8 Hour (ppm)	1.24	0.82	ID
		Days > State Standard (9.0 ppm)	0	0	0
		Days > National Standard (9 ppm)	0	0	0
NO_2	Annual	Annual Average (ppm)	ID	0.01	ID
	1 Hour	Max 1 Hour (ppm)	0.0573	0.0528	0.0514
		Days > State Standard (0.18 ppm)	0	0	0
SO_2[1]	Annual	Annual Average (ppm)	0.000	ID	ID
	24 Hour	Max 24 Hour (ppm)	0.003	0.003	0.002
		Days > State Standard (0.04 ppm)	0.0	0.0	0.0

[1] On October 1, 2015, the EPA strengthened the NAAQS for ground-level ozone to 70 parts per million through the adoption of a new standard. The Final Rule went into effect on December 28, 2015.

Table 3.3-1 (cont.): Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2011	2012	2013
Inhalable coarse particles (PM_{10})[1]	Annual	Annual Average (µg/m^3)	15.7	12.6	ID
	24 hour	24 Hour (µg/m^3)	58.8	35.4	50.5
		Days > State Standard (50 µg/m^3)	**6.1**	0.0	ID
		Days > National Standard (150 µg/m^3)	0.0	0.0	ID
Fine particulate matter ($PM_{2.5}$)	Annual	Annual Average (µg/m^3)	8.5	6.6	ID
	24 Hour	24 Hour (µg/m^3)	45.4	31.1	40.1
		Days > National Standard (35 µg/m^3)	**2.0**	0.0	4.0

Notes:
> = exceed ppm = parts per million µg/m^3 = micrograms per cubic meter
ID = insufficient data ND = no data max = maximum
Bold = exceedance
State Standard = California Ambient Air Quality Standard
National Standard = National Ambient Air Quality Standard
[1] Concord-Treat Boulevard
Source: California Air Resources Board 2014a: Livermore–Rincon Avenue and Concord–Treat Boulevard BAAQMD Air Monitoring Sites

Local Sources of Air Pollution

Exhaust gas from motor vehicles that travel along the nearby roadways constitutes the major source of ambient air pollutants within the Project vicinity.

Sensitive Receptors

Some population groups such as children, the elderly, and persons with pre-existing respiratory or cardiovascular illness are more sensitive to air pollution than others. BAAQMD defines sensitive receptors as residential areas, hospitals and long-term health care facilities, rehabilitation centers, convalescent centers and retirement homes, elementary schools, daycare centers, playgrounds, athletic facilities and parks. Residential areas are considered sensitive to air pollution because residents, including children and the elderly, tend to be at home for extended periods of time, resulting in sustained exposure to pollutants. Implementation of the Project would result in the construction of new residences, some of which would be located within 1,000 feet of an existing high-volume roadway (e.g., Camino Tassajara). Sensitive receptors may also be impacted by fugitive dust and emissions generated by construction activities.

The following is a list of the closest sensitive receptors to the Project Site.

- Tassajara Hills Elementary School at 4675 Camino Tassajara located approximately 133 feet from the Project Site to the west
- Residences at 4600 and 4610 Kingswood Drive located approximately 175 feet from the Project Site to the northwest

- Residence at 3400 Cashmere Street located approximately 197 feet from the Project Site to the southwest
- Athletic field at 4680 Camino Tassajara located approximately 383 feet from the Project Site to the south

Attainment Status

The United States Environmental Protection Agency (EPA) and the ARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there are inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards.

Each standard has a different definition, or "form" of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the 3-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

The current attainment designations for the Air Basin are shown in Table 3.3-2. The Air Basin is designated as nonattainment for the state and federal ozone and $PM_{2.5}$ federal and state standards and the PM_{10} state standards.

Table 3.3-2: San Francisco Bay Area Air Basin Attainment Status

Pollutant	Designation	
	Federal	State
Ozone—1-hour	No Federal Standard	Nonattainment
Ozone—8-hour	Nonattainment	Nonattainment
PM_{10}	Unclassified	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment/Unclassified	Attainment
NO_2	Attainment/Unclassified	Attainment
SO_2	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-reducing particles	No Federal Standard	Unclassified
Source: California Air Resources Board, 2014b.		

GHG Emissions

Potential Effects of Human Activity on Global Climate Change

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2 degrees Celsius (°C) (0.36° Fahrenheit) per decade is projected, and there are identifiable signs that global warming is taking place, including substantial loss of ice in the Arctic (IPCC 2013).

Potential Effects of Climate Change on State of California

According to the ARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (ARB 2006). Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability relies on large-scale scenarios of changing climate parameters, using information that is typically at too general a scale to make accurate regional assessments (Kiparsky and Gleick 2003).

Below is a summary of some of the potential effects reported in an array of studies that could be experienced in California as a result of global warming and climate change.

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants, the effects of climate change and/or weather are less well studied, and even less well understood. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State (CCCC 2006).

Wildfires

Climate change could result in increased wildfires. In recent years, wildfires have increased in frequency, duration, and size. The forested area burned in the western United States from 1987 to 2003 is 6.7 times the area burned from 1970 to 1986. A century of fire suppression has led to increased forest densities and accumulation of fuel wood that can result in more severe fires when

this excess buildup of fuel is ignited. However, warmer temperatures and longer dry seasons are the main reasons for the increasing trend in forest wildfire risk. Reduced winter precipitation and early spring snowmelt deplete the moisture in soils and vegetation, leading to longer growing seasons and drought. These increasingly dry conditions provide more favorable conditions for ignition. In addition, higher temperatures increase evaporative water loss from vegetation, increasing the risk of rapidly spreading and large fires. In the last three decades, the wildfire season in the western United States has increased by 78 days, and burn durations of fires greater than 1,000 hectare in area have increased from 7.5 to 37.1 days, in response to a spring-summer warming. Forests at mid-elevations are at a greater risk for wildfire than lower or higher elevational bands. At high elevations, the conditions are less favorable for wildfires because even if the dry season is longer, it is still relatively short and is more protected from the drying effects of the higher temperatures (Moser et al. 2009, page 23).

Fire is an important ecosystem disturbance. It promotes vegetation and wildlife diversity, releases nutrients into the soil, and eliminates heavy accumulation of underbrush that can fuel catastrophic fires. However, if temperatures rise into the predicted medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. Because wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the State. In many regions, wildfire activity will depend critically on future precipitation patterns (California Climate Change Center 2006, page 10). The Project vicinity is not anticipated to be at significant increase of wildfire risk from climate change.

Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions (i.e., parallel climate model (PCM)) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions (such as the Hadley Centre Coupled Model, version 2 [HadCM2]) project increased reservoir inflows and storage, and increased river flows (Brekke, L.D. et al. 2004). A July 2006 technical report prepared by the California Department of Water Resources (DWR) addresses the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta. Although the report projects that "[c]limate change will likely have a significant effect on California's future water resources . . . [and] future water demand," it also reports that "there is much uncertainty about future water demand, especially those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood" (DWR 2006). DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future" (DWR 2006). Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows (CCCC 2006).

Hydrology

As discussed above, climate change could potentially affect the following: the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise can be a product of global warming through two main processes—expansion of seawater as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could also jeopardize California's water supply. In particular, saltwater intrusion would threaten the quality and reliability of the State's major fresh water supply that is pumped from the southern portion of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. In 2004, the Pew Center on Global Climate Change released a report examining the possible impacts of climate change on ecosystems and wildlife (Parmesan and Galbraith 2004). The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events, (2) geographic range, (3) species' composition within communities, and (4) ecosystem processes such as carbon cycling and storage.

Local GHG Emissions

A community-wide baseline (2005) GHG emissions inventory was conducted for Contra Costa County as part of the development of the Climate Action Plan (CAP). Table 3.3-3 provides the estimated 2005 baseline by sector for Contra Costa County.

Table 3.3-3: 2005 Unincorporated County Baseline by Sector (excluding Stationary Source Emissions)

Sector	Metric Tons CO_2e/Year	Percentage of Total
Residential Energy	274,690	20
Nonresidential Energy	118,770	8
Solid Waste	48,450	3
Landfill	193,950	14
On-road Transportation	628,200	45
Off-Road Equipment	71,880	5
Water and Wastewater	8,080	1
BART	2,300	<1
Agriculture	57,320	4
Total	1,403,610	100
Source: Contra Costa County Climate Action Plan, December 2015.		

3.3.2 - Regulatory Framework

Air Quality Regulations

Air pollutants are regulated at the national, state, and air basin level; each agency has a different level of regulatory responsibility. The United States Environmental Protection Agency (EPA) regulates at the national level. The ARB regulates at the state level and BAAQMD regulates at the air basin level.

Federal and State

Environmental Protection Agency

The EPA handles global, international, national, and interstate air pollution issues and policies. The EPA sets national vehicle and stationary source emission standards, oversees approval of all State Implementation Plans (SIPs), provides research and guidance for air pollution programs, and sets National Ambient Air Quality Standards, also known as federal standards or national standards. There are national standards for six common air pollutants, called criteria air pollutants, which were identified from provisions of the Clean Air Act of 1970. The criteria pollutants are:

- Ozone
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Nitrogen dioxide (NO_2)
- Carbon monoxide (CO)
- Lead
- Sulfur dioxide (SO_2)

The national standards were set to protect public health, including that of sensitive individuals; thus, the standards continue to change as more medical research is available regarding the health effects of the criteria pollutants. Primary national standards are the levels of air quality necessary, with an adequate margin of safety, to protect public health, as discussed in Ambient Air Quality Standards summary prepared by the ARB.

California Air Resources Board

A SIP is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain national standards. The SIP for the State of California is administered by the ARB, which has overall responsibility for statewide air quality maintenance and air pollution prevention. The ARB also administers California Ambient Air Quality Standards for the 10 air pollutants designated in the California Clean Air Act. The 10 state air pollutants are the six national standards listed above as well as the following: visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride.

The national and state ambient air quality standards, the most relevant effects, the properties, and sources of the pollutants are summarized in Table 3.3-4**.**

Table 3.3-4: Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Ozone	1 Hour	0.09 ppm	—	(a) Decrease of pulmonary function and localized lung edema in humans and animals (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals (c) Increased mortality risk (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans (e) Vegetation damage (f) Property damage	Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between reactive organic gases, NO_x, and sunlight. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind.	Ozone is a secondary pollutant; thus, it is not emitted directly into the lower level of the atmosphere. The primary sources of ozone precursors (ROG and NO_x) are mobile sources (on-road and off-road vehicle exhaust).
	8 Hour	0.070 ppm	0.070 ppm[e]			
Carbon monoxide (CO)	1 Hour	20 ppm	35 ppm	(a) Aggravation of angina pectoris (chest pain) and other aspects of coronary heart disease (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease (c) Impairment of central nervous system functions (d) Possible increased risk to fetuses	CO is a colorless, odorless, toxic gas. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, replaces oxygen as an attachment to hemoglobin, and reduces available oxygen in the blood.	CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources.
	8 Hour	9.0 ppm	9 ppm			

Table 3.3-4 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Nitrogen dioxide[c] (NO_2)	1 Hour	0.18 ppm	0.100 ppm	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes (c) Contribution to atmospheric discoloration	During combustion of fossil fuels, oxygen reacts with nitrogen to produce nitrogen oxides—NO_x (NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5). NO_x is a precursor to ozone, PM_{10}, and $PM_{2.5}$ formation. NO_x can react with compounds to form nitric acid and related particles.	NO_x is produced in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. NO_2 concentrations near major roads can be 30 to 100 percent higher than those at monitoring stations.
	Annual	0.030 ppm	0.053 ppm			
Sulfur dioxide (SO_2)	1 Hour	0.25 ppm	0.075 ppm[d]	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient sulfur dioxide levels. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.	Sulfur dioxide is a colorless, pungent gas. At levels greater than 0.5 ppm, the gas has a strong odor, similar to rotten eggs. Sulfur oxides (SO_x) include sulfur dioxide and sulfur trioxide. Sulfuric acid is formed from sulfur dioxide, which can lead to acid deposition and can harm natural resources and materials. Although sulfur dioxide concentrations have been reduced to levels well below state and national standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM_{10}.	Human caused sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethylsulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The sulfur dioxide levels in the State are well below the maximum standards.
	3 Hour[1]	—	0.5 ppm			
	24 Hour	0.04 ppm	0.14 ppm			
	Annual	—	0.030 ppm			
Particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease (b) Declines in pulmonary function growth in children	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM_{10} refers to	Stationary sources include fuel combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products
	Mean	20 µg/m^3	—			
Particulate matter ($PM_{2.5}$)	24 Hour	—	35 µg/m^3			
	Annual	12 µg/m^3	15.0 µg/m^3			

Table 3.3-4 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
				(c) Increased risk of premature death from heart or lung diseases in the elderly. Daily fluctuations in $PM_{2.5}$ levels have been related to hospital admissions for acute respiratory conditions, school absences, and increased medication use in children and adults with asthma	particulate matter that is between 2.5 and 10 microns in diameter, (1 micron is one-millionth of a meter). $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter.	processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation-related sources are from vehicle exhaust and road dust.
Sulfates	24 Hour	25 µg/m^3	—	(a) Decrease in ventilatory function (b) Aggravation of asthmatic symptoms (c) Aggravation of cardio-pulmonary disease (d) Vegetation damage (e) Degradation of visibility (f) Property damage	The sulfate ion is a polyatomic anion with the empirical formula SO_4^{2-}. Sulfates occur in combination with metal and/or hydrogen ions. Many sulfates are soluble in water.	Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide. In California, the main source of sulfur compounds is combustion of gasoline and diesel fuel.
Lead[b]	30-day	1.5 µg/m^3	—	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction. The more serious effects of lead poisoning include behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs. Lead may also contribute to high blood pressure and heart disease.	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. An aerosol is a collection of solid, liquid, or mixed-phase particles suspended in the air. Lead was first regulated as an air pollutant in 1976. Leaded gasoline was first marketed in 1923 and was used in motor vehicles until around 1970. Lead concentrations have not exceeded state or national air quality standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering. Lead can be removed from the atmosphere through deposition to soils, ice caps, oceans, and inhalation.
	Quarter	—	1.5 µg/m^3			
	Rolling 3-month average	—	0.15 µg/m^3			

Table 3.3-4 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Vinyl chloride[b]	24 Hour	0.01 ppm	—	Short-term exposure to high levels of vinyl chloride in the air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.	Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1990, ARB identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.	Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. It can be formed when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites.
Hydrogen sulfide	1 Hour	0.03 ppm	—	High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause headache, nausea, vomiting, and cough. Long exposure can cause pulmonary edema.	Hydrogen sulfide (H_2S) is a flammable, colorless, poisonous gas that smells like rotten eggs.	Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal).
Reactive organic gases (ROGs)		There are no state or national ambient air quality standards for ROGs because they are not classified as criteria pollutants.		Health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of ROGs are suspected to cause eye, nose, and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, the kidneys, and the central nervous system. Many ROGs have been classified as toxic air contaminants.	ROGs, or volatile organic compounds (VOCs), are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably.	Indoor sources of ROGs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of ROGs are from combustion and fuel evaporation. A reduction in ROG emissions reduces certain chemical reactions that contribute to the formulation of ozone. ROGs are transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.

