GREENHOUSE GAS TECHNICAL REPORT

Introduction

This technical report examines the direct and indirect impacts of a Proposed Project at 21611 Perry Street in the City of Carson related to greenhouse gas (GHG) emissions and global climate change by disclosing GHG emissions generation and by addressing the Project's consistency with applicable GHG emission reduction plans, policies, and regulations. Calculation worksheets and documentation are included in the Technical Appendix to this analysis.

Environmental Setting

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Global warming, a related concept, is the observed increase in average temperature of Earth's surface and atmosphere. One cause of global warming is an increase of GHG emissions in the atmosphere. GHG emissions are those compounds in Earth's atmosphere that play a critical role in determining Earth's surface temperature.

Earth's natural warming process is known as the "greenhouse effect" because Earth and the atmosphere surrounding it are like a greenhouse with glass panes that allow solar radiation (sunlight) into Earth's atmosphere but prevents radiative heat from escaping, thus warming Earth's atmosphere. Some levels of GHG emissions keep the average surface temperature of Earth close to a hospitable 60 degrees Fahrenheit. However, it is believed that excessive concentrations of anthropogenic GHG emissions in the atmosphere can result in increased global mean temperatures, with associated adverse climatic and ecological consequences.[1]

Scientists studying the rapid rise in global temperatures have determined that human activity has resulted in increased emissions of GHGs, primarily from the burning of fossil fuels (from motor vehicle travel, electricity generation, consumption of natural gas, industrial activity, manufacturing), deforestation, agricultural activity, and the decomposition of solid waste. Scientists refer to the global warming context of the past century as the "enhanced greenhouse effect" to distinguish it from the natural greenhouse effect.[2]

Global GHG emissions due to human activities have grown since pre-industrial times. As reported by the United States Environmental Protection Agency (USEPA), global carbon emissions from fossil fuels increased by over 16 times between 1900 and 2008 and by about 1.5 times between 1990 and 2008. In addition, in the Global Carbon Budget 2014 report, published in September 2014, atmospheric carbon dioxide (CO_2) concentrations in 2013 were found to be 43 percent above the concentration at the start of the Industrial Revolution, and the present concentration is the highest during at least the last 800,000

1 Intergovernmental Panel on Climate Change, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)].

2 Center for Climate and Energy Solutions, Climate Change 101: Understanding and Responding to Global Climate Change.

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years.[3] Global increases in CO_2 concentrations are due primarily to fossil fuel use, with land use change providing another significant but smaller contribution. Regarding emissions of non-CO_2 GHG, these have also increased significantly since 1990. In particular, studies have concluded that it is very likely that the observed increase in methane (CH_4) concentration is predominantly due to agriculture and fossil fuel use.[4]

In August 2007, international climate talks held under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) led to the official recognition by the participating nations that global emissions of GHG must be reduced. According to the "Ad Hoc Working Group on Further Commitments of Annex I Parties under the Kyoto Protocol," avoiding the most catastrophic events forecast by the United Nations Intergovernmental Panel on Climate Change (IPCC) would entail emissions reductions by industrialized countries in the range of 25 to 40 percent below 1990 levels. Because of the Kyoto Protocol's Clean Development Mechanism, which gives industrialized countries credit for financing emission-reducing projects in developing countries, such an emissions goal in industrialized countries could ultimately spur efforts to cut emissions in developing countries as well.[5]

With regard to the adverse effects of global warming, as reported by the Southern California Association of Governments (SCAG), "Global warming poses a serious threat to the economic well-being, public health, and natural environment in southern California and beyond. The potential adverse impacts of global warming include, among others, a reduction in the quantity and quality of water supply, a rise in sea level, damage to marine and other ecosystems, and an increase in the incidences of infectious diseases. Over the past few decades, energy intensity of the national and state economy has been declining due to the shift to a more service-oriented economy. California ranked fifth lowest among the states in CO_2 emissions from fossil fuel consumption per unit of Gross State Product. However, in terms of total CO_2 emissions, California is second only to Texas in the nation and is the 12th largest source of climate change emissions in the world, exceeding most nations. The SCAG region, with close to half of the state's population and economic activities, is also a major contributor to the global warming problem."

GHG Emissions Background. GHG emissions include CO_2, CH_4, nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).[6] Carbon dioxide is the most abundant GHG. Other GHG emissions are less abundant but have higher global warming potential than CO_2. Thus, emissions of other GHG emissions are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooking are the primary sources of GHG emissions. A general description of the GHG emissions is provided in Table 1.

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3 C. Le Quéré, et al., Global Carbon Budget 2014, (Earth System Science Data, 2015, doi:10.5194/essd–7–47–2015).