Table 3.3-4 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources
Benzene		There are no ambient air quality standards for benzene.		Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, loss of consciousness can occur. Long-term (chronic) occupational exposure of high doses has caused blood disorders, leukemia, and lymphatic cancer.	Benzene is a ROG. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a "Group A" carcinogen.	Benzene is emitted into the air from fuel evaporation, motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is used as a solvent for paints, inks, oils, waxes, plastic, and rubber. It is used in the extraction of oils from seeds and nuts and in the manufacture of detergents, explosives, and pharmaceuticals.
Diesel particulate matter (DPM)		There are no ambient air quality standards for DPM.		Some short-term (acute) effects of diesel exhaust exposure include eye, nose, throat, and lung irritation, and can cause coughs, headaches, light-headedness, and nausea. Studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Human studies on the carcinogenicity of DPM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure.	DPM is a source of $PM_{2.5}$—diesel particles are typically 2.5 microns and smaller. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which consists of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust.	Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. In 2002 in the South Coast Air Basin, the main sources of diesel particulate matter were due to the combustion of diesel fuel in diesel-powered engines. Such engines can include on-road vehicles such as diesel trucks, off-road construction vehicles, diesel electrical generators, and various pieces of stationary construction equipment.

Table 3.3-4 (cont.): Description of Air Pollutants

Air Pollutant	Averaging Time	California Standard	National Standard[a]	Most Relevant Effects from Pollutant Exposure	Properties	Sources

Notes:
ppm = parts per million (concentration) $\mu g/m^3$ = micrograms per cubic meter Annual = Annual Arithmetic Mean 30-day = 30-day average Quarter = Calendar quarter

[a] National standard refers to the primary national ambient air quality standard, or the levels of air quality necessary, with an adequate margin of safety to protect the public health. All standards listed are primary standards except for 3 Hour SO_2, which is a secondary standard. A secondary standard is the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[b] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[c] Effective April 12, 2010, to attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb, or 188 $\mu g/m^3$

[d] To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

[e] On October 1, 2015, the EPA strengthened the NAAQS for ground-level ozone to 70 parts per million (ppm) through the adoption of a new standard (Docket No. EPA–HQ–OAR–2008-0699). The Final Rule went into effect on December 28, 2015.

Source of effects: South Coast Air Quality Management District, 2007; California Environmental Protection Agency, 2002; California Air Resources Board, 2009; United States Environmental Protection Agency, 2007; United States Environmental Protection Agency, 2000; National Toxicology Program, 2005.
Source of standards: California Air Resources Board, 2010.
Source of properties and sources: United States Environmental Protection Agency, 1999; United States Environmental Protection Agency, 2003; Environmental Protection Agency, 2009; National Toxicology Program, 2005.

Applicable Toxic Air Contaminant Regulation

ARB's toxic air contaminant program traces its beginning to the criteria pollutant program in the 1960s. For many years, the criteria pollutant control program has been effective at reducing toxic air contaminants, since many volatile organic compounds and PM constituents are also toxic air contaminants. During the 1980s, the public's concern over toxic chemicals heightened. As a result, citizens demanded protection and control over the release of toxic chemicals into the air. In response to public concerns, the California legislature enacted the Toxic Air Contaminant Identification and Control Act governing the release of toxic air contaminants into the air. This law charges ARB with the responsibility for identifying substances as toxic air contaminants, setting priorities for control, adopting control strategies, and promoting alternative processes. ARB has designated almost 200 compounds as toxic air contaminants. Additionally, ARB has implemented control strategies for a number of compounds that pose high health risk and show potential for effective control.

The ARB's Diesel Risk Reduction Plan has led to the adoption of new state regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce DPM emissions by about 90 percent overall from year 2000 levels as stated on page 1 of the plan. The projected emission benefits associated with the full implementation of this plan, including federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020 (California Air Resources Board 2000).

In 2005, ARB approved an Air Toxics Control Measure (ATCM) to limit diesel-fueled commercial motor vehicle idling to reduce emissions of toxics and criteria pollutants. The driver of any vehicle subject to this section (1) shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location and (2) shall not idle a diesel-fueled auxiliary power system for more than 5 minutes to power a heater, air conditioner, or any ancillary equipment on the vehicle if it has a sleeper berth and the truck is located within 100 feet of a restricted area (homes and schools).

Greenhouse Gases Regulations

International

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

Intergovernmental Panel on Climate Change

In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socio economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

United Nations Framework Convention on Climate Change (Convention)

On March 21, 1994, the United States joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at average of five per cent against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014, more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the United Nations. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience. Government leaders also committed to reach an ambitious and universal climate agreement for adoption in a meeting scheduled in Paris for December 2015 and pledged to work under the UN Framework Convention on Climate Change to reach it.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties, or COP 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;

- Establish binding commitments by all parties to make "nationally determined contributions" (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and "progress made in implementing and achieving" their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will "represent a progression" beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address "loss and damage" resulting from climate change, which explicitly will not "involve or provide a basis for any liability or compensation";
- Require parties engaging in international emissions trading to avoid "double counting"; and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC (C2ES 2015a).

Federal

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

Greenhouse Gas Endangerment

Massachusetts v. EPA (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four GHGs, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below. After a lengthy legal challenge, the United States Supreme Court declined to review an Appeals Court ruling upholding that upheld the EPA Administrator findings (EPA 2009b).

Clean Vehicles

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light-duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On May 7, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States. A petition for writ of certiorari to the United States Court of Appeals for the District of Columbia Circuit was denied by the Supreme Court on October 15, 2013.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon (mpg) if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams per mile of carbon dioxide (CO_2) in model year 2025, which is equivalent to 54.5 mpg if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20-percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15-percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10-percent reduction in fuel consumption and carbon dioxide emissions from the 2014 to 2018 model years.

Mandatory Reporting of Greenhouse Gases

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which became effective January 1, 2010. The rule

requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA.

New Source Review

The EPA issued a final rule on May 13, 2010 that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the federal code of regulations, the EPA states:

> This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to greenhouse gas sources, starting with the largest greenhouse gas emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016.

The EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units

As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology.

Cap and Trade

Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Examples in the United States include the Acid Rain Program and the NO_x Budget Trading Program and Clean Air Interstate Rule in the northeast. The Clean Air Interstate Rule (CAIR) and the Acid Rain Program (ARP) are both cap and trade programs designed to reduce emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) from power plants. The ARP, established under Title IV of the 1990 Clean Air Act (CAA) Amendments,

requires power plants to make major emission reductions of SO_2 and NO_x, the primary precursors of acid rain. CAIR addresses regional interstate transport of soot (fine particulate matter) and smog (ozone) pollution. CAIR requires certain eastern states to limit annual emissions of SO_2 and NO_x, which contribute to the formation of fine particulate matter. It also requires certain states to limit ozone season NO_x emissions, which contribute to the formation of ozone during the summer ozone season (May through September). There is no federal GHG cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Regional Greenhouse Gas Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020. The partners are California, British Columbia, Manitoba, Ontario, and Quebec. Currently only California and Quebec are participating in the cap and trade program (C2ES 2015b)

State

Legislative Actions to Reduce GHGs

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark AB 32 California Global Warming Solutions Act of 2006 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

AB 32

The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. "Greenhouse gases" as defined under AB 32 include carbon dioxide, methane, NO_x, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The ARB is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

The ARB approved the 1990 GHG emissions level of 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) on December 6, 2007 (California Air Resources Board 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" scenario were estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (California Air Resources Board 2008). At that level, a 28 percent reduction was required to achieve the 427 million $MTCO_2e$ 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million $MTCO_2e$. Therefore, under the updated forecast, a 21.7 percent reduction from business as usual (BAU) is required to achieve 1990 levels (California Air Resources Board 2010). The ARB also prepared updated emission inventories for 2000 through 2011 to show progress achieved to date (California Air Resources Board 2013). Executive Order S-3-05 includes a target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 million $MTCO_2e$
- 2000: 463 million $MTCO_2e$ (an average 8-percent reduction needed to achieve 1990 base)
- 2010: 450 million $MTCO_2e$ (an average 5-percent reduction needed to achieve 1990 base)
- 2020: 545 million $MTCO_2e$ BAU (an average 21.7-percent reduction needed to achieve 1990 base)

Under AB 32, the ARB published its Final Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California. The measures were enforceable by January 1, 2010. The 44 early action measures apply to the transportation, commercial, forestry, agriculture, cement, oil and gas, fire suppression, fuels, education, energy efficiency, electricity, and waste sectors. ARB has completed regulations implementing all Early Action Measures. The ARB estimated that the 44 recommendations are expected to result in reductions of at least 42 $MMTCO_2e$ by 2020, representing approximately 25 percent of the 2020 target.

ARB Scoping Plan

The ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 to comply with AB 32 (California Air Resources Board 2008). The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;

- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. Capped strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. Uncapped strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional GHG emission reductions.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (California Air Resources Board 2014).

The ARB has no legislative mandate to set a target beyond the 2020 target from AB 32 or to adopt additional regulations to achieve a post-2020 target. The Update estimates that reductions averaging 5.2 percent per year would be required after 2020 to achieve the 2050 goal. With no estimate of future reduction commitments from the State, identifying a feasible strategy including plans and measures to be adopted by local agencies is not currently possible.

SB 375—the Sustainable Communities and Climate Protection Act of 2008

Senate Bill (SB) 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28 states that CEQA findings determinations for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the greenhouse gas emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

AB 1493 Pavley Regulations and Fuel Efficiency Standards

California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light-duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. On January 21, 2009, the ARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that the EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request. On September 8, 2009, the U.S. Chamber of Commerce and the National Automobile Dealers Association sued the EPA to challenge its granting of the waiver to California for its standards. California assisted the EPA in defending the waiver decision. The U.S. District Court for the District of Columbia denied the Chamber's petition on April 29, 2011. The EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22-percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30-percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program and became effective on August 7, 2012. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025 and provide a 3 percent reduction in overall light-duty vehicle emissions between 2017 and 2020. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate

fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

SB 1368

In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower GHG emissions associated with California's energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for GHG emissions required by SB 1368. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007.

SB 1078—Renewable Electricity Standards

On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger also directed the ARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the State's load serving entities to meet a 33 percent renewable energy target by 2020. The ARB Board approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23.

SB 350—Clean Energy and Pollution Reduction Act of 2015

The legislature recently approved and the Governor signed SB 350 which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Provisions for a 50 percent reduction in the use of petroleum statewide were removed from the Bill due to opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030, with interim targets of 40 percent by 2024, and 25 percent by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and local publicly owned utilities.

- Reorganize the Independent System Operator (ISO) to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States (California Leginfo 2015).

SBX 7-7—The Water Conservation Act of 2009

The legislation directs urban retail water suppliers to set individual 2020 per capita water use targets and begin implementing conservation measures to achieve those goals. Meeting this statewide goal of 20 percent decrease in demand will result in a reduction of almost 2 million acre-feet in urban water use in 2020.

Executive Orders Related to GHG Emissions

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the State and guide the actions of state agencies.

Executive Order S-13-08

Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the ". . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-3-05

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S 3-05, the following reduction targets for GHG emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels.
- By 2020, reduce greenhouse gas emissions to 1990 levels.
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order B-30-15

Governor Jerry Brown signed Executive Order B-30-15s on April 29, 2015. The following are major provisions of the Executive Order:

1. A new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

2. All state agencies with jurisdiction over sources of greenhouse gas emissions shall implement measures, pursuant to statutory authority, to achieve reductions of greenhouse gas emissions to meet the 2030 and 2050 greenhouse gas emissions reductions targets.
3. The California Air Resources Board shall update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

The executive order does not apply directly to cities and counties, but will lead to the preparation of a new ARB Scoping Plan and the development of regulations to achieve post-2020 reduction targets.

Executive Order S-01-07—Low Carbon Fuel Standard

The Governor signed Executive Order S 01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the SIP for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard was challenged in the United States District Court in Fresno in 2011. The court's ruling issued on December 29, 2011 included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals reversed the decision of the District Court in September 2013 and denied a petition to rehear a challenge on January 22, 2014. The Renewable Fuels Association and Growth Energy filed a petition to the US Supreme Court on March 20, 2014 challenging the Court of Appeals decision. On June 30, 2014, the U.S. Supreme Court announced that it would not review the constitutionality of the California Low Carbon Fuel Standard (LCFS).

To address the Court ruling, ARB was required to bring a new LCFS regulation to the Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-CI fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The public hearing for the new LCFS regulation was held on February 19, 2015. The Final Rulemaking Package adopting the regulation was filed with the Office of Administrative Law (OAL) on October 2, 2015. The OAL approved the regulation on November 16, 2015 (ARB 2015e).

California Regulations and Building Codes

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

Title 24

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to

reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The newest version of Title 24 was adopted by the California Energy Commission (CEC) on May 31, 2012. The standards became effective on July 1, 2014. The CEC has completed the process of preparing the 2016 Building Energy Efficiency Standards that are scheduled to go into effect on January 1, 2017 (CEC 2016)..

Title 20

California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. Twenty-three categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the State and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

California Green Building Standards Code

The California Green Building Standards Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect January 1, 2011. The code is updated on a regular basis, with the most recent update consisting of the 2013 California Green Building Code Standards that became effective January 1, 2014. It does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

Model Water Efficient Landscape Ordinance

The Model Water Efficient Landscape Ordinance (Ordinance) was required by AB 1881 Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Reductions in water use of 20 percent consistent with (SBX-7-7) 2020 mandate are expected for Ordinance. Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed DWR to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015, which became effective on December 15, 2015. New development projects that include landscaped areas of 500 square feet or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems
- Incentives for graywater usage
- Improvements in on-site stormwater capture
- Limiting the portion of landscapes that can be planted with high water use plants
- Reporting requirements for local agencies

Heavy Duty Vehicle Aerodynamic Efficiency

This measure would require existing trucks/trailers to be retrofitted with the best available technology and/or ARB approved technology. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. The 2020 estimated GHG reductions could be up to 6.4 $MMTCO_2e$ nationwide, of which about 0.93 $MMTCO_2e$ or about 15 percent would occur within California.

Medium and Heavy Duty Vehicle Hybridization

Hybrid technology provides the greatest benefit when used in vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Such applications include parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks. The ARB Scoping Plan estimates that hybridization provides an estimated reduction of 0.5 $MMTCO_2e$ per year in 2020.

High GWP Gas Regulations

The State has adopted refrigerant management regulations that apply to commercial air conditioning and refrigeration systems. The regulations require increased leak detection and related repairs and maintenance. ARB estimated that the regulation would reduce emissions from regulated sources by 50 percent.

SB 97 and the CEQA Guidelines Update

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On April 13, 2009, the Office of Planning and Research submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the proposed Guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process—how to determine whether a project's estimated GHG emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze GHG emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable; however, it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in Appendix G was amended to include GHG questions.

3.3.3 - Local Regulations

Bay Area Air Quality Management District

The BAAQMD regulates air quality in the Air Basin. The BAAQMD is responsible for controlling and permitting industrial pollution sources (such as power plants, refineries, and manufacturing operations) and widespread, area wide sources (such as bakeries, dry cleaners, service stations, and commercial paint applicators), and for adopting local air quality plans and rules.

Air Quality Plans

As described above under federal and state regulations, an SIP is a federal requirement; each state prepares an SIP to describe existing air quality conditions and measures that will be followed to attain and maintain the federal standards. In addition in California, state ozone standards have planning requirements. However, state PM_{10} standards have no attainment planning requirements, but air districts must demonstrate that all measures feasible for the area have been adopted. Because the Air Basin is nonattainment for the federal and state ozone standards, the BAAQMD prepared an Ozone Attainment Demonstration Plan to satisfy the federal 1-hour ozone planning requirement and a Clean Air Plan to satisfy the state 1-hour ozone planning requirement.

The latest AQP in the Basin is the 2010 Clean Air Plan, which provides the following:

- Review progress in improving Bay Area air quality to date.
- Establish a control strategy including "all feasible measures" to achieve state ozone standards by the earliest practicable date and reduce transport of ozone precursors to neighboring air basins.
- Address ozone, particulate matter, air toxics, and GHG emissions in a single integrated plan.

AQPs are required to address transportation control measures requirements of the federal Clean Air Act and California Clean Air Act. Transportation control measures are defined as "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled (VMT), vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions." The Bay Area has extensive experience with developing and implementing transportation control measures. The first regional plan prepared pursuant to the California Clean Air Act, the 1991 Clean Air Plan, included 23 transportation control measures to meet state planning requirements (state transportation control measures). Plan updates in 1994 and 1997 included revisions to the transportation control measures.

BAAQMD Climate Protection Program

The BAAQMD established a climate protection program in 2005 to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin (SFBAAB). The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents (BAAQMD 2014). BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

Rules and Regulations

BAAQMD establishes and administers a program of rules and regulations, as described above, to attain and maintain state and national air quality standards. The rules and regulations that may apply to this Project include but are not limited to the following:

- Regulation 8, Rule 3. Architectural Coatings. This rule governs the manufacture, distribution, and sale of architectural coatings and limits the ROG content in paints and paint solvents. Although this rule does not directly apply to the Project, it does dictate the ROG content of paint available for use during the construction.
- Regulation 8, Rule 15. Emulsified and Liquid Asphalts. Although this rule does not directly apply to the Project, it does dictate the ROG content of asphalt available for use during the construction through regulating the sale and use of asphalt and limits the ROG content in asphalt.

Metropolitan Transportation Commission and Association of Bay Area Governments

In July 2013, the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) jointly approved the Plan Bay Area, which includes the region's Sustainable

Communities Strategy and the 2040 Regional Transportation Plan, and the associated Final EIR for the Plan Bay Area. Two of the 10 "targets" of the Plan Bay Area address the requirements of SB 375:

The first two targets are required by SB 375, "The California Sustainable Communities and Climate Protection Act of 2008" (Steinberg), and address the respective goals of climate protection and adequate housing:

- Reduce per-capita carbon dioxide emissions from cars and light-duty trucks by seven percent by 2020 and by 15 percent by 2035.
- House 100 percent of the region's projected 25-year growth by income level (very-low, low, moderate, above-moderate), without displacing current low-income residents.

A total of four lawsuits have been filed against the Plan Bay Area. All four lawsuits were filed with the Alameda County Superior Court and include three suits filed in August 2013 and one suit filed in October 2013. The August lawsuits include (1) Bay Area Citizens, (2) Communities for a Better Environment and the Sierra Club, and (3) the Building Industry Association of the Bay Area. The October lawsuit is from the Post-Sustainability Institute. In the Post-Sustainability Institute lawsuit, the Post-Sustainability Institute claims the Plan Bay Area violates private property rights as well as CEQA requirements. Three of the four suits have been settled out of court or were decided in Plan Bay Area's favor at the trial court level:

- In July 2014, the suit filed by Bay Area Citizens in conjunction with the Pacific Legal Foundation failed in Alameda Superior Court. The judge upheld the Plan and EIR.
- In June 2014, MTC and ABAG settled with the Sierra Club and Communities for a Better Environment. Both agencies agreed to disclose to the public progress in getting housing built in city and county PDAs and to explain how the plan measures and accounts for pollution reductions, among other things.
- In March 2014, MTC and ABAG agreed to settle with the Building Industry Association of the Bay Area, committing to monitor regional development patterns and types, along with issuance of building permits. The agencies also committed to a process that invites and discloses public comment when developing new strategies for the 2017 update to Plan Bay Area.

The remaining suit filed by the Post Sustainability Institute is pending in Alameda Superior Court and has yet to be considered.

Contra Costa County General Plan

The Contra Costa County 2005-2020 General Plan establishes goals, objectives, and policies associated with air quality and GHGs. Those goals and policies that are relevant to this analysis are listed below.

Conservation Element

- **Goal 8-K:** To encourage the use of renewable resources where they are compatible with the maintenance of environmental quality.
- **Goal 8-L:** To reduce energy use in the County to avoid risks of air pollution and energy shortages which could prevent orderly development.
- **Goal 8-A:** To preserve and protect the ecological resources of the County.
- **Goal 8-C:** To achieve a balance of uses of the County's natural and developed resources to meet the social and economic needs of the County's residents.
- **Goal 8-F:** To encourage the preservation and restoration of the natural characteristics of the San Francisco Bay/Delta estuary and adjacent lands, and recognize the role of Bay vegetation and water area in maintaining favorable climate, air and water quality, and fisheries and migratory waterfowl.
- **Goal 8-AA:** To meet Federal Air Quality Standards for all air pollutants.
- **Goal 8-AB:** To continue to support Federal, State and regional efforts to reduce air pollution in order to protect human and environmental health.
- **Goal 8-AC:** To restore air quality in the area to a more healthful level.
- **Goal 8-AD:** To reduce the percentage of Average Daily Traffic (ADT) trips occurring at peak hours.
- **Policy 8-101:** A safe, convenient and effective bicycle and trail system shall be created and maintained to encourage increased bicycle use and walking as alternatives to driving.
- **Policy 8-102:** A safe and convenient pedestrian system shall be created and maintained in order to encourage walking as an alternative to driving.
- **Policy 8-107:** New housing in infill and peripheral areas which are adjacent to existing residential development shall be encouraged.

Transportation and Circulation Element

- **Goal 5-C:** To balance transportation and circulation needs with the desired character of the community.
- **Goal 5-D:** To maintain and improve air quality above air quality standards.
- **Goal 5-I:** To encourage use of transit.
- **Goal 5-J:** To reduce single-occupant auto commuting and encourage walking and bicycling.
- **Goal 5-L:** To reduce greenhouse gas emissions from transportation sources through provision of transit, bicycle, and pedestrian facilities.
- **Policy 5-3:** Transportation facilities serving new urban development shall be linked to and compatible with existing and planned roads, bicycle facilities, pedestrian facilities and pathways of adjoining areas, and such facilities shall use presently available public and semi-public rights of way where feasible.
- **Policy 5-23:** All efforts to develop alternative transportation systems to reduce peak period traffic congestion shall be encouraged.
- **Policy 5-24:** Use of alternative forms of transportation, such as transit, bike and pedestrian modes, shall be encouraged in order to provide basic accessibility to those without access to a personal automobile and to help minimize automobile congestion and air pollution.
- **Policy 5-25:** Improvement of public transit shall be encouraged to provide for increased use of local, commuter and intercity public transportation.

Contra Costa County Climate Action Plan

On December 15, 2015, the Contra Costa County Climate Action Plan was approved by the Board of Supervisors. The Climate Action Plan identifies specific measures on how the County can achieve a GHG reduction target of 15 percent below baseline levels by the year 2020. In addition to reducing GHG, the Draft Climate Action Plan includes proposed policies and actions to improve public health and provide additional community benefits, and it lays the groundwork for achieving long-term GHG reduction goals for 2020 and 2035.

Although the CAP was adopted by the County on December 15, 2015, the application for the Project was deemed complete by the County on November 26, 2015.

California Supreme Court GHG Ruling

In a November 30, 2015 ruling, the California Supreme Court in *Center for Biological Diversity (CBD) v. California Department of Fish and Wildlife (CDFW)* on the Newhall Ranch project concluded that whether the project was consistent with meeting statewide emission reduction goals is a legally permissible criterion of significance, but the significance finding for the project was not supported by a reasoned explanation based on substantial evidence. The Court offered potential solutions on pages 25–27 of the ruling to address this issue summarized below:

Specifically, the Court advised that:

- **Substantiation of Project Reductions from BAU**. A lead agency may use a BAU comparison based on the Scoping Plan's methodology if it also substantiates the reduction a particular project must achieve to comply with statewide goals. The Court suggested a lead agency could examine the "data behind the Scoping Plan's business-as-usual model" to determine the necessary project-level reductions from new land use development at the proposed location (p. 25).
- **Compliance with Regulatory Programs or Performance Based Standards**. A lead agency "might assess consistency with A.B. 32's goal in whole or part by looking to compliance with regulatory programs designed to reduce greenhouse gas emissions from particular activities. (See Final Statement of Reasons, supra, at p. 64 [greenhouse gas emissions 'may be best analyzed and mitigated at a programmatic level.'].) To the extent a project's design features comply with or exceed the regulations outlined in the Scoping Plan and adopted by the Air Resources Board or other state agencies, a lead agency could appropriately rely on their use as showing compliance with 'performance based standards' adopted to fulfill 'a statewide . . . plan for the reduction or mitigation of greenhouse gas emissions' (CEQA Guidelines § 15064.4(a)(2), (b)(3); see also id., § 15064(h)(3) [determination that impact is not cumulatively considerable may rest on compliance with previously adopted plans or regulations, including 'plans or regulations for the reduction of greenhouse gas emissions'])" (p. 26).
- **Compliance with GHG Reduction Plans or Climate Action Plans (CAPs)**. A lead agency may utilize "geographically specific GHG emission reduction plans" such as climate action plans or greenhouse gas emission reduction plans to provide a basis for the tiering or streamlining of project-level CEQA analysis (p. 26).

- **Compliance with Local Air District Thresholds**. A lead agency may rely on "existing numerical thresholds of significance for greenhouse gas emissions" adopted by, for example, local air districts (p. 27).

3.3.4 - Methodology

Methodology and thresholds for air quality and GHG impacts, as set forth in the BAAQMD's Guidelines and 2010 Thresholds, are utilized in this Draft EIR. The following BAAQMD screening thresholds and significance criteria are applicable to the Project, based on the County's determination, at its discretion, that such thresholds and significance criteria are supported by substantial evidence in the record. The substantial evidence supporting use of the 2010 Thresholds is provided in the BAAQMD's 2011 CEQA Air Quality Guidelines, Appendix D Threshold of Significance. If a project exceeds the screening thresholds, it would be required to conduct a full analysis using the significance criteria set forth in the BAAQMD Guidelines. Project emissions were modeled with the CalEEMod 2013 Version 2.2 emission model. CalEEMod replaces the URBEMIS model that is no longer maintained or recommended for use in the Bay Area.

As detailed in Section 2, Project Description, the Project could include a pre-project construction requirement to construct a 1.8-mile, 6-inch-diameter pipeline for recycled water transport in the City of San Ramon (along San Ramon Valley Boulevard between Alcosta Boulevard and Montevideo Avenue) that would offset the potable water needs of the proposed residential development. The potential impacts of the recycled water pipeline are included in each section of the impact analysis as a separate line item, because the construction of the recycled water pipeline will not run concurrently with construction of the rest of the proposed project.

Operational and construction emissions for the Project were modeled using CalEEMod based on information as described in Section 2, Project Description, of this Draft EIR. Model output and assumptions are provided in Appendix B.

3.3.5 - Thresholds of Significance

According to the CEQA Guidelines' Appendix G Environmental Checklist, to determine whether impacts to air quality are significant environmental effects, the following questions are analyzed and evaluated.

> Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.
>
> Would the Project:
>
> a) Conflict with or obstruct implementation of the applicable air quality plan?
>
> b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
>
> c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality

standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

d) Expose sensitive receptors to substantial pollutant concentrations?

e) Create objectionable odors affecting a substantial number of people?

On February 16, 2010, the Office of Administrative Law filed the CEQA Guideline Amendments with the Secretary of State. The Amendments became effective on March 18, 2010. The CEQA Guidelines amendments included two new checklist questions pertaining to GHG emissions, listed below:

Would the Project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

This analysis will follow the guidance in the CEQA Guideline Amendments.

While the final determination of whether or not a project's impacts are significant is within the purview of the lead agency pursuant to CEQA Guidelines Section 15064(b), the BAAQMD recommends that its quantitative and qualitative air pollution thresholds be used to determine the significance of project emissions.

BAAQMD Criteria of Significance

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. The BAAQMD adopted revisions to the Guidelines in May 2011 that clarify application of several thresholds. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2012) (BAAQMD 2010 and 2012).

BAAQMD's adoption of the thresholds was called into question by an order issued March 5, 2012, *in California Building Industry Association v. BAAQMD* (Alameda Superior Court Case No. RGI0548693). The order required BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The claims made in the case concerned the environmental impacts of adopting the thresholds, that is, how the thresholds would indirectly affect land use development patterns. Those issues are not relevant to the scientific basis of BAAQMD's analysis of what levels of pollutants should be deemed significant. In August 2013, the First District Court of Appeal held the adoption of the thresholds was not a "project" subject to CEQA review. Then in December 2013, the California Supreme Court granted a petition to review the question of whether the guidelines could compel evaluation of impacts of the environment on a project (i.e., "CEQA in reverse"). In December 2015, the Court held that CEQA generally does not require such an analysis. This analysis considers the science informing the thresholds as being supported by substantial evidence. Scientific information supporting the thresholds was documented in BAAQMD's proposed thresholds of

significance analysis. This analysis herein uses the thresholds and methodologies from BAAQMD's May 2011 CEQA Air Quality Guidelines to determine the potential impacts of the Project on the existing environment. The significance thresholds identified by BAAQMD and used in this analysis are listed in Table 3.3-5.

CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA.

Table 3.3-5: BAAQMD Thresholds of Significance

Pollutant	Construction Thresholds Average Daily Emissions (lbs/day)	Operational Thresholds	
		Average Daily Emissions (lbs/day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Greenhouse Gases			
GHGs—Projects other than Stationary Sources	None	Compliance with Qualified GHG Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 $MTCO_2e$/SP/yr (residents+employees)	
GHGs—Stationary Sources	None	10,000 MT/yr	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 µg/m^3	0.3 µg/m^3	
Health Risks and Hazards for Sensitive Receptors (Cumulative from All Sources within 1,000-Foot Zone of Influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per 1 million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 µg/m^3		

Table 3.3-5 (cont.): BAAQMD Thresholds of Significance

Pollutant	Construction Thresholds Average Daily Emissions (lbs/day)	Operational Thresholds	
		Average Daily Emissions (lbs/day)	Annual Average Emissions (tons/year)
Accidental Release of Acutely Hazardous Air Pollutants			
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	

Notes:
ROG = reactive organic gases NO_x = nitrogen oxides
PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 µm or less
$PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5 µm or less
SP/yr = Service Population (residents + employees) per year
Source: BAAQMD 2010

The BAAQMD service population GHG threshold is based achieving a performance standard of 4.6 $MTCO_2e$ per residents plus employees by the 2020 target year from AB 32. The performance standard is appropriate for the Project. Among other reasons and based on available information and as of the writing of the Draft EIR, the Project is expected to be completed prior to 2020. The reduction levels set forth by AB 32 and various executive orders were established with the expectation that, as technology advanced throughout the 2006 and 2050 timeframe, it would become feasible to effect further reductions below 1990 levels. As stated by the California Governor's Office, California is on track to meet or exceed the current 2020 target.[2]

Notwithstanding, the Project will continue operating after 2020, the emissions will decline as State regulations on motor vehicle fuel efficiency and renewable energy use are phased in over time. For example, under the LEVIII emission standards, GHGs from new cars will be reduced by 34 percent from 2016 levels by 2025. Under SB 350, California electric utilities are required to provide 50 percent of their energy portfolio from renewable sources by 2030. These two sources comprise approximately 77 percent of project GHG emissions. Therefore, the State will make continued progress toward later goals beyond 2020. In addition, it is highly likely that the State will continue to strengthen other existing GHG regulations after 2020. The State is in the process of preparing a Scoping Plan Update that is expected to include a strategy to achieve the Governor's goal from Executive Order B-15-03 to reduce emissions to 40 percent below 1990 levels by 2030.