4 USEPA, Atmospheric Concentrations of Greenhouse Gas, updated June 2015.

5 United Nations Framework Convention on Climate Change, Press Release—Vienna UN Conference Shows Consensus on Key Building Blocks for Effective International Response to Climate Change, August 31, 2007

6 As defined by California Assembly Bill (AB) 32 and Senate Bill (SB) 104.

Table 1
Description of Identified GHG Emissions[a]

Greenhouse Gas	General Description
Carbon Dioxide (CO_2)	An odorless, colorless GHG, which has both natural and anthropocentric sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources of CO_2 are burning coal, oil, natural gas, and wood.
Methane (CH_4)	A flammable gas and is the main component of natural gas. When one molecule of CH_4 is burned in the presence of oxygen, one molecule of CO_2 and two molecules of water are released. A natural source of CH_4 is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.
Nitrous Oxide (N_2O)	A colorless GHG. High concentrations can cause dizziness, euphoria, and sometimes slight hallucinations. N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, racecars, and as an aerosol spray propellant.
Hydrofluorocarbons (HFCs)	Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are non-toxic, non-flammable, insoluble, and chemically unreactive in the troposphere (the level of air at Earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. Because they destroy stratospheric ozone, the production of CFCs was stopped as required by the Montreal Protocol in 1987. HFCs are synthetic man-made chemicals that are used as a substitute for CFCs as refrigerants. HFCs deplete stratospheric ozone, but to a much lesser extent than CFCs.
Perfluorocarbons (PFCs)	PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface destroy the compounds. PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane and hexafluoroethane. The two main sources of PFCs are primary aluminum production and semi-conductor manufacturing.
Sulfur Hexafluoride (SF_6)	An inorganic, odorless, colorless, non-toxic, and non-flammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.
Nitrogen Trifluoride (NF_3)	An inorganic, non-toxic, odorless, non-flammable gas. NF_3 is used in the manufacture of semi-conductors, as an oxidizer of high-energy fuels, for the preparation of tetrafluorohydrazine, as an etchant gas in the electronic industry, and as a fluorine source in high power chemical lasers.

GHG emissions identified in this table are ones identified in the Kyoto Protocol and other synthetic gases recently added to the IPCC's Fifth Assessment Report.
Source: Association of Environmental Professionals, Alternative Approaches to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents, Final, June 29, 2007; Environmental Protection Agency, Acute Exposure Guideline Levels (AEGLs) for Nitrogen Trifluoride; January 2009.

Global Warming Potential (GWP) is one type of simplified index based upon radiative properties used to estimate the potential future impacts of emissions of different gases upon the climate system. The

GWP is based on several factors, including the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. The higher the GWP, the more that a given gas warms the Earth compared to CO_2 over that period. As shown in Table 2, the atmospheric lifetime and GWP of selected gases ranges from 1 to 22,800.[7]

Table 2
Atmospheric Lifetimes and Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50–200	1
Methane (CH_4)	12 (+/-3)	25
Nitrous Oxide (N_2O)	114	298
HFC-23: Fluoroform (CHF_3)	270	14,800
HFC-134a: 1,1,1,2-Tetrafluoroethane (CH_2FCF_3)	14	1,430
HFC-152a: 1,1-Difluoroethane ($C_2H_4F_2$)	1.4	124
PFC-14: Tetrafluoromethane (CF_4)	50,000	7,390
PFC-116: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800
Nitrogen Trifluoride (NF_3)	740	17,200
Source: IPCC, Climate Change 2007: Working Group I: The Physical Science Basis, Direct Global Warming Potentials		

Projected Impacts of Global Warming in California. The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain significant scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of the Earth's climate system and inability to accurately model it, the uncertainty surrounding climate change may never be eliminated. Nonetheless, the IPCC's Fifth Assessment Report, Summary for Policy Makers states that, "it is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forces together."[8] A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity.[9]

7 Atmospheric lifetime is defined as the time required to turn over the global Atmospheric burden. Source: Intergovernmental Panel on Climate Change, IPCC Third Assessment Report: Climate Change 2001 (TAR), Chapter 4: Atmospheric Chemistry and Greenhouse Gases, 2001, p. 247.

8 Intergovernmental Panel on Climate Change, Fifth Assessment Report, Summary for Policy Makers, page 5, 2013, http://ipcc.ch/report/ar5/syr/. Accessed November 2023.

9 Anderegg, William R. L., J.W. Prall, J. Harold, S.H., Schneider, Expert Credibility in Climate Change, Proceedings of the National Academy of Sciences of the United States of America. 2010;107:12107-12109.