Recent studies show that the State's existing and proposed regulatory framework will allow the State to reduce its GHG emissions level to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050. Even though these studies did not provide an exact regulatory and technological roadmap to achieve the 2030 and 2050 goals, they demonstrated that various combinations of policies could allow the statewide emissions level to achieve the very low levels

[2] See Governor's press release regarding Executive Order 8-30-16, available at https://www.gov.ca.gov/news.php?id=18938, visited on August 20, 2016.

required by 2050, suggesting that the combination of new technologies and other regulations not analyzed in the studies could allow the State to meet the 2050 target (Energy and Economics 2015).

Climate change is a global problem that will require a fair share of GHG reductions from every country and for each state within this country. Defining the fair share of rich and poor countries has proven very difficult to achieve. In the absence of firm commitments by the United States and many other countries around the globe, California has set its own course. California has defined its fair share of GHG reductions under AB 32 and supported it with a strategy in the ARB Scoping Plan to achieve its first goal in 2020. The next task for the State is to identify the next installment of its fair share through 2030. If the State does not act to set legislated targets for later years and adopt commitments for additional regulations to reduce GHG emissions, there is no framework for determining a fair share for local government entities that comprise the State. Nevertheless, the Contra Costa CAP includes analysis for 2020 and 2035 that demonstrate consistency with the AB 32 2020 target and continuing progress toward meeting the 2030 target from Executive Order B-15-03. The CAP provides the necessary strategies to achieve its fair share of the 2020 target and 2030 Executive Order goal. Review of the CAP strategies (see Impact AIR-6) indicates that Project would not interfere with the implementation of the strategies related to transportation and is supportive of strategies related to energy efficiency, water conservation, and solid waste.

3.3.6 - Project Impacts and Mitigation Measures

This section discusses potential environmental impacts associated with the development and operation of the Project and provides feasible mitigation measures where appropriate. As described in Section 2 of this R-DEIR, a Memorandum of Understanding (MOU) is currently being considered to preserve certain land in the county for agriculture and open space, wetlands, or parks. The effect of the MOU would be to continue existing policy, and the MOU would not result in a substantial adverse change to existing conditions with respect to air quality and greenhouse gas emissions. The range of actions to be considered pursuant to the MOU were it to be adopted would include promoting agriculture through the purchase of land or easements from willing sellers, through continuing the Williamson Act program and its related tax benefits, as well as through technical support to better manage weeds and water. To the extent that any specific projects that could be considered for funding pursuant to the MOU—such as land conservation, weed management, or groundwater improvements—could have adverse environmental effects, such projects would be subject to separate project-level CEQA review as proposed actions are defined and funding for them is identified. As the precise location and scope of such projects is not known at this time, further consideration of potential impacts would be speculative. Additional information on the methodology used in assessing impacts is available in Appendix B.

Consistency with Air Quality Management Plan

Impact AIR-1:	**The Project may conflict with or obstruct implementation of the applicable air quality plan.**

Impact Analysis

The BAAQMD's 2010 Clean Air Plan (2010 CAP) is the regional air quality plan (AQP) for the Air Basin. The 2010 CAP accounts for projections of population growth provided by Association of Bay Area Governments and vehicle miles traveled provided by the Metropolitan Transportation Commission,

and it identifies strategies to bring regional emissions into compliance with federal and state air quality standards. The BAAQMD's guidance provides three criteria for determining if a plan-level project is consistent with the current AQP control measures. However, the BAAQMD does not provide criteria or a threshold of significance for project-level consistency analysis. Under the BAAQMD's approach, projects that do not exceed project-level quantitative thresholds would not conflict with or obstruct the implementation of the applicable air quality plan (see Impact AIR-3). However, additional analysis was conducted to determine if the Project would conflict with any of the plan-level criteria to provide a conservative analysis. Therefore, the following plan-level criteria were used for determining a project's consistency with the AQP in addition to the quantitative analysis provided under Impact AIR-3.

- Criterion 1: Does the Project support the primary goals of the AQP?
- Criterion 2: Does the Project include applicable control measures from the AQP?
- Criterion 3: Does the Project disrupt or hinder implementation of any AQP control measures?

Criterion 1

The primary goals of the 2010 Plan and the current AQP to date are to:

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

As discussed in impact discussions AIR-2, AIR-3, AIR-4, and AIR-5, the Project would not create a localized violation of state or federal air quality standards, significantly contribute to cumulative nonattainment pollutant violations, expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors affecting a substantial number of people. Specifically, MM AIR-2 reduces the Project's potential to generate a significant localized dust impact during Project construction to less than significant. MM AIR-3 reduces NO_x emissions and TACs from construction equipment so that regional criteria pollutant impacts and health impacts are reduced to a less than significant level. Therefore, the Project is consistent with criterion 1 for criteria pollutant and toxic air contaminant impacts with incorporation of MMs AIR-2 and AIR-3, and AIR-6.

The analysis prepared under Impact AIR-6 indicates that the Project would not achieve the 4.6 $MTCO_2e/SP/yr$ threshold after the application of all feasible mitigation measures. MM AIR-6 reduces GHG emissions through the incorporation of new technologies, on-site generation of renewable energy, (10 percent solar power) and energy efficiency measures; however, the Project would continue to exceed the significance threshold after application of all feasible mitigation measures. Therefore, the Project could be considered to be inconsistent with the CAP GHG emissions goal. It should be recognized that the CAP has no mandatory provisions for GHG emissions. The BAAQMD has no authority to specifically regulate sources of GHG, so the CAP goal for GHG emissions should be considered as having less weight than the goals for criteria pollutants and toxic emissions for which it has regulatory authority. The CAP GHG strategy primarily relies upon co-benefits from controls that reduce criteria pollutants, but also reduce GHG emissions. Nevertheless, as a conservative interpretation, the Project would not reduce GHG emissions sufficiently to achieve the service population threshold and would be considered to have a significant impact under this criterion.

Criterion 2

The 2010 Plan contains 55 control measures aimed at reducing air pollution in the Bay Area. Along with the traditional stationary, area, mobile source, and transportation control measures, the 2010 Plan contains a number of new control measures designed to protect the climate and promote mixed use, compact development to reduce vehicle emissions and exposure to pollutants from stationary and mobile sources (BAAQMD 2010).

Review of the 55 control measures found that six were applicable to the project. The following consistency analysis applies to those measures. Of the transportation control measures, TCM-D (Support Focused Growth), measures D-2 and D-3, apply to the Project. The Project complies with these measures through its inclusion of sidewalks, sufficient circulation within the Project Site, connection to existing roadways, and higher density (i.e., site plan that clusters development such that the vast majority of the Project Site remains undeveloped).

Relative to the energy and climate measures contained in the 2010 Plan, the Project would be consistent with all applicable measures:

- Energy Efficiency: The Project applicant would be required to conform to the energy efficiency requirements of the California Building Standards Code, also known as Title 24. Specifically, the Project must implement the requirements of the most recent Building Energy Efficiency Standards, which is the current version of Title 24. The 2013 Building Efficiency Standards were adopted, in part, to meet an Executive order in the Green Building Initiative to improve the energy efficiency of buildings through aggressive standards. The 2013 Building Efficiency Standards are estimated to be 25 percent more energy efficient than the 2008 Building Efficiency Standards for residential development. In addition, the 2016 Building Energy Efficiency Standards that go into effect January 1, 2017 are estimated to be 25 percent more energy efficient than the current 2013 standards for residential buildings.
- Renewable Energy. Pacific Gas and Electric Company (PG&E) provides electricity and natural gas service to the Project vicinity. PG&E facilities include nuclear, natural gas, and hydroelectric facilities. PG&E's 2012 power mix consisted of nuclear generation (21.0 percent), large hydroelectric facilities (11.0 percent), and renewable resources (19.0 percent), such as wind, geothermal, biomass, and small hydro. The remaining portion came from natural gas (27.0 percent), and unspecified sources (21.0 percent). Under mitigation measure AIR-6, the Project commits to generating 10 percent of Project emissions from renewable sources (PV solar) and to use solar water heating throughout the Project. Homeowners will be able to take advantage of incentive programs to install solar panels at a later date and will be purchasing power from an increasingly low carbon electrical grid. The BAAQMD has not implemented any mandatory CAP provisions requiring a certain percentage of solar generation and is unlikely to gain authority to require the use of solar. In addition, the Contra Costa County CAP does not specify a certain percentage of renewable self-generation required from new development. Therefore, the Project is consistent with this criterion.
- Urban Heat Island Mitigation and Shade Tree Planting. The Project would implement landscaping, including trees, on-site.

In summary, the Project would comply with all applicable rules, regulations, and control measures of the AQP. Additionally, the Project would not impede attainment of ambient air quality standards for criteria pollutants because its emissions do not exceed the BAAQMD regional significance thresholds after incorporation of MM AIR-3. The CAP includes GHG emissions in its multipollutant plan approach. GHG emissions are not criteria pollutants, but may be reduced by certain criteria pollutant control measures within the BAAQMD's authority and from state regulations and programs and from local measures contained in the Contra Costa County CAP. GHG emissions exceed the BAAQMD threshold after application of all feasible measures. Therefore, the Project would be considered to have a significant impact on the applicable clean air plan.

Criterion 3

The Project would not preclude extension of a transit line or bike path, propose excessive parking beyond parking requirements, or otherwise create an impediment or disruption to implementation of any AQP control measures.

Conclusion

The Project would be consistent with the criteria of the AQP with incorporation of MMs AIR-2, AIR-3, and AIR-6. As such, with the implementation of mitigation this impact would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Implement Mitigation Measures AIR-2, AIR-3, and AIR-6.

Level of Significance After Mitigation

Significant and unavoidable impact.

Potential for Air Quality Standard Violation

Impact AIR-2:	**The Project may violate an air quality standard or contribute substantially to an existing or projected air quality violation.**

Impact Analysis

This impact responds to localized criteria pollutant impacts, also known as "hotspots." Potential localized impacts would be exceedances of State or federal standards for particulate matter (PM_{10}), or carbon monoxide (CO). PM_{10} is of concern during construction because of the potential to emit fugitive dust during earth-disturbing activities (construction fugitive dust). CO emissions are of concern during Project operation because operational CO hotspots are related to increases in on-road vehicle congestion. Each area of impact is discussed separately below.

Construction Fugitive Dust

During construction (grading), fugitive dust (PM_{10}) would be generated from site grading and other earth-moving activities. The majority of this fugitive dust would remain localized and would be deposited on or near the Project Site.

The BAAQMD does not have a quantitative significance threshold for fugitive dust. The BAAQMD's Air Quality Guidelines recommend that projects determine the significance for fugitive dust through application of Best Management Practices (BMPs). The Project does not currently include any dust control measures, resulting in the potential for a significant impact. Therefore, it is recommended that the fugitive dust control measures identified in the BAAQMD's Air Quality Guidelines be included to reduce localized dust impacts to less than significant. MM AIR-2 requires the application of BMPs for fugitive dust control. Implementation of MM AIR-2 reduces the Project's construction-generated fugitive dust impact to less than significant.

Operational CO Hotspot

Localized high levels of CO (CO hotspot) are associated with traffic congestion and idling or slow moving vehicles. The BAAQMD recommends a screening analysis to determine if a project has the potential to contribute to a CO hotspot. The screening criteria identify when site-specific CO dispersion modeling is not necessary. The Project would result in a less than significant impact to air quality for local CO if the following screening criteria are met:

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

The Contra Costa Transportation Authority (CCTA) serves as the Congestion Management Agency (CMA) for Contra Costa County. As the CMA, the CCTA must, under state law, prepare a Congestion Management Program (CMP) and update it every two years. The CMP is meant to outline the CCTA's strategies for managing the performance of the regional transportation within the County. A CMP must contain several components: traffic level of service standards for state highways and principal arterials; multi-modal performance measures to evaluate current and future systems; a seven-year capital program of proposed projects to maintain or improve the performance of the system or mitigate the regional impacts of land use proposed projects; a program to analyze the impacts of land use decisions; and a travel demand element that promotes transportation alternatives to the single-occupant vehicle.

In the Project vicinity, Camino Tassajara has been identified by as a Route of Regional Significance, and as such, is addressed in the 2014 Tri-Valley Transportation Plan and Action Plan for Routes of Regional Significance. This route has two intersections, the Camino Tassajara/Hanson Lane/Diablo Vista Middle School Driveway and the Camino Tassajara/Oak Gate Drive/Lawrence Road, which are expected to degrade from LOS D to LOS E (in the AM peak hour) under the Existing (2015) Plus Project conditions.

The Project traffic study indicates that Project impacts on three freeway segments would result in significant and unavoidable impacts. An individual project's contribution to an existing significant impact does not automatically result in inconsistency with the congestion management plan. The CMP includes a review process for projects requiring a General Plan Amendment to determine if the jurisdiction remains consistent with the CMP. The Project applicant would be required to pay the applicable Tri-Valley Transportation Development (TVTD) Fees which serve as mitigation to the impact. The fees contribute to the construction of planned freeway improvements, including HOV lanes, auxiliary lanes, interchange improvements as well as other regional transportation improvements, including a contribution toward the new West Dublin BART Station.

The CCTA's Implementation Documents outline the processes for notifying all regional transportation planning committees (RTPCs) and affected jurisdictions when a proposed project or General Plan amendment would generate more than 100 net new peak-hour vehicle trips and would require an environmental document (whether a negative declaration, mitigated negative declaration or environmental impact report). Notification and consultation by the sponsoring jurisdiction would occur throughout the process of preparing and reviewing the environmental document. The Project adds 7 peak-hour trips to the most heavily traveled freeway segment, which is 0.13 percent of the total peak traffic volume. This is well below the threshold notification level of 100 net new peak-hour trips, and does not, individually or cumulatively, exacerbate congestion in a significant manner or make the Project inconsistent with the CMP. Therefore, the Project meets this screening criterion and would not require CO hotspot modeling. The Traffic Impact Study (Kimley-Horn and Associates 2016) also identified peak-hour traffic volumes for 18 intersections affected by the Project. As identified in the Traffic Impact Study, the maximum peak-hour intersection volume would occur at the Camino Tassajara/Blackhawk Road/Crow Canyon Road intersection in the Cumulative (2035) Plus Project scenario during the PM peak hour. The estimated cumulative traffic volume at the Camino Tassajara/Blackhawk Road/Crow Canyon Road intersection is 5,362 PM peak-hour trips. This level of peak-hour trips is substantially less than the BAAQMD's second and third screening criteria of 44,000 vehicles per hour and 24,000 vehicles per hour respectively. The Project would not result in an increase of traffic volumes at affected intersections to more than 44,000 vehicles per hour and would not increase traffic volumes at affected intersections to more than 24,000 where vertical or horizontal mixing is substantially limited, thus satisfying the last two criteria.

As indicated in Section 3-12, Transportation/Traffic, the following freeway segments do not function within acceptable standards:

I-580

- Eastbound from Eden Canyon Road to Dougherty Road (Segment #1, 2, and 3) and from Hacienda Road to Fallon Road-El Charro Road (Segment #5 and 6) in the PM Peak
- Westbound from Dougherty Road to Foothill Road (Segment #1, 2, and 3) and Fallon Road-El Charro Road to Hacienda Drive (Segment #5 and 6) in the AM Peak

I-680

- Northbound from I-580 Junction to Dublin Boulevard (Segment #9) in the PM Peak hour Southbound from Bollinger Canyon Road to Dublin Boulevard (Segment #10 and 11) and the I-580 Junction to W. Las Positas Boulevard (Segment #7 and 8) in the AM Peak

These segments operate below standards under Cumulative Conditions, and the addition of Project traffic would exacerbate these deficiencies. With the addition of the Project, these segments would continue to operate at LOS F during the indicated (AM or PM) peak hour. As required by the CMP, the Traffic Impact Study (Kimley-Horn and Associates 2016) identified mitigation measures to reduce Project impacts on these CMP routes. Therefore, the Project is consistent with the CMP.

The greatest peak-hour volumes on any of these modeled freeway segments is 13,293 vehicles per hour under Cumulative Conditions with the Project. This level of peak-hour trips is substantially less than the BAAQMD's second and third screening criteria of 44,000 vehicles per hour and 24,000 vehicles per hour, respectively.

Background concentrations of CO recorded at the nearest monitoring station in this area over the last three years, according to EPA monitoring values, had a maximum one-hour concentration recording of 1.4 ppm. The EPA 1-hour threshold is 35 ppm, and the BAAQMD threshold based on the California standard is 20 ppm, such that existing pollution levels in the vicinity of the Project are between four and seven percent of applicable state and federal thresholds. Given the low existing background concentrations along with maximum volumes of only 13,293 vehicles per hour, and with maximum Project trip estimate of only vehicles during peak hours, which represents 0.13 percent of the total peak-hour volumes along these freeway segments, the CO concentration would not exceed the 1-hour thresholds at receptor locations along the corridor. Therefore, Project operations would result in a less than significant CO hotspot impact.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

MM AIR-2 During construction, the following air pollution control measures (consistent with BAAQMD's Basic Construction Mitigation Measures) shall be implemented:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads and surfaces shall be limited to 15 miles per hour.

- Idling times shall be minimized by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified vehicle emissions evaluator.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders were used.
- A publicly visible sign shall be posted with the telephone number and person to contact at the County of Contra Costa regarding dust complaints. This person shall respond and take corrective action within 2 business days of a complaint or issue notification. The Bay Area Air Quality Management District's phone number shall also be visible to ensure compliance with applicable regulations.

Level of Significance After Mitigation

Less than significant impact.

Cumulative Criteria Pollutant Impacts

Impact AIR-3:	**The Project may have the potential to 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 which exceed quantitative thresholds for ozone precursors).**

Impact Analysis

This impact is related to regional air quality impacts. Non-attainment pollutants of concern for this impact are ozone, PM_{10} and $PM_{2.5}$. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified regional significance thresholds, its emissions would be cumulatively considerable and result in significant adverse air quality impacts to the region's existing air quality conditions.

Regional impacts are caused by the combined emissions from all existing and new sources of air pollution in the air basin. No individual development project of the scale of the proposed Project would cause a measurable change in regional air pollutant concentrations in the air basin. Air quality plans prepared to address the cumulative impacts include growth in emissions from all sources based on population and economic forecasts for the region and reductions needed to attain the standards within mandated timeframes. In other words, emissions will continue to decline and air quality will improve even with regional growth. CEQA recognizes that where impacts are already significant without the Project it is appropriate for Lead Agencies to use thresholds based on the project's cumulative contribution to the existing significant impact. The BAAQMD thresholds serve this purpose.

Project construction and operational impacts are assessed separately below.

Construction Emissions

Construction of the potential recycled water pipeline component of the project is assumed to take approximately 36 days and begin in December 2016. Phases of the pipeline construction include site preparation, grading and pipeline construction. All construction phases of the pipeline portion of the project are assumed to be completed before the July of 2017 start date of residential construction. Projected emissions construction of the potential recycled water pipeline component of the project that would occur in 2016 and 2017 have been included in Table 3.3-6 and Table 3.3-7 and compared with the BAAQMD thresholds.

Residential construction is anticipated to begin in July 2017 with site grading activities occurring through November 2017. The Project is subject to EBMUD Policy 3.01, which limits the cumulative number of dwelling units outside the Ultimate Service Boundary added as a result of small boundary adjustments to no more than 100 in any 2-year period. Therefore, the first phase of home construction of 100 dwelling units is assumed to begin in November 2017 and conclude in November 2018. The second phase of construction of the remaining 25 homes is assumed to begin as early as March 2019 and be completed by March 2020. For the purposes of this analysis, the Project would be fully operational in 2020.[3] If construction were delayed to later years, the emissions would be expected to decrease as new regulations requiring lower polluting construction equipment take effect that would require the turnover of higher polluting equipment. The construction emissions modeling parameters and assumptions are provided in Appendix B.

Construction activities associated with development activities contemplated by the Project would include site preparation, grading, paving, building construction, and painting. Generally, the most substantial air pollutant emissions would be dust generated from site preparation and grading. If uncontrolled, these emissions could lead to both health and nuisance impacts. Construction activities would also temporarily create emissions of equipment exhaust and other air contaminants.

BAAQMD does not recommend a numerical threshold for fugitive, dust-related particulate matter emissions. Instead, BAAQMD bases the determination of significance for fugitive dust on a consideration of the control measures to be implemented; the County has determined, at its discretion, to utilize BAAQMD's recommended approach in this analysis. If all appropriate emissions control measures recommended by BAAQMD are implemented for a project, then fugitive dust emissions during construction are not considered significant. Therefore, without application of BMPs, this impact is potentially significant. Incorporation of MM AIR-2 would reduce this impact to less than significant.

Off-road construction equipment is a large source of NO_x and DPM in the Bay Area. NO_x is an ozone precursor pollutant that contributes to regional ozone formation. DPM contributes to elevated PM_{10} and $PM_{2.5}$ concentrations and is a TAC.

Table 3.3-6 summarizes the construction-generated emissions in annual tons. Table 3.3-7, Table 3.3-8, Table 3.3-9, and Table 3.3-10 provide the average daily emissions rates per construction year for the Project.

[3] Consideration of construction days varies by construction phase. Construction days used in each emission analysis vary for the specific timeframe and phase, with the exception of TAC emissions, where the impact is cumulative and all construction days are considered.

Table 3.3-6: Construction Criteria Air Pollutants Emissions (Annual Tons)

Year	Air Pollutant Emissions (Total Tons)			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Residential Construction				
2017	0.60	6.33	0.33	0.30
2018	1.72	3.83	0.24	0.23
2019	0.25	2.21	0.13	0.13
2020	0.34	0.23	0.01	0.01
Maximum Year for Project	1.72	6.33	0.33	0.30

Notes:
[1] Exhaust only
ROG = reactive organic gases NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-7: 2017 Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions-Residential				
Total Emissions (tons)	*0.60*	*6.33*	*0.33*	*0.30*
Total Emissions (lbs)	1,190.94	12,660	652.8	603.2
Average Daily Emissions (lbs/day)[3]	9.16	97.38	5.02	4.64
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	Yes	No	No

Notes:
[1] Exhaust only
[2] Maximum projected emissions for each criteria pollutant was used for comparison to the daily threshold
[3] Calculated by dividing the total lbs by 22 days for the pipeline and 130 working days of residential construction for the year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-8: 2018 Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*1.72*	*3.83*	*0.24*	*0.23*
Total Emissions (lbs)	3437	7,669	481.8	453
Average Daily Emissions (lbs/day)[2]	14.50	32.36	2.03	1.91
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by 265 working days of construction for the year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-9: 2019 Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*0.25*	*2.21*	*0.13*	*0.13*
Total Emissions (lbs)	500.2	4,415	268.2	252
Average Daily Emissions (lbs/day)[2]	2.39	21.12	1.28	1.21
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by 220 working days of construction for the year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-10: 2020 Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*0.34*	*0.23*	*0.01*	*0.01*
Total Emissions (lbs)	686	459	26.8	25.4
Average Daily Emissions (lbs/day)[2]	16.33	10.92	0.64	0.60
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by 250 working days of construction for the year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

As stated in Table 3.3-6 and Table 3.3-7, emissions associated with the total proposed development would not exceed the BAAQMD regional emission thresholds for the criteria pollutants other than as indicated above and mitigated as follows.

As noted in Table 3.3-7, the Project would exceed the BAAQMD's regional emission thresholds for construction exhaust NO_x during 2017. The ROG, PM_{10}, and $PM_{2.5}$ emissions would not exceed the regional thresholds during construction in 2017. Likewise, Project emissions would not exceed the BAAQMD's regional construction emissions thresholds for 2018, 2019 or 2020. Because of the exceedance in 2017, the Project would have a potentially significant regional impact from Project construction. MM AIR-3 would require the use of cleaner construction equipment.

Table 3.3-11 provides the total mitigated annual construction emissions in tons per year. Table 3.3-12, Table 3.3-13, Table 3.3-14, and Table 3.3-15 provide the mitigated average daily emissions accounting for reductions that would be achieve through implementation of MM AIR-2 and MM AIR-3. These tables all reflect full buildout of the Project. As shown in these tables, all Project construction emissions would be reduced to a level of less than significant. Therefore, construction emissions are less than significant with incorporation of mitigation.

Table 3.3-11: Mitigated Annual Construction Criteria Air Pollutants Emissions

Year	Air Pollutant Emissions (Total Tons)			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
2017	0.08	0.35	0.01	0.01
2018	1.34	0.47	0.01	0.01
2019	0.13	1.04	0.06	0.05

Table 3.3-11 (cont.): Mitigated Annual Construction Criteria Air Pollutants Emissions

Year	Air Pollutant Emissions (Total Tons)			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
2020	0.33	0.10	0.01	0.00
Maximum Year for Project	1.34	1.04	0.06	0.05

Notes:
[1] Exhaust only
ROG = reactive organic gases NO_x = oxides of nitrogen PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-12: 2017 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*0.08*	*0.35*	*0.01*	*0.01*
Total Emissions (lbs)	162.6	697	19.18	19.14
Average Daily Emissions (lbs/day)[2]	1.25	5.36	0.15	0.15
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by 130 working days of construction per year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-13: 2018 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*1.34*	*0.47*	*0.01*	*0.01*
Total Emissions (lbs)	2686.4	939	16.34	16.08
Average Daily Emissions (lbs/day)[2]	11.34	3.96	0.07	0.07

Table 3.3-13 (cont.): 2018 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by 265 working days of construction.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-14: 2019 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*0.13*	*1.04*	*0.06*	*0.05*
Total Emissions (lbs)	254.2	2,086	111.4	105.6
Average Daily Emissions (lbs/day)[2]	1.22	9.98	0.53	0.51
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by the total 220 working days of construction per year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Table 3.3-15: 2020 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Total Construction Emissions				
Total Emissions (tons)	*0.33*	*0.10*	*0.01*	*0.00*
Total Emissions (lbs)	658.8	206	10.38	9.8

Table 3.3-15 (cont.): 2020 Mitigated Construction Criteria Air Pollutants Emissions (Average Daily Rate)

Parameter	Air Pollutants			
	ROG	NO_x	PM_{10}[1]	$PM_{2.5}$[1]
Average Daily Emissions (lbs/day)[2]	15.69	4.90	0.25	0.23
Significance Threshold	54	54	82	54
Exceeds Significance Threshold?	No	No	No	No

Notes:
[1] Exhaust only
[2] Calculated by dividing the total lbs by the total 250 working days of construction per year.
lbs = pounds ROG = reactive organic gases NO_x = oxides of nitrogen
PM_{10} = particulate matter 10 microns in diameter
$PM_{2.5}$ = particulate matter 2.5 microns in diameter
Source: FirstCarbon Solutions 2016, Appendix B.

Operational Emissions

Project operational emissions were estimated using CalEEMod version 2013.2.2. The trip generation rates are from the Traffic Impact Study prepared for the Project (Kimley Horn & Associates 2016). Assumptions and parameters are provided in Appendix B, and include without limitation an accounting of emissions associated with the Project's daily vehicle trip estimates.

The annual operational emissions for the first 100 homes of the Project are shown in Table 3.3-16. Table 3.3-17 and Table 3.3-18 show the daily operational emissions for summer and winter respectively for the first 100 homes. As shown in the tables, the first 100 homes of the Project would not exceed the BAAQMD's annual or daily significance thresholds. The impact would be less than significant.

Table 3.3-16: Annual Operational Emissions—Phase 1 (100 homes) (2018)

Source	Annual Emissions (tons)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	1.05	0.03	.31	0.31
Energy	0.02	0.16	0.01	0.01
Mobile	0.66	1.41	1.02	0.29
Total Emissions	1.74	1.61	1.34	0.61
Threshold of Significance	10	10	15	10
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases PM_{10} = particulate matter 10 microns and less in diameter
NO_x = nitrogen oxides $PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2018)
Source of thresholds: BAAQMD 2010.

Table 3.3-17: Daily Operational Emissions (2018) (Summer)

Source	Daily Emissions (pounds per day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	20.61	2.42	23.37	23.37
Energy	0.10	0.89	0.07	0.07
Mobile	4.06	7.60	6.09	1.69
Total Emissions	24.78	10.92	29.54	25.14
Threshold of Significance	54	54	82	54
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases
NO_x = nitrogen oxides
PM_{10} = particulate matter 10 microns and less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2018)
Source of thresholds: BAAQMD 2010.

Table 3.3-18: Daily Operational Emissions (2018) (Winter)

Source	Daily Emissions (pounds per day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	20.61	2.42	23.37	23.37
Energy	0.10	0.89	0.07	0.07
Mobile	4.06	8.50	6.09	1.69
Total Emissions	24.78	11.81	29.54	25.14
Threshold of Significance	54	54	82	54
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases
NO_x = nitrogen oxides
PM_{10} = particulate matter 10 microns and less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2018)
Source of thresholds: BAAQMD 2010.

The Project is estimated to be built out by 2020. Table 3.3-19 shows the annual operational emissions for buildout of the Project. Table 3.3-20 and Table 3.3-21 show the daily operational emissions for summer and winter respectively for buildout of the Project. As shown in the tables, the completed Project would not exceed the BAAQMD's annual or daily significance thresholds. The impact would be less than significant.

Table 3.3-19: Annual Operational Emissions—Buildout (125 homes) (2020)

Source	Annual Emissions (tons)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	1.36	0.05	0.44	0.44
Energy	0.02	0.20	0.02	0.02
Mobile	0.79	1.64	1.42	0.39
Total Emissions	2.17	1.90	1.88	0.86
Threshold of Significance	10	10	15	10
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases
NO_x = nitrogen oxides
PM_{10} = particulate matter 10 microns and less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
* PM_{10} and $PM_{2.5}$ emissions are for exhaust only.
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2021)
Source of thresholds: BAAQMD 2010.

Table 3.3-20: Daily Operational Emissions (2020) (Summer)

Source	Daily Emissions (pounds per day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	28.81	3.48	33.73	33.73
Energy	0.13	1.11	0.09	0.09
Mobile	4.88	8.86	8.42	2.34
Total Emissions	33.83	13.45	42.25	36.16
Threshold of Significance	54	54	82	54
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases
NO_x = nitrogen oxides
PM_{10} = particulate matter 10 microns and less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2021)
Source of thresholds: BAAQMD 2010.

Table 3.3-21: Daily Operational Emissions (2020) (Winter)

Source	Daily Emissions (pounds per day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Area	28.81	3.48	33.73	33.73
Energy	0.13	1.11	0.09	0.09
Mobile	4.85	9.90	8.43	2.33

Table 3.3-21 (cont.): Daily Operational Emissions (2020) (Winter)

Source	Daily Emissions (pounds per day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Total Emissions	33.80	14.50	42.25	36.16
Threshold of Significance	54	54	82	54
Significant Impact?	No	No	No	No

Notes:
ROG = reactive organic gases
NO_x = nitrogen oxides
PM_{10} = particulate matter 10 microns and less in diameter
$PM_{2.5}$ = particulate matter 2.5 microns and less in diameter
Source: First Carbon Solutions 2016 (CalEEMod Output for year 2021)
Source of thresholds: BAAQMD 2010.