According to the California Air Resources Board (CARB), the potential impacts in California due to global climate change may include: loss in snow pack; sea level rise; more extreme heat days per year; more high ozone days; more large forest fires; more drought years; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation. Below is a summary of some of the potential effects that could be experienced in California because 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. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would exacerbate air quality. 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.[10] However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires.

In 2009, the California Natural Resources Agency (CNRA) published the *California Climate Adaptation Strategy* as a response to the Governor's Executive Order S-13-2008.[11] The CNRA report lists specific recommendations for state and local agencies to best adapt to the anticipated risks posed by a changing climate. In accordance with the *California Climate Adaptation Strategy*, the California Energy Commission (CEC) was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers.[12] The website, known as Cal-Adapt, became operational in 2011[13] and provides a projection of potential future climate scenarios. The data are comprised of the average values (i.e., temperature, sea-level rise, snowpack) from a variety of scenarios and models and are meant to illustrate how the climate may change based on a variety of different potential social and economic factors.

Water Supply. Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. Studies have found that, "[c]onsiderable uncertainty about precise impacts of climate change on California hydrology and water resources will remain until we have more precise and consistent information about how precipitation patterns, timing, and intensity will change."[14] For example, some studies identify little change in total annual precipitation in projections for California while

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10 California Environmental Protection Agency, Preparing California for Extreme Heat: Guidance and Recommendations, October 2013, https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CCHEP-General/CDPH-EPA-2013-Preparing-CA-for-Extreme-Heat_ADA.pdf. Accessed November 2023.

11 California Natural Resources Agency, Climate Action Team, 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008, 2009.

12 California Natural Resources Agency, Climate Action Team, 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008, 2009.

13 The Cal-Adapt website address is: http://cal-adapt.org.

14 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature, July 2003, page 5, http://www.pacinst.org/reports/climate_change_and_california_water_resources.pdf. Accessed November 2023.

others show significantly more precipitation.[15] Warmer, wetter winters would increase the amount of runoff available for groundwater recharge; however, this additional runoff would occur at a time when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge.[16]

The California Department of Water Resources report on climate change and effects on the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta, concludes that "climate change will likely have a significant effect on California's future water resources…[and] future water demand." It also reports that "much uncertainty about future water demand [remains], especially [for] 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."[17] It also reports that the relationship between climate change and its potential effect on water demand is not well understood, but "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future." 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.[18] In its *Fifth Assessment Report*, the IPCC states "Changes in the global water cycle in response to the warming over the 21st century will not be uniform. The contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions."[19]

Hydrology and Sea Level Rise. As discussed above, climate change could potentially affect: 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 jeopardize California's water supply. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture. California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield

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15 Pacific Institute for Studies in Development, Environment and Security, Climate Change and California Water Resources: A Survey and Summary of the Literature, July 2003, http://www.pacinst.org/reports/climate_change_and_california_water_resources.pdf. Accessed November 2023.

16 California Natural Resources Agency, Safeguarding California: Reducing Climate Risk, an Update to the 2009 California Climate Adaptation Strategy, 2014.

17 California Department of Water Resources Climate Change Report, Progress on Incorporating Climate Change into Planning and Management of California's Water Resources, July 2006, page 2-54, https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=6454.

18 California Department of Water Resources Climate Change Report, Progress on Incorporating Climate Change into Planning and Management of California's Water Resources, July 2006, page 2-75, https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=6454.

19 Intergovernmental Panel on Climate Change, Fifth Assessment Report, Summary for Policy Makers, 2013, page 20.

could be threatened by a less reliable water supply; and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[20]

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. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise by 2-11.5°F (1.1-6.4°C) by 2100, with significant regional variation.[21] Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Sea level could rise as much as 2 feet along most of the United States coastline. Rising temperatures could have four major impacts on 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.[22]

Regulatory Framework: Federal

In response to growing scientific and political concern with global climate change, federal and state entities have adopted a series of laws to reduce emissions of GHG emissions to the atmosphere.

Federal Clean Air Act. The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that CO_2 and other GHG emissions are pollutants under the federal Clean Air Act (CAA), which the USEPA must regulate if it determines they pose an endangerment to public health or welfare. The U.S. Supreme Court did not mandate that the USEPA enact regulations to reduce GHG emissions. Instead, the Court found that the USEPA could avoid acting if it found that GHG emissions do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHG emissions contribute to climate change.