Conclusion

Project construction emissions associated with the proposed residential and trail components of the development project would exceed the BAAQMD's thresholds of significance for regional construction emissions in 2010 for construction exhaust NO_x.

The Project includes the addition of 125 single-family homes at a site located on edge of the urban area. Not every project built to meet the region's housing needs can be constructed as an urban infill project close to existing high-quality transit. Suburban development remains an important part of the development mix envisioned for Contra Costa County and is most appropriate for the Project Site. The modeling prepared for the Project accounts for Project density in trip generation assumptions for the land use. Single-family homes have the highest trip generation of residential land use types. In addition, the CalEEMod mitigation component provides the means to quantify the trip and vehicle miles traveled reductions from alternative modes of travel available at the Project Site. The modeling claims no credit for reductions from these alternative modes; therefore, the results reflect the maximum emissions expected from the type of development proposed. Although the project is currently outside the urban limit line, determining a difference in VMT between projects on either side of the line is beyond the capability of the currently available traffic and air quality models. The analysis does not take credit for shorter commute trips to Bay Area job centers compared to trips from outside the Bay Area that would be required if housing needs are not accommodated in the Bay Area. Therefore, the analysis discloses the Project's air quality impacts using the best methods available for project level analysis.

Operational emissions would not exceed the BAAQMD's thresholds of significant for regional operational emissions. Implementation of MM AIR-2 and MM AIR-3 would ensure that construction emissions are reduced to a less than significant level. As such, the residual significance of this impact would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Implement MM AIR-2 and the following:

MM AIR-3 Off-road diesel-powered construction equipment greater than 50 horsepower shall meet United States Environmental Protection Agency Tier 4 off-road emissions standards. The Project applicant shall include in all construction contracts a clause reflecting this requirement.

Level of Significance After Mitigation

Less than significant impact.

Sensitive Receptors

Impact AIR-4: The Project may have the potential to expose sensitive receptors to substantial pollutant concentrations.

Impact Analysis

This impact addresses whether the Project would expose sensitive receptors to construction-generated fugitive dust (PM_{10} and $PM_{2.5}$), construction-generated DPM, operational-related TACs, or operational CO hotspots. Project construction and operational impacts are assessed separately below.

A sensitive receptor is defined as the following (from BAAQMD 2010): "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."

Two scenarios have the potential for exposing sensitive receptors to TACs. The first is when a project includes a new or modified source of TACs and would be located near an existing or proposed sensitive receptor. The second scenario involves a residential or other sensitive receptor development locating near an existing or planned source of TACs. Because the Project would house sensitive receptors, the Project itself is a sensitive receptor. Under the recent California Supreme Court case (*CBIA v. BAAQMD*), analysis of impacts of the existing environment on projects is not required to comply with CEQA except for under limited circumstances. The ruling specifically voided the BAAQMD guidelines and thresholds requiring residential development projects to assess impacts from air pollutant emissions from existing sources of emissions that would expose future residents of the project to substantial pollutant concentrations. Therefore, for CEQA purposes, no comparison of existing emission to BAAQMD thresholds was included in this analysis. Residential and recreational open space uses are not considered significant sources of operational TAC emissions. However, Project construction activities could expose sensitive receptors located near construction sites to TAC and PM emissions.

The BAAQMD guidance identifies the area within 1,000 feet of the Project Site as the zone of influence for TACs. The Project's zone of influence was reviewed to identify locations of sensitive receptors. The nearest sensitive receptors is the Tassajara Hills Elementary School at 4675 Camino Tassajara located approximately 133 feet from the Project Site's western boundary and residences at 4600 and 4610 Kingswood Drive located approximately 175 feet northwest from the Project Site's

western boundary. Therefore, this analysis examines potential exposure of off-site receptors from development and operation of the Project Site. In addition, for informational purposes only, this analysis considers potential exposure of on-site receptors from emission sources located nearby.

Construction—Project as a Source

Construction Generated DPM

Construction-period DPM emissions could contribute to increased health risks to nearby residents and students. MM AIR-3 would minimize potential TAC emissions through the use of cleaner construction equipment.

As discussed in the BAAQMD's 2010 Air Quality Guidelines, construction activity using diesel-powered equipment emits DPM, a known carcinogen. DPM includes exhaust $PM_{2.5}$. A 10-year research program (California Air Resources Board 1998) demonstrated that DPM (exhaust $PM_{2.5}$) from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. The current conservative methodological protocols required by the ARB when studying the health risk posed by DPM assume the following: (1) 24-hour constant exposure; (2) 350 days a year; (3) for a continuous period lasting 70 years.

In addition to DPM, Project construction would emit ROGs. ROGs are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Constituents of ROGs include a number of TACs. The TAC constituents of ROGs that are included in the risk analysis are provided in Appendix A. Risks from ROGs are categorized as an acute non-cancer hazard.

The majority of heavy diesel equipment usage for the Project would occur during the site preparation phase, which would occur over an estimated 173 working days.

Construction equipment DPM (exhaust $PM_{2.5}$) and construction-generated ROG emissions were estimated using CalEEMod. The emissions were then used to estimate potential health risks for adjacent sensitive receptors. As previously indicated, the nearest location of sensitive receptors is the elementary school located 133 feet from the Project Site's western boundary.

FirstCarbon Solutions' Construction Health Risk Assessment Screening Tool (version 1.3, June 16, 2015) was used in order to estimate health risk impacts associated with the $PM_{2.5}$ and ROG emissions from Project construction. The tool was developed using the recommended health risk guidance from BAAQMD and by running an air dispersion model for several different combinations of the size of the construction area and the distance to the receptor of interest. Specifically, the air dispersion model was run for construction areas ranging from approximately 0.5 acre to 50 acres and receptor distances from the Project fence line to 984 feet (300 meters) from the boundary of the construction area. The meteorological data used in the dispersion model runs is from the BAAQMD and is specific to Pleasanton, California (the nearest meteorological location to the Project Site). The model was run for a construction area of 58.47 acres (site preparation) inclusive of 30 acres of home construction with a receptor within 22 meters (75 feet) of the Project boundary. All receptor location quadrants were analyzed and the highest impacts were found in the northwest (NW) quadrant. Table 3.3-22 gives a summary of the construction health risk assessment for the northwest quadrant. The model output from the Construction Health Risk Assessment Screening

Tool is also included in Appendix B. As shown in Table 3.3-22, the Project exceeds the increased cancer risk for a child without implementation of mitigation, and the Project's Maximum Annual $PM_{2.5}$ concentration would exceed the BAAQMD's threshold. The ROG emissions would result in a risk that is below the BAAQMD's thresholds for acute non-cancer hazard index.

Table 3.3-22: Construction Health Risk Assessment Summary for the NW Receptor Quadrant—Unmitigated Emissions

Pollutant or Type of Cancer Risk	Project Result	BAAQMD Significance Threshold	Project Exceeds Threshold?
Maximum Annual $PM_{2.5}$ Concentration	0.86 µg/m^3	0.3 µg/m^3	Yes
Total Increased Cancer Risk for a Child	134.3 risk per million	10 risk per million	Yes
Total Increased Cancer risk for an Adult	7.4 risk per million	10 risk per million	No
Chronic Non-Cancer Hazard Index	0.17	1	No
Acute Non-Cancer Hazard Index	0.20	1	No

Source of Project result: FirstCarbon Solutions, June 2015 (Construction Health Risk Assessment Screening Tool)
Source of BAAQMD Significance Threshold: Bay Area Air Quality Management District, 2010. CEQA Guidelines, "Local Community Risk and Hazard Impacts—Project Level."
Source: FCS, 2016.

Without mitigation, the Project would exceed the BAAQMD Significance Threshold for Total Increased Cancer Risk for a Child and the Annual $PM_{2.5}$ concentration threshold. However, MM AIR-3, which would be implemented to address regional and local emissions impacts, would also reduce the cancer risk created by the Project. MM AIR-3 would require the applicant to use Tier 4 Engines for all construction equipment used for the duration of construction. Table 3.3-23 gives a summary of the construction health risk assessment for the northwest receptor quadrant with the implementation of MM AIR-3. As shown, with the incorporation of MM AIR-3, the Project's construction health risk is below the BAAQMD's threshold. As such, impacts from construction are less than significant with mitigation incorporated.

Table 3.3-23: Construction Health Risk Assessment Summary for the NW Receptor Quadrant with Mitigation

Pollutant or Type of Cancer Risk	Project Result	BAAQMD Significance Threshold	Project Exceeds Threshold?
Maximum Annual $PM_{2.5}$ Concentration	0.07 µg/m^3	0.3 µg/m^3	No
Total Increased Cancer Risk for a Child	7.4 risk per million	10 risk per million	No
Total Increased Cancer risk for an Adult	0.6 risk per million	10 risk per million	No
Chronic Non-Cancer Hazard Index	0.01	1	No
Acute Non-Cancer Hazard Index	0.319	1	No

Source of Project result: FirstCarbon Solutions, June 2014 (Construction Health Risk Assessment Screening Tool)
Source of BAAQMD Significance Threshold: Bay Area Air Quality Management District, 2011. CEQA Guidelines, "Local Community Risk and Hazard Impacts—Project Level."

Construction Fugitive Dust

During construction (grading), fugitive dust (PM_{10}) is generated. As detailed in Impact AIR-2, the Project would result in a less than significant dust impact after incorporation of MM AIR-2. Therefore, the Project would not expose adjacent receptors to significant amounts of construction dust after incorporation of mitigation.

Operations—Project as a Receptor

Toxic Air Contaminants

The Project is locating new sensitive receptors (residents) that could be subject to existing sources of TACs. As explained above, while this is not an impact requiring analysis under CEQA, this evaluation is being presented for informational purposes.

For project-level analysis, BAAQMD specifies both individual and cumulative-level thresholds of significance for risks and hazards. For projects that are considered new sources of TACs or $PM_{2.5}$ (such as stationary sources, industrial sources, or roadway projects), it is generally appropriate to use both the project-level and cumulative-level thresholds because the project-level threshold identifies said project's individual contribution to risk, while the cumulative threshold assesses said project's cumulative contribution to risk. However, for projects that consist of new receptors, it is generally appropriate to use only the cumulative-level threshold because the Project itself is not a source of TACs and, thus, the individual project-level threshold is not relevant. The cumulative risk threshold accounts for all potential sources of TACs and $PM_{2.5}$ in proximity to new receptors. Because the Project is a residential development, and residential development is not considered a source of TACs, this analysis is focused to the cumulative impact of nearby sources of TACs to the Project Site. BAAQMD's recommended procedure involves first consulting with screening tools to identify whether there are any substantial TAC sources within 1,000 feet of the Project. The results of the screening tools were as follows:

- BAAQMD's county specific Google Earth Highway Screening Analysis Tool indicates there are no highways within 1,000 feet of the Project Site.
- The Traffic Impact Study prepared for the Project indicates that the Cumulative plus Project traffic volume at the intersection of Lusitano Street and Camino Tassajara would be 2,425 vehicles during the morning peak-hour, which would equal 24,250 average annual daily trips (AADT). This would exceed the BAAQMD's screening criteria of 10,000 AADT or 1,000 trucks per day. The BAAQMD $PM_{2.5}$ Concentrations and Cancer Risk Generated from Surface Streets screening tool provides lifetime cancer risk estimates and $PM_{2.5}$ concentrations at roadways 50 feet from the Project Site and with 24,250 AADT in Contra Costa County.
- BAAQMD's county-specific Google Earth Stationary Source Screening Analysis Tool indicates there is one stationary source within 1,000 feet of the Northern Site. There is an emergency generator located at 2001 Lusitano Street at the San Ramon Valley Fire Protection District, Fire Station 36.

Table 3.3-24 provides a summary of the cumulative screening health risk assessment.

Table 3.3-24: Screening Health Risk Assessment Cumulative Results

Source	Lifetime Excess Cancer Risk (in a million)	$PM_{2.5}$ Concentration ($\mu g/m^2$)
Stationary Sources (generator)[1]	5.1[2]	0.01[2]
Surface Streets—Camino Tassajara[3]	7.22	0.189
Total	12.33	0.190
Cumulative Threshold	100	0.8
Exceeds Threshold?	No	No

Notes:
[1] Data for the nearest stationary source ID #19903 (generator) located at 2001 Lusitano Street, Danville, California is not available from the BAAQMD. Given the proximity to the existing Tassajara Hills Elementary School, the potential risks from the emergency generator would have been less than significant in order to be approved to operate.
[2] Data for a generator located at the Pacific Bell Corporation at 3900 Blackhawk Circle, Danville, approximately 2.3 miles east from the Project Site was used to provide an estimate of risks.
[3] A copy of the Roadway Screening Calculator is provided in Appendix B.
Source: FCS, 2016.

The analysis showed the Project would not expose sensitive receptors to excess lifetime cancer risk beyond the applicable threshold, nor would it exceed the $PM_{2.5}$ concentration level. As such, it can be assumed that future residents would not be subject to levels of TACs above screening levels. No analysis of impacts from existing emission sources on the Project was required for CEQA purposes; however, the results of the analysis are presented in Table 3.3-24 for informational purposes only.

Operations—Project as a Source

Carbon Monoxide Emission Impacts

As noted in the discussion of Impact AIR-2, the Project is not expected to generate a CO hotspot. Therefore, the Project would not expose receptors to substantial CO concentrations from operational activities.

Toxic Air Contaminants

The Project would not be considered a significant source of operational TACs. Operational TAC impacts would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Implement Mitigation Measure AIR-3.

Level of Significance After Mitigation

Less than significant impact.

Objectionable Odors

Impact AIR-5: **The Project would not create objectionable odors affecting a substantial number of people.**

Impact Analysis

As stated in the BAAQMD 2010 Air Quality Guidelines, odors are generally regarded as an annoyance rather than a health hazard. The ability to detect odors varies considerably and overall is subjective.

The BAAQMD does not have a recommended quantitative odor threshold for construction activities. However, BAAQMD recommends operational screening criteria, as shown in Table 3.3-25, that are based on the distance between types of sources known to generate odor and the receptor. Utilizing BAAQMD's recommended criteria, projects that would site an odor source or a receptor farther than the applicable screening distance, shown in Table 3.3-25 would not result in a significant odor impact.

Table 3.3-25: Odor Screening Distances

Land Use/Type of Operation	Project Screening Distance
Wastewater Treatment Plant	2 miles
Wastewater Pumping Facilities	1 mile
Sanitary Landfill	2 miles
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	2 miles
Chemical Manufacturing	2 miles
Fiberglass Manufacturing	1 mile
Painting/Coating Operations	1 mile
Rendering Plant	2 miles
Coffee Roaster	1 mile
Food Processing Facility	1 mile
Confined Animal Facility/Feed Lot/Dairy	1 mile
Green Waste and Recycling Operations	1 mile
Metal Smelting Plants	2 miles
Source: BAAQMD 2011	

Project Construction

Diesel exhaust and ROG would be emitted during construction of the Project, the odors of which are objectionable to some; however, emissions would be temporary and would disperse rapidly from the

Project Site and, therefore, would not create objectionable odors affecting a substantial number of people. Therefore, odor impacts would be less than significant during Project construction.

Project Operation

Land uses typically considered associated with odors include wastewater treatment facilities, waste disposal facilities, or agricultural operations. The Project does not contain any of these land uses or other land uses typically associated with emitting objectionable odors.

The Project Site is not located within the recommended screening distances (as shown in Table 3.3-20) of any typical sources of objectionable odors, which typically include agricultural operations (dairies, feedlots, etc.), landfills, wastewater treatment plants, refineries, and other types of industrial land uses. Therefore, odor impacts would be less than significant during Project operations.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less than significant impact.

Greenhouse Gas Emissions

Impact AIR-6:	**Implementation of the Project would generate direct and indirect greenhouse gas emissions that would result in a significant impact on the environment.**

Impact Analysis

This analysis is restricted to GHGs identified by Assembly Bill (AB) 32, which include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The Project would generate a variety of GHGs during construction and operation, including several defined by AB 32 such as carbon dioxide, methane, and nitrous oxide.

The Project may also emit GHGs that are not defined by AB 32. For example, the Project may generate aerosols. Aerosols are short-lived particles, as they remain in the atmosphere for about 1 week. Black carbon is a component of aerosol. Studies have indicated that black carbon has a high global warming potential; however, the Intergovernmental Panel on Climate Change states that it has a low level of scientific certainty. Water vapor could be emitted from evaporated water used for landscaping, but this is not a significant impact because water vapor concentrations in the upper atmosphere are primarily due to climate feedbacks rather than emissions from Project-related activities. The Project would emit nitrogen oxides and volatile organic compounds, which are ozone precursors. Ozone is a GHG; however, unlike the other GHGs, ozone in the troposphere is relatively short-lived and can be reduced in the troposphere on a daily basis. Stratospheric ozone can be reduced through reactions with other pollutants.

Certain GHGs defined by AB 32 would not be emitted by the Project. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the Project. Therefore, it is not anticipated that the Project would emit perfluorocarbons or sulfur hexafluoride.

An upstream emission source (also known as life cycle emissions) refers to emissions that were generated during the manufacture of products to be used for construction of the Project. Upstream emission sources for the Project include but are not limited emissions from the manufacture of cement, emissions from the manufacture of steel, and/or emissions from the transportation of building materials to the seller. The upstream emissions were not estimated because they are not within the control of the Project and to do so would be speculative. Additionally, the California Air Pollution Control Officers Association White Paper on CEQA and Climate Change supports this conclusion by stating, "The full life-cycle of GHG [greenhouse gas] emissions from construction activities is not accounted for . . . and the information needed to characterize [life-cycle emissions] would be speculative at the CEQA analysis level." Therefore, pursuant to CEQA Guidelines Sections 15144 and 15145, upstream/life cycle emissions are speculative and no further discussion is necessary.

BAAQMD provides multiple options in its 2010 Thresholds for evaluating project-level GHG generation from Project operation. Prior to the 2010 Air Guidance document, BAAQMD did not have an adopted threshold of significance for GHG emissions. BAAQMD does not presently provide a construction-related GHG generation threshold, but it recommends that construction-generated GHGs be quantified and disclosed. BAAQMD also recommends that lead agencies (in this case, Contra Costa County) make a determination of the level of significance of construction-generated GHG emissions in relation to meeting AB 32 GHG reduction goals. The lead agency is also encouraged to incorporate BMPs to reduce GHG emissions during Project construction, as feasible and applicable.

BAAQMD's project-level significance threshold for operational GHG generation was deemed appropriate to use when determining the Project's potential GHG impacts. The thresholds suggested by BAAQMD for project-level operational GHG generation are as follows:

- Compliance with a qualified Greenhouse Gas Reduction Strategy, or
- 1,100 $MTCO_2e$/year, or
- 4.6 metric tons of CO_2 equivalent per service population (employees plus residents).

On December 15, 2015, the Board of Supervisors approved the Contra Costa County Climate Action Plan. The Climate Action Plan identifies specific measures on how the County can achieve a GHG reduction target of 15 percent below baseline levels by the year 2020. In addition to reducing GHGs, the Climate Action Plan includes policies and actions to improve public health and provide additional community benefits, and it lays the groundwork for achieving long-term greenhouse reduction goals for a qualified 2020 and 2035 GHG Reduction Strategy. The CAP contains an analysis demonstrating that it meets the BAAQMD's minimum standards for a qualified GHG reduction strategy. Therefore, the primary means of determining project significance is through an assessment of consistency of the Project with the CAP. In addition, a quantitative analysis that compares Project emissions with BAAQMD's 4.6 $MTCO_2e$/Service Population per year (SP/yr) threshold was prepared to demonstrate compliance with this additional criterion.

BAAQMD's Air Quality Guidelines state that if annual emissions of GHG exceed the thresholds, the Project would result in a cumulatively considerable significant impact to global climate change. Therefore, if the Project is less than any one of the thresholds identified above, then the Project would result in a less than significant cumulative impact to global climate change.

Construction

The construction of the residential development would emit GHG emissions during construction from the off-road equipment, worker vehicles, and any hauling that may occur. As previously indicated, BAAQMD does not presently provide a construction-related GHG generation threshold, but it recommends that construction-generated GHGs be quantified and disclosed, and then determine the level of significance in relation to achieving AB 32 goals. BAAQMD also recommends that lead agencies (in this case, Contra Costa County) make a determination of the level of significance of construction-generated GHG emissions in relation to meeting AB 32 GHG reduction goals.

One approach recommended by other air districts such as the Sacramento Metropolitan Air Quality Management District and the South Coast Air Quality Management District to address construction GHG emissions in a cumulative context is to amortize the emissions generated during construction over the life of the project (30 years) and to add those emissions to the annual operational emissions for comparison to the operational emissions threshold. Although construction emissions are short-term, GHG emissions can remain in the atmosphere for many years and contribute to the cumulative effect of development on climate change. Using this method makes the service population threshold a more stringent measure of significance because it includes emissions not envisioned in the BAAQMD analysis method that determined the required 2020 emission level.

The County, in its discretion, has determined to quantify construction GHGs and amortize them over the life of the Project. GHGs from Project construction equipment and worker vehicles and construction of the remainder of the proposed project development are shown in Table 3.3-26. The emissions are from each phase of construction as detailed in the table. Construction of the proposed project development is estimated to generate approximately 1,270 $MTCO_2e$. Combined emissions from all phases of the project is estimated to generate 1,281 $MTCO_2e$.

Table 3.3-26: Construction Greenhouse Gas Emissions

Year	Emissions ($MTCO_2e$)
2017 (Project)	546
2018	436
2019	258
2020	30
Total Construction Emissions	1,281
Annualized over 30 years	43

Notes:
$MTCO_2e$ = metric tons of carbon dioxide equivalents
Source: see Appendix B CalEEMod output.
Source: FirstCarbon Solutions 2016.

Operational Emissions

Long-term, operational GHG emissions would result from Project generated vehicular traffic, on-site combustion of natural gas, operation of any landscaping equipment, off-site generation of electrical power over the life of the Project, the energy required to convey water to and wastewater from the Project Site, the emissions associated with the hauling and disposal of solid waste from the Project Site.

Operational GHG emissions by source are shown in Table 3.3-27. The total annualized Project emissions are estimated to be 1,953 $MTCO_2e$. The emissions analysis incorporates Project design features and regulatory compliance into the model to quantify emissions. Because the CalEEMod model used to estimate reductions for certain existing regulatory requirements and Project design features is termed "mitigation" within the model, the mitigated output from CalEEMod is used; however, those modeling components are not considered mitigation under CEQA, but rather are treated as Project design features. With a service population (SP) of 358, the Project would generate approximately 5.45 $MTCO_2e/SP/yr$. Therefore, the Project would not meet the BAAQMD service population performance standard and would result in significant GHG emissions.

Table 3.3-27: Unmitigated Project Greenhouse Gas Emissions (2020)

Emissions Source	Emissions ($MTCO_2e$)
Area Sources	71
Energy	434
Mobile (Vehicle)	1,349[a]
Waste	34[a]
Water	22[a]
Total Operational Emissions	1,910
Annualized Construction Emissions[b]	42
Total Project Emissions	1,952[c]
Service Population	358
Project Emission Generation	*5.45 $MTCO_2e/SP/yr$*
BAAQMD 2010 Threshold	*4.60 $MTCO_2e/SP/yr$*
Significant Impact?	*Yes*

Notes:
[a] Includes CalEEMod "mitigation" for locational features, Project design features and compliance with regulatory measure
[b] Construction emissions annualized over an anticipated 30-year Project lifespan
[c] Total is based on independent rounding and differs slightly when adding rounded numbers.
Source: CalEEMod Output (Appendix B)

As shown in Table 3.3-27, the Project's emissions would be above the bright-line BAAQMD small project screening threshold of 1,100 $MTCO_2e$/year. Based on the Project's projected residential population of 358 people, the GHG emissions of this Project would be 5.45 $MTCO_2e/SP/yr$, also above

the BAAQMD threshold of 4.6 $MTCO_2e/SP/yr$, making this a significant impact without mitigation measures. Most of the Project's emissions are from mobile sources, which comprise 69 percent of project emissions. No feasible mitigation measures to reduce mobile source emissions beyond compliance with existing regulations have been identified. The developer has no control over the fuel efficiency of vehicles operated by future residents. The Project may ultimately be served by public transit; however, transit use in suburban locations is limited by infrequent service and distance to transit stops. Construction of a transit stop in an area that would not be expected to generate sufficient transit use to justify a stop and would not result in consequential emission reductions. The design of the Project is conducive to bicycle use for recreational use and for limited use by some cyclists for commuting to job locations; however, the amount of cycling trips would not be substantially increased through additional mitigation measures applied to the project. Actions required by MM AIR-6, which requires the Project to utilize solar panels to provide at least 10 percent of project electrical needs would reduce the Project's operation-related GHGs from energy use. However, as shown in Table 3.3-28, the emissions after incorporation of MM AIR-6 would still exceed the BAAQMD threshold of 4.6 $MTCO_2e/SP/yr$; the residual impact would be significant and unavoidable.

Table 3.3-28: Mitigated Project Greenhouse Gas Emissions (2020)

Emissions Source	Emissions ($MTCO_2e$)
Area Sources	6
Energy	363
Mobile (Vehicle)	1,349
Waste	34
Water	22
Total Operational Emissions	1,774
Annualized Construction Emissions*	43
Total Project Emissions	1,816
Service Population	358
Project Emission Generation	*5.07 $MTCO_2e/SP/yr$*
BAAQMD 2011 Threshold	*4.60 $MTCO_2e/SP/yr$*
Significant Impact?	*Yes*

Note:
* Construction emissions annualized over an anticipated 30-year Project lifespan.
Source: CalEEMod Output (Appendix B)

The BAAQMD thresholds are based on the region achieving fair share of reductions needed to be consistent with the AB 32 2020 targets. No threshold of significance has been established to achieve State goals included in Executive Orders signed by the Governor. Executive Orders apply only to the actions of state agencies and do not provide a legislative mandate, as did AB 32. The BAAQMD—which is the regulatory agency with expertise in this area on air quality matters—has identified the appropriate threshold, which remains a valid performance standard; as of the writing of the Draft

EIR and based on available information, the Project is expected to be constructed by 2020. In addition, projects will continue to achieve reductions from the implementation of motor vehicle fuel efficiency standards that apply through model year 2025 and building energy efficiency standards that are updated every 3 years with a goal of zero net energy consumption for new development. This will guarantee continued progress in reducing GHG emissions until such a time as the State adopts new targets and the BAAQMD or the County adopt new thresholds of significance based on the new state target.

Level of Significance Before Mitigation

Significant and unavoidable impact.

Mitigation Measures

MM AIR-6 Prior to issuance of building permits, the following measures to reduce greenhouse gas emissions shall be implemented to the extent feasible:

a) Only natural gas hearths shall be installed throughout the development.
b) Install solar or tankless water heaters throughout the development.
c) Install energy-efficient ceiling/whole-house fans.
d) Install on-site generation of renewable energy, such as solar to meet a minimum of 10 percent of the Project's total energy demand.
e) Comply with California Green Building standards to reduce both indoor and outdoor water consumption.

Level of Significance After Mitigation

Significant and unavoidable impact.

Greenhouse Gas Reduction Plan Consistency

Impact AIR-7: Implementation of the Project would not conflict with any applicable plan, policy or regulation of an agency adopted to reduce the emissions of greenhouse gases.

Impact Analysis

To address this potential impact, Project consistency with the Contra Costa County Climate Action Plan and the ARB's Scoping Plan is used for this analysis. Consistency with a local climate action plan is the preferred method for determining the significance of GHG impacts. The Supreme Court of California in the case *Center for Biological Diversity (CBD) v. California Department of Fish and Wildlife (CDFW)* found that whether a project was consistent with meeting statewide emission reduction goals was a legally permissible criterion of significance. However, the finding that a project's emissions would not be significant under this criterion was not supported by a reasoned explanation based on substantial evidence. The Court did not clearly specify what would constitute substantial evidence meeting this criterion, but it did provide statements that may help Lead Agencies in crafting a defensible GHG threshold. The Court states that "some of this burden can be relieved by using geographically specific greenhouse gas emission reduction plans to provide a basis for the tiering or streamlining of project-level CEQA analysis," and that these plans "may, if sufficiently detailed and adequately supported, be used in later project-specific CEQA documents to

simplify the evaluation of the project's cumulative contribution to the effects of greenhouse gas emissions" (CEQA Guidelines Section 15183.5(a),(b)). The Contra Costa CAP meets this requirement.

As described earlier, the approved Contra Costa County CAP demonstrates that the County would achieve a 15 percent reduction from implementation of GHG regulations and CAP strategies. The CAP includes analysis indicating that the CAP meets the BAAQMD's minimum standards for a qualified GHG Reduction Strategy. The CAP includes a project consistency checklist that was created to help both project applicants and County staff determine where a proposed new development project is consistent with Contra Costa County's Climate Action Plan (CAP). The checklist would be filled out for each new project subject to discretionary review. The County will work with applicants on a project-by-project basis to identify appropriate measures to integrate with the project through conditions of approval or project design, or other techniques as applicable. This approach allows the County to ensure that new projects are consistent with and do not compromise the County's ability to attain the GHG reduction targets outlined in this CAP. To assist with implementation, the checklist provides descriptions and performance criteria that explain how individual projects can comply with requirements. The individual project criterion clarifies implementation of the CAP, providing additional information that is consistent with the assumptions identified in Appendix D of the CAP.

An assessment of the Project's consistency with the ARB's Scoping Plan was also accomplished to determine if the Project would conflict with the State's plans and regulations. The assessment compares the emissions from Project sources under a business as usual scenario and the Project with regulations that apply to Project sources and mitigation measures and design features that provide GHG emission reductions. Each is discussed separately below.

Contra Costa County Climate Action Plan

The following CAP checklist measures apply to residential development:

- **EE 1 & EE 6.** New residential development will install high-efficiency appliances and insulation to prepare for the statewide transition to zero net energy.

The Project will install new high efficiency appliances meeting Title 20 appliance efficiency standards. Insulation and other building envelope-related energy efficiency requirements will be required to meet the latest version of Title 24. The newest version of Title 24 is the 2016 Title 24 update that goes into effect January 1, 2017.

- **RE 1.** New residential and nonresidential development will meet the standards to be solar ready as defined by the California Building Standards Code.

The Project will comply with the California Building Codes Standards requiring the homes to be solar ready. In addition, the Project includes a mitigation measure requiring the installation of sufficient amounts of solar panels to provide at least 10 percent of Project electricity.

- **LUT 2.** New single-family houses and multi-family units with private attached garages or carports will provide prewiring for EV charging stations inside the garage or carport.

The Project residences will be required to provide wiring that allows installation of EV charging equipment in garages.