On April 17, 2009, the USEPA issued a proposed finding that GHG emissions contribute to air pollution that may endanger public health or welfare. On April 24, 2009, the proposed rule was published in the Federal Register under Docket ID No. EPA-HQ-OAR-2009-0171. The USEPA stated that high atmospheric levels of GHG emissions "are the unambiguous result of human emissions and are very likely the cause of the observed increase in average temperatures and other climatic changes." The USEPA further found that "atmospheric concentrations of greenhouse gases endanger public health and welfare within the meaning of Section 202 of the Clean Air Act." The findings were signed by the USEPA Administrator on December 7, 2009. The final findings were published in the Federal Register on December 15, 2009. The final rule was effective on January 14, 2010.[23] While these findings alone do

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20 California Climate Change Center, Our Changing Climate: Assessing the Risks to California, 2012, https://www.cakex.org/sites/default/files/documents/CEC-500-2012-007.pdf.

21 National Research Council, Advancing the Science of Climate Change, 2010, https://nap.nationalacademies.org/catalog/12782/advancing-the-science-of-climate-change. Accessed November 2023.

22 Parmesan, C., and H. Galbraith, Observed Impacts of Global Climate Change in the U.S., Prepared for the Pew Center on Global Climate Change, November 2004, https://www.c2es.org/site/assets/uploads/2004/11/observed-impacts-climate-change-united-states.pdf. November 2023.

23 USEPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, Final Rule.

not impose any requirements on industry or other entities, this action is a prerequisite to regulatory actions by the USEPA, including, but not limited to, GHG emissions standards for light-duty vehicles.

On April 4, 2012, the USEPA published a proposed rule to establish, for the first time, a new source performance standard for GHG emissions. Under the proposed rule, new fossil fuel–fired electric generating units larger than 25 megawatts (MW) are required to limit emissions to 1,000 pounds of CO_2 per MW-hour (CO_2/MWh) on an average annual basis, subject to certain exceptions. Subsequently, on April 23, 2018, the USEPA issued a policy stating that CO_2 emissions from biomass-fired and other biogenic sources would be considered carbon neutral when used for energy production at stationary sources.

On April 17, 2012, the USEPA issued emission rules for oil production and natural gas production and processing operations, which are required by the CAA under Title 40 of the Code of Federal Regulations, Parts 60 and 63. The final rules include the first federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that currently are not regulated at the federal level.[24]

Corporate Average Fuel Economy (CAFE) Standards. In response to the *Massachusetts v. Environmental Protection Agency* ruling, the George W. Bush Administration issued Executive Order 13432 in 2007, directing the USEPA, the United States Department of Transportation (USDOT), and the United States Department of Energy (USDOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; in 2010, the USEPA and the NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the USEPA, USDOT, USDOE, and NHTSA to establish additional standards regarding fuel efficiency and GHG emissions reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG emissions and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if the standards were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021. In March 2020, NHTSA and USEPA adopted new less stringent standards covering model years 2021 through 2026.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011 the USEPA and the NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and

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24 USEPA, 2012 Final Rules for Oil and Natural Gas Industry, April 17, 2012, https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/2012-final-rules-oil-and-natural-gas-industry. Accessed November 2023.

vocational vehicles. According to the USEPA, this regulatory program would reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines.[25]

Building on the success of the first phase of standards, in August 2016, the USEPA and the NHTSA finalized Phase 2 standards for medium and heavy-duty vehicles through model year 2027 that will improve fuel efficiency and cut carbon pollution. The Phase 2 standards were to lower CO_2 emissions by approximately 1.1 billion metric tons and save vehicle owners fuel costs of about $170 billion.[26] On August 10, 2021, NHTA proposed new CAFE standards for 2024-2026 that would increase the stringency of standards by 8 percent per year rather than the previous 1.5 percent.

On September 19, 2019, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) and USEPA issued a final action entitled the "One National Program Rules" to enable the federal government to provide nationwide uniform fuel economy and GHG emission standards for automobile and light duty trucks. This action finalizes the Safe Affordable Fuel Efficient (SAFE) Vehicles Rule and clarifies that federal law preempts state and local tailpipe GHG emissions standards as well as zero emission vehicle (ZEV) mandates. On March 31, 2020, Part II of the SAFE Vehicles was issued and sets carbon dioxide emissions and CAFE standards for passenger vehicles and light duty trucks, covering model years 2021-2026.[27] On December 21, 2021, NHTA repealed the SAFE I Rule.

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by the USEPA and the NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks, and (ii) directing the NHTSA to establish a fuel

25 The emission reductions attributable to the regulations for medium- and heavy-duty trucks were not included in the Project's emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative (i.e., higher) estimate of emissions for the Project.

26 USEPA and NHTSA Adopt Standards to Reduce GHG and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond, August 2016.

27 U.S. Department of Transportation. 2020. The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/final_safe_preamble_web_version_200330.pdf.

economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."[28]

2024 Fleet Rules. On March 20, 2024, the USEPA issued final rules mandating significant reductions in future light- and medium-duty vehicles from model years 2027 to 2032. These rules call for vehicle manufacturers to achieve an industry-wide average target of 85 grams of CO_2 per mile, a fifty-percent reduction compared to standards for model year 2026 vehicles. Similar regulations would reduce CO_2 emission 44 percent when compared to standards for model year 2026 vehicles. On March 29, 2024, the USEPA approved its "Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles – Phase 3" regulations that sets more stringent standard for heavy-duty vehicles beginning in model year 2027. This regulation will accelerate the shift of heavy-duty vehicles to cleaner fuels and electric drivetrains.

Regulatory Framework: State

Scoping Plan for Achieving Carbon Neutrality (Scoping Plan). The Scoping Plan is a GHG emission reduction roadmap developed and updated by the California Air Resources Board (CARB) at least once every five years, as required by Assembly Bill (AB) 32. It lays out the transformations needed across various sectors to reduce GHG emissions and reach the State's climate targets. CARB published the Final 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan Update) in November 2022, as the third update to the initial plan that was adopted in 2008. The initial 2008 Scoping Plan laid out a path to achieve the AB 32 target of returning to 1990 levels of GHG emissions by 2020, a reduction of approximately 15 percent below business as usual activities.[29] The 2008 Scoping Plan included a mix of incentives, regulations, and carbon pricing, laying out the portfolio approach to addressing climate change and clearly making the case for using multiple tools to meet California's GHG targets. The 2013 Scoping Plan Update (adopted in 2014) assessed progress toward achieving the 2020 target and made the case for addressing short-lived climate pollutants (SLCPs).[30] The 2017 Scoping Plan Update,[31] shifted focus to the newer Senate Bill (SB) 32 goal of a 40 percent reduction below 1990 levels by 2030 by laying out a detailed cost-effective and technologically feasible path to this target, and also assessed progress towards achieving the AB 32 goal of returning to 1990 GHG levels by 2020. The 2020 goal was ultimately reached in 2016, four years ahead of the schedule called for under AB 32.

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28 A green job, as defined by the United States Department of Labor, is a job in business that produces goods or provides services that benefit the environment or conserve natural resources.

29 CARB. 2008. Climate Change Scoping Plan. https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2008-scoping-plan-documents.

30 CARB. 2014. First Update to the Climate Change Scoping Plan. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

31 CARB, California's 2017 Climate Change Scoping Plan, 2017, https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

The 2022 Scoping Plan Update is the most comprehensive and far-reaching Scoping Plan developed to date. It identifies a technologically feasible, cost-effective, and equity-focused path to achieve new targets for carbon neutrality by 2045 and to reduce anthropogenic GHG emissions to at least 85 percent below 1990 levels, while also assessing the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan.[32] The 2030 target is an interim but important stepping stone along the critical path to the broader goal of deep decarbonization by 2045. The relatively longer path assessed in the 2022 Scoping Plan Update incorporates, coordinates, and leverages many existing and ongoing efforts to reduce GHGs and air pollution, while identifying new clean technologies and energy. Given the focus on carbon neutrality, the 2022 Scoping Plan Update also includes discussion for the first time of the natural and working lands sectors as sources for both sequestration and carbon storage, and as sources of emissions as a result of wildfires. Table 3 summarizes the potential scenarios to reduce emissions through 2045.

Table 3
Estimated Statewide Greenhouse Gas Emissions Reductions in the 2022 Scoping Plan

Emissions Scenario	GHG Emissions ($MMTCO_2e$)
2019	
2019 State GHG Emissions	404
2030	
2030 BAU Forecast	312
2030 GHG Emissions without Carbon Removal and Capture	233
2030 GHG Emissions with Carbon Removal and Capture	226
2030 Emissions Target Set by AB 32 (i.e., 1990 level by 2030)	260
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2030	52 (16.7%)[a]
2045	
2045 BAU Forecast	266
2045 GHG Emissions without Carbon Removal and Capture	72
2045 GHG Emissions with Carbon Removal and Capture	(3)

$MMTCO_2e$ = million metric tons of carbon dioxide equivalents; parenthetical numbers represent negative values.
[a] 312 – 260 = 52. 52 / 312 = 16.7%
Source: CARB, Final 2022 Climate Change Scoping Plan, November 2022.