- **LUT 4.** Work to increase residential and nonresidential densities within one half-mile of a BART or Amtrak station, or within one quarter-mile of a bus station.

Pursuant to CAP Appendix D, Measure LUT 4 requires the County to work to increase densities within half a mile of BART and Amtrak stations, and within 0.25 mile of stops for express bus routes. The Project site is not near a BART or Amtrak station or a location suitable for an express bus stop. This measure is intended to increase development density in areas with these amenities, not to preclude development in areas not so served. Therefore, this measure is not applicable to the Project. For a project to be inconsistent with this measure, it would need to be within the distance radii described from those facilities and to propose low density development. The Project density is appropriate for the vicinity where it is proposed. The Project is not currently served by transit; however, the Project increases development density in the area, increasing the feasibility of providing service on Tassajara Road in the future.

Based on the Project's compliance with the applicable measures from the CAP checklist and mitigation measures that go beyond the checklist requirement, the Project is consistent with the CAP and would have less than significant impacts from GHG emissions. The checklist provides a qualitative measure of consistency; however, a quantitative analysis was also conducted to demonstrate consistency with the County's reduction target in Table 3.3-29.

The Contra Costa County CAP required a reduction of 15 percent below 2005 baseline levels by 2020. The CAP indicates that population in unincorporated Contra Costa County is predicted to increase by 4.0 percent between 2005 and 2020. The unincorporated service population (jobs plus population) is predicted to increase by 6.0 percent. Therefore, for the County to achieve its 2020 target, it would need overall reductions of approximately 21 percent (15 percent plus 6 percent SP increase). As shown in Table 3.3-29, the Project would meet the required reductions. Accordingly, impacts would be less than significant.

Table 3.3-29: Contra Costa County CAP Consistency Analysis

Emission Source	$MTCO_2e$ per year		Percent Reduction
	2005 BAU Scenario	2020 Project Scenario	
Area	71	6	91.0%
Energy	558	363	34.9%
Mobile	1,778	1,349	24.1%
Waste	68	34	50.0%
Water	35	22	37.1%
Total Emissions	2,511	1,774	29.4%
Contra Costa County CAP Reduction Goal			15.0%

Table 3.3-29 (cont.): Contra Costa County CAP Consistency Analysis

Emission Source	$MTCO_2e$ per year		Percent Reduction
	2005 BAU Scenario	2020 Project Scenario	
Contra Costa County Predicted Increase in Service Population by 2020			6%
Reductions Required to Achieve CAP Target Accounting for Projected Growth			21%
Does the Project Meet the Reduction Goal?			Yes

Notes:
BAU = business as usual $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: CalEEMod output (Appendix B).

The Project reductions are achieved primarily through compliance with adopted state regulations that apply to sources of emissions in the Project's emission inventory. The percentage reductions are only applied to the specific sources subject to the regulations. For example, the Pavley Low Emission Vehicle Standards apply only to light-duty cars and trucks. The applicable regulations providing the emission reductions are described in Table 3.3-30.

Table 3.3-30: Reductions from Greenhouse Gas Regulations

Regulation	Project Applicability	Reduction Source	Percent Reduction from BAU in 2020
Pavley Low Emission Vehicle Standards	Light-duty cars and trucks accessing the site are subject to the regulation	CalEEMod defaults (Pavley I)	25.1[1]
		Adjusted GHG emission factor (Pavley II/LEV III) in CalEEMod.	3%[2]
Low Carbon Fuel Standard (LCFS)	Vehicles accessing the site will use fuel subject to the LCFS	CalEEMod defaults	10%[1]
Title 24 Energy Efficiency Standards	Project homes will be constructed to meet the latest version of Title 24 (currently 2013). Reduction applies only to energy consumption subject to the regulation.	CalEEMod defaults (2008) and CalEEMod mitigation component (2013)	25%[3]
Green Building Code Standards	The Project will include water conservation features required by the standard	CalEEMod mitigation component	20%[4]
Water Efficient Land Use Ordinance	The Project landscaping will comply with the regulation	CalEEMod mitigation component	20%[5]
Renewable Portfolio Standard (RPS)	Electricity purchased for use at the Project Site is subject to the 33% RPS mandate	CalEEMod adjusted energy intensity factors from PG&E	23.3%[6]

Table 3.3-30 (cont.): Reductions from Greenhouse Gas Regulations

Regulation	Project Applicability	Reduction Source	Percent Reduction from BAU in 2020
Recycling, Source Reduction and Diversion Mandate	The reduction is based on achieving CalRecycle 75% recycling goal.	CalEEMod mitigation component	50%[7]

Notes:
Regulations are described in Section 2.3 Regulatory Environment. The source of the percentage reductions from each measure are from the following sources:
[1] Pavley 1 + Low Carbon Fuel Standard Postprocessor Version 1.0 User's Guide (ARB 2010c).
[2] ARB Staff Report for LEV III Amendments (ARB 2013)
[3] 2013 Title 24 Building Energy Efficiency Standards Adoption Hearing Presentation (CEC 2012)
[4] 2013 California Green Building Standards Code Section 5.303.2
[5] California Water Plan Update 2013 (CDWR 2013)
[6] Based on PG&E compliance with the Renewable Portfolio Standard
[7] CalRecycle—California's 75 Percent Initiative: Defining the Future (CalRecycle 2016)

In addition to rules and regulations listed above, the Project would incorporate design features and would obtain benefits from its location and infrastructure that would reduce Project vehicle miles traveled compared with default values. The reductions attributable to the measures in CalEEMod are derived from methodologies compiled in the CAPCOA report Quantifying GHG Measures. The combined reduction from these measures is a 2.0 percent reduction in mobile source emissions.

Scoping Plan

ARB adopted the Climate Change Scoping Plan (Scoping Plan), which outlines actions recommended to obtain the emission reduction goals contained in AB 32. The Scoping Plan states, "The 2020 goal was established to be an aggressive, but achievable, mid-term target, and the 2050 greenhouse gas emissions reduction goal represents the level scientists believe is necessary to reach levels that will stabilize climate" (California Air Resources Board 2008, page 4). The year 2020 goal of AB 32 corresponds with the mid-term target established by S-3-05, which aims to reduce California's fair-share contribution of GHGs in 2050 to levels that will stabilize the climate. The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target, with each sector having a different emission reduction target. Most of the measures target the transportation and electricity sectors. Therefore, the majority of measures are not directly applicable or implementable at the Project level.

As stated in the ARB's adopted Scoping Plan, reducing GHG emissions to 1990 levels means cutting approximately 30 percent from BAU emission levels projected for 2020, or about 15 percent from 2008 levels. The 2014 First Update to the Scoping Plan presented revised growth forecasts reflecting slower growth during the recession that would require a lower reduction of 21.7 percent from business as usual to achieve the AB 32 target. As shown in Table 3.3-31, the Project as proposed would be consistent with the emission reduction goal of ARB's Scoping Plan. The regulations that will provide reductions needed to achieve this goal are described in Table 3.3-30. Additional reductions in mobile emissions from design features and Project location are estimated using the

CalEEMod mitigation component. Therefore, the Project would not conflict with implementation of the Scoping Plan or its policies, and impacts would be less than significant.

Table 3.3-31: Scoping Plan Consistency Analysis

Emission Source	$MTCO_2e$ per year		Percent Reduction
	2005 BAU Scenario	2020 Project Scenario	
Area	71	6	91.0%
Energy	558	363	34.9%
Mobile	1,778	1,349	24.1%
Waste	68	34	50%
Water	35	22	37.1%
Total Emissions	2,511	1,774	29.4%
ARB Scoping Plan Reduction Goal			21.7%
Does the Project Meet the Reduction Goal?			Yes

Notes:
BAU = business as usual $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: CalEEMod output (Appendix B).

Consistency with SB 375 Sustainable Communities Strategy

The Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) are responsible for implementing SB 375 in the Bay Area. The ARB was required to determine if it should accept or reject the determination of each metropolitan planning organization (MPO), that its Sustainable Communities Strategy (SCS) would, if implemented, achieve the greenhouse gas (GHG) emission reduction targets (targets) for 2020 and 2035, set by the ARB in 2010. The ARB affirmed that ABAG/MTC's adopted SCS demonstrates that, if implemented, the region will achieve a 10 percent per capita GHG emissions reduction in 2020, and a 16 percent reduction in 2035. These reductions meet the targets established for ABAG/MTC of 7 percent and 15 percent per capita GHG emissions reductions from 2005 for the years 2020 and 2035, respectively. The preferred scenario in the SCS focuses growth in locally nominated Priority Development Areas (PDAs) while preserving land in the Priority Conservation Areas (PCAs). The Project is not within a PDA or in a PCA according the map included in the One Bay Plan. Although it focuses growth in PDA's, the Plan does not preclude growth in areas outside PDAs. The Plan Bay Area assumes that 25 percent of new development will be single-family residential.

Consistency with Contra Costa County US Cool Counties Climate Stabilization Declaration

The Cool Counties Climate Stabilization Declaration declares that the County will take immediate steps to help the federal, state, and local governments within our county to achieve the 2050 climate stabilization goal. The goal would be pursued by working closely with local, state, and federal governments and other leaders to reduce county geographical GHG emissions to 80 percent below current levels by 2050, by developing a GHG emissions inventory and regional plan that establishes short-, mid-, and long-term GHG reduction targets, with recommended goals to stop increasing

emissions by 2010, and to achieve a 10 percent reduction every 5 years thereafter through to 2050. The County has implemented this resolution first by adopting the Greenhouse Gas Inventory Report in 2008 to create baseline GHG inventories for the County and then by adopting the CAP to provide the County's short term and mid-term GHG reduction goals. The Project is consistent with the CAP and is therefore consistent with County resolution. The CAP indicates that complete implementation will allow the County to achieve a 16 percent reduction of GHG emissions below 2005 levels by 2020 and will set the County on a trajectory to achieve the state GHG reduction target set by Executive Order S-3-05 of reducing GHG emissions 80 percent below 1990 levels by 2050. Showing reasonable progress toward a 2050 target in the CAP is appropriate because identifying the technology and control strategy needed to achieve the target now would be speculative.

A project-level GHG CEQA threshold based on 2035 and 2050 is also speculative because the impacts of the primary sources of emissions (transportation and energy use) are unknown after full implementation of the currently adopted regulations. Additional regulations are likely, but without a new Scoping Plan that identifies a strategy achieves the next target, identifying a gap that will be filled by new development is not possible. The amount of reductions required by near-term projects to achieve mid-term and long-term goals beyond regulation, if any, is speculative.

Consistency with Executive Orders S-3-05 and B-30-15

At the state level, Executive Orders S-3-05 and B-30-15 are orders from the State's Executive Branch for the purpose of reducing GHG emissions. The goal of Executive Order S-3-05 is to reduce GHG emissions to 1990 levels by 2020 and it was codified by the Legislature as the 2006 Global Warming Solutions Act (AB 32). As explained above, the proper threshold to which the Project should be compared is AB 32's 2020 targets. The Project, as analyzed above, is consistent with AB 32 and does not conflict with this component of Executive Order S-3-05.

While unnecessary to apply post-2020 targets, the EIR evaluates whether the Project has the potential to frustrate future GHG reduction targets. The Executive Orders also establish goals to reduce GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. These goals have not been codified. However, studies have shown that, in order to meet the 2030 and 2050 targets, aggressive technologies in the transportation and energy sectors, including electrification and the decarbonization of fuel, will be required. In its Climate Change Scoping Plan, ARB acknowledged that the "measures needed to meet the 2050 are too far in the future to define in detail." In the First Scoping Plan Update, however, ARB generally described the type of activities required to achieve the 2050 target: "energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and rapid market penetration of efficiency and clean energy technologies that requires significant efforts to deploy and scale markets for the cleanest technologies immediately." Because of the technological shifts required and the unknown parameters of the regulatory framework in 2030 and 2050, quantitatively analyzing the project's impacts further relative to the 2030 and 2050 goals is speculative for purposes of CEQA. Moreover, ARB has not calculated and released the BAU emissions projections for 2030 or 2050, which are necessary data points for quantitatively analyzing a CEQA project's consistency with these targets (ARB 2014).

The Scoping Plan recognizes that AB 32 establishes an emissions reduction trajectory that will allow California to achieve the more stringent 2050 target: "These [greenhouse gas emission reduction] measures also put the State on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. This trajectory is consistent with the reductions that are needed globally to stabilize the climate." In addition, ARB's First Update "lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050," and many of the emission reduction strategies recommended by ARB would serve to reduce the proposed project's post-2020 emissions level to the extent applicable by law:

1. Energy Sector: Continued improvements in California's appliance and building energy efficiency programs and initiatives, such as the State's zero net energy building goals, would serve to reduce the proposed project's emissions level. Additionally, further additions to California's renewable resource portfolio would favorably influence the proposed project's emissions level.
2. Transportation Sector: Anticipated deployment of improved vehicle efficiency, zero emission technologies, lower carbon fuels, and improvement of existing transportation systems all will serve to reduce the proposed project's emissions level.
3. Water Sector: The proposed project's emissions level will be reduced as a result of further desired enhancements to water conservation technologies.
4. Waste Management Sector: Plans to further improve recycling, reuse and reduction of solid waste will beneficially reduce the proposed project's emissions level.

In addition to ARB's First Update, in January 2015, during his inaugural address, Governor Jerry Brown expressed a commitment to achieve "three ambitious goals" that he would like to see accomplished by 2030 to reduce the State's GHG emissions:

1. Increasing the State's Renewable Portfolio Standard from 33 percent in 2020 to 50 percent in 2030;
2. Cutting the petroleum use in cars and trucks in half; and
3. Doubling the efficiency of existing buildings and making heating fuels cleaner.

These expressions of Executive Branch policy may be manifested in adopted legislative or regulatory action through the state agencies and departments responsible for achieving the State's environmental policy objectives, particularly those relating to global climate change (Brown 2015). Further, recent studies show that the State's existing and proposed regulatory framework will allow the State to reduce its GHG emissions level to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050. Even though these studies did not provide an exact regulatory and technological roadmap to achieve the 2030 and 2050 goals, they demonstrated that various combinations of policies could allow the statewide emissions level to remain very low through 2050, suggesting that the combination of new technologies and other regulations not analyzed in the studies could allow the State to meet the 2050 target (Energy and Economics 2015).

Given the proportional contribution of mobile source-related GHG emissions to the State's inventory, recent studies also show that relatively new trends, such as the increasing importance of web-based shopping, the emergence of different driving patterns by the "millennial" generation and the increasing effect of Web-based applications on transportation choices, are beginning to substantially influence transportation choices and the energy used by transportation modes. These factors have changed the direction of transportation trends in recent years, and will require the creation of new models to effectively analyze future transportation patterns and the corresponding effect on GHG emissions. For the reasons described above, the proposed project's post-2020 emissions trajectory is expected to follow a declining trend, consistent with the 2030 and 2050 targets.

Regarding goals for 2050 under Executive Order S-3-05, at this time it is not possible to quantify the emissions savings from future regulatory measures, as they have not yet been developed; nevertheless, it can be anticipated that operation of the Project would comply with whatever measures are enacted that state lawmakers decide would lead to an 80 percent reduction below 1990 levels by 2050. Note again that the Project already includes several Project design features that exceed regulatory requirements and reduce VMT.

Accordingly, taking into account the proposed Project's emissions, Project design features, standard measures and the progress being made by the State towards reducing emissions in key sectors such as transportation, industry, and electricity, the Project furthers the State's goals of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction below 1990 levels by 2050, and does not obstruct their attainment.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less than significant impact.

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