The 2022 Scoping Plan Update reflects existing and recent direction in the Governor's Executive Orders and State Statutes, which identify policies, strategies, and regulations in support of and implementation of the Scoping Plan. Among these include Executive Order B-55-18 and AB 1279 (The California Climate Crisis Act), which identify the 2045 carbon neutrality and GHG reduction targets required for the Scoping Plan. Table 4 provides a summary of major climate legislation and executive orders issued since the adoption of the 2017 Scoping Plan.

32 CARB, California's 2017 Climate Change Scoping Plan, 2017, ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
Assembly Bill 1279 (AB 1279) (Muratsuchi, Chapter 337, Statutes of 2022) *The California Climate Crisis Act*	AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that the Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies. This bill is reflected directly in the 2022 Scoping Plan Update but is addressed in the State's Priority Climate Action Plan (PCAP) that aims to reduce anthropogenic emissions by 85 percent below 1990 levels and achieve carbon neutrality by 2045. The PCAP was submitted to the U.S. Environmental Protection Agency on March 1, 2024.
Senate Bill 905 (SB 905) (Caballero, Chapter 359, Statutes of 2022) *Carbon Capture, Removal, Utilization, and Storage Program*	SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate CCUS and carbon dioxide removal (CDR) projects and technology. The bill requires CARB, on or before January 1, 2025, to adopt regulations creating a unified state permitting application for approval of CCUS and CDR projects. The bill also requires the Secretary of the Natural Resources Agency to publish a framework for governing agreements for two or more tracts of land overlying the same geologic storage reservoir for the purposes of a carbon sequestration project. The 2022 Scoping Plan Update modeling reflects both CCUS and CDR contributions to achieve carbon neutrality.
Senate Bill 846 (SB 846) (Dodd, Chapter 239, Statutes of 2022) *Diablo Canyon Powerplant: Extension of Operations*	SB 846 extends the Diablo Canyon Power Plant's sunset date by up to five additional years for each of its two units and seeks to make the nuclear power plant eligible for federal loans. The bill requires that the California Public Utilities Commission (CPUC) not include and disallow a load-serving entity from including in their adopted resource plan, the energy, capacity, or any attribute from the Diablo Canyon power plant. The 2022 Scoping Plan Update explains the emissions impact of this legislation.
Senate Bill 1020 (SB 1020) (Laird, Chapter 361, Statutes of 2022) *Clean Energy, Jobs, and Affordability Act of 2022*	SB 1020 adds interim renewable energy and zero carbon energy retail sales of electricity targets to California end-use customers set at 90 percent in 2035 and 95 percent in 2040. It accelerates the timeline required to have 100 percent renewable energy and zero carbon energy procured to serve state agencies from the original target year of 2045 to 2035. This bill requires each state agency to individually achieve the 100 percent goal by 2035 with specified requirements. This bill requires the CPUC, California Energy Commission (CEC), and CARB, on or before December 1, 2023, and annually thereafter, to issue a joint reliability progress report that reviews system and local reliability. The bill also modifies the requirement for CARB to hold a portion of its Scoping Plan workshops in regions of the state with the most significant exposure to air pollutants by further specifying that this includes communities with minority populations or low-income communities in areas

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
	designated as being in extreme federal non-attainment. The 2022 Scoping Plan Update describes the implications of this legislation on emissions.
Senate Bill 1137 (SB 1137) (Gonzales, Chapter 365, Statutes of 2022) *Oil & Gas Operations: Location Restrictions: Notice of Intention: Health protection zone: Sensitive receptors*	SB 1137 prohibits the development of new oil and gas wells or infrastructure in health protection zones, as defined, except for purposes of public health and safety or other limited exceptions. The bill requires operators of existing oil and gas wells or infrastructure within health protection zones to undertake specified monitoring, public notice, and nuisance requirements. The bill requires CARB to consult and concur with the California Geologic Energy Management Division (CalGEM) on leak detection and repair plans for these facilities, adopt regulations as necessary to implement emission detection system standards, and collaborate with CalGEM on public access to emissions detection data.
Senate Bill 1075 (SB 1075) (Skinner, Chapter 363, Statutes of 2022) *Hydrogen: Green Hydrogen: Emissions of Greenhouse Gases*	SB 1075 requires CARB, by June 1, 2024, to prepare an evaluation that includes: policy recommendations regarding the use of hydrogen, and specifically the use of green hydrogen, in California; a description of strategies supporting hydrogen infrastructure, including identifying policies that promote the reduction of GHGs and short-lived climate pollutants; a description of other forms of hydrogen to achieve emission reductions; an analysis of curtailed electricity; an estimate of GHG and emission reductions that could be achieved through deployment of green hydrogen through a variety of scenarios; an analysis of the potential for opportunities to integrate hydrogen production and applications with drinking water supply treatment needs; policy recommendations for regulatory and permitting processes associated with transmitting and distributing hydrogen from production sites to end uses; an analysis of the life-cycle GHG emissions from various forms of hydrogen production; and an analysis of air pollution and other environmental impacts from hydrogen distribution and end uses. This bill would inform the production of hydrogen at the scale called for in the 2022 Scoping Plan Update.
Assembly Bill 1757 (AB 1757) (Garcia, Chapter 341, Statutes of 2022) *California Global Warming Solutions Act of 2006: Climate Goal: Natural and Working Lands*	AB 1757 requires the California Natural Resources Agency (CNRA), in collaboration with CARB, other state agencies, and an expert advisory committee, to determine a range of targets for natural carbon sequestration, and for nature-based climate solutions, that reduce GHG emissions in 2030, 2038, and 2045 by January 1, 2024. These targets must support state goals to achieve carbon neutrality and foster climate adaptation and resilience. This bill also requires CARB to develop standard methods for state agencies to consistently track GHG emissions and reductions, carbon sequestration, and additional benefits from natural and working lands over time. These methods will account for GHG emissions reductions of CO2, methane, and nitrous oxide related to natural and working lands and the potential impacts of climate change on the ability to reduce GHG emissions and sequester carbon from natural and working lands, where feasible. This 2022 Scoping Plan Update describes the next steps and implications of this legislation for the natural and working lands sector.

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
Senate Bill 1206 (SB 1206) (Skinner, Chapter 884, Statutes of 2022) *Hydrofluorocarbon gases: sale or distribution*	SB 1206 mandates a stepped sales prohibition on newly produced high-global warming potential (GWP) HFCs to transition California's economy toward recycled and reclaimed HFCs for servicing existing HFC-based equipment. Additionally, SB 1206 also requires CARB to develop regulations to increase the adoption of very low-, i.e., GWP < 10, and no-GWP technologies in sectors that currently rely on higher-GWP HFCs.
Senate Bill 27 (SB 27) (Skinner, Chapter 237, Statutes of 2021) *Carbon Sequestration: State Goals: Natural and Working Lands: Registry of Projects*	SB 27 requires CNRA, in coordination with other state agencies, to establish the Natural and Working Lands Climate Smart Strategy by July 1, 2023. This bill also requires CARB to establish specified CO_2 removal targets for 2030 and beyond as part of its Scoping Plan. Under SB 27, CNRA is to establish and maintain a registry to identify projects in the state that drive climate action on natural and working lands and are seeking funding. CNRA also must track carbon removal and GHG emission reduction benefits derived from projects funded through the registry. This bill is reflected directly in the 2022 Scoping Plan Update as CO_2 removal targets for 2030 and 2045 in support of carbon neutrality.
Senate Bill 596 (SB 596) (Becker, Chapter 246, Statutes of 2021) *Greenhouse Gases: Cement Sector: Net- zero Emissions Strategy*	SB 596 requires CARB, by July 1, 2023, to develop a comprehensive strategy for the state's cement sector to achieve net-zero-emissions of GHGs associated with cement used within the state as soon as possible, but no later than December 31, 2045. The bill establishes an interim target of 40 percent below the 2019 average GHG intensity of cement by December 31, 2035. Under SB 596, CARB must: ● Define a metric for GHG intensity and establish a baseline from which to measure GHG intensity reductions. ● Evaluate the feasibility of the 2035 interim target (40 percent reduction in GHG intensity) by July 1, 2028. ● Coordinate and consult with other state agencies. ● Prioritize actions that leverage state and federal incentives. ● Evaluate measures to support market demand and financial incentives to encourage the production and use of cement with low GHG intensity. The 2022 Scoping Plan Update modeling is designed to achieve these outcomes.
Executive Order N-82-20	Governor Newsom signed Executive Order N-82-20 in October 2020 to combat the climate and biodiversity crises by setting a statewide goal to conserve at least 30 percent of California's land and coastal waters by 2030. The Executive Order also instructed the CNRA, in consultation with other state agencies, to develop a Natural and Working Lands Climate Smart Strategy that serves as a framework to advance the state's carbon neutrality goal and build climate resilience. In addition to setting a statewide conservation goal, the Executive Order directed CARB to update the target for natural and working lands in support of carbon neutrality as part of this Scoping Plan, and to take into consideration the NWL Climate Smart Strategy.

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
	CO_2 Executive Order N-82-20 also calls on the CNRA, in consultation with other state agencies, to establish the California Biodiversity Collaborative (Collaborative). The Collaborative shall be made up of governmental partners, California Native American tribes, experts, business and community leaders, and other stakeholders from across the state. State agencies will consult the Collaborative on efforts to: ● Establish a baseline assessment of California's biodiversity that builds upon existing data and can be updated over time. ● Analyze and project the impact of climate change and other stressors in California's biodiversity. ● Inventory current biodiversity efforts across all sectors and highlight opportunities for additional action to preserve and enhance biodiversity. CNRA also is tasked with advancing efforts to conserve biodiversity through various actions, such as streamlining the state's process to approve and facilitate projects related to environmental restoration and land management. The California Department of Food and Agriculture (CDFA) is directed to advance efforts to conserve biodiversity through measures such as reinvigorating populations of pollinator insects, which restore biodiversity and improve agricultural production. The Natural and Working Lands Climate Smart Strategy informs the 2022 Scoping Plan Update.
Executive Order N-79-20	Governor Newsom signed Executive Order N-79-20 in September 2020 to establish targets for the transportation sector to support the state in its goal to achieve carbon neutrality by 2045. The targets established in this Executive Order are: ● 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. ● 100 percent of medium- and heavy-duty vehicles will be zero-emission by 2045 for all operations where feasible, and by 2035 for drayage trucks. ● 100 percent of off-road vehicles and equipment will be zero-emission by 2035 where feasible. The Executive Order also tasked CARB to develop and propose regulations that require increasing volumes of zero- electric passenger vehicles, medium- and heavy-duty vehicles, drayage trucks, and off-road vehicles toward their corresponding targets of 100 percent zero-emission by 2035 or 2045, as listed above. The 2022 Scoping Plan Update modeling reflects achieving these targets.
Executive Order N-19-19	Governor Newsom signed Executive Order N-19-19 in September 2019 to direct state government to redouble its efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This Executive Order instructs the Department of Finance to create a Climate Investment Framework that:

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
	● Includes a proactive strategy for the state's pension funds that reflects the increased risks to the economy and physical environment due to climate change. ● Provides a timeline and criteria to shift investments to companies and industry sectors with greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change. ● Aligns with the fiduciary responsibilities of the California Public Employees' Retirement System, California State Teachers' Retirement System, and the University of California Retirement Program. Executive Order N-19-19 directs the State Transportation Agency to leverage more than $5 billion in annual state transportation spending to help reverse the trend of increased fuel consumption and reduce GHG emissions associated with the transportation sector. It also calls on the Department of General Services to leverage its management and ownership of the state's 19 million square feet in managed buildings, 51,000 vehicles, and other physical assets and goods to minimize state government's carbon footprint. Finally, it tasks CARB with accelerating progress toward California's goal of five million ZEV sales by 2030 by: ● Developing new criteria for clean vehicle incentive programs to encourage manufacturers to produce clean, affordable cars. ● Proposing new strategies to increase demand in the primary and secondary markets for ZEVs. ● Considering strengthening existing regulations or adopting new ones to achieve the necessary GHG reductions from within the transportation sector. The 2022 Scoping Plan Update modeling reflects efforts to accelerate ZEV deployment.
Senate Bill 576 (SB 576) (Umberg, Chapter 374, Statutes of 2019) *Coastal Resources: Climate Ready Program and Coastal Climate Change Adaptation, Infrastructure and Readiness Program*	Sea level rise, combined with storm-driven waves, poses a direct risk to the state's coastal resources, including public and private real property and infrastructure. Rising marine waters threaten sensitive coastal areas, habitats, the survival of threatened and endangered species, beaches, other recreation areas, and urban waterfronts. SB 576 mandates that the Ocean Protection Council develop and implement a coastal climate adaptation, infrastructure, and readiness program to improve the climate change resiliency of California's coastal communities, infrastructure, and habitat. This bill also instructs the State Coastal Conservancy to administer the Climate Ready Program, which addresses the impacts and potential impacts of climate change on resources within the conservancy's jurisdiction.
Assembly Bill 65 (AB 65) (Petrie- Norris, Chapter 347, Statutes of 2019) *Coastal Protection: Climate Adaption: Project Prioritization: Natural*	This bill requires the State Coastal Conservancy, when it allocates any funding appropriated pursuant to the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018, to prioritize projects that use natural infrastructure in coastal communities to help adapt to climate change. The bill requires the conservancy to provide information to the Office of Planning and Research on any projects funded pursuant to the above provision to be considered for inclusion into the clearinghouse for climate adaptation information. The bill authorizes the

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
Infrastructure: Local General Plans	conservancy to provide technical assistance to coastal communities to better assist them with their projects that use natural infrastructure.
Executive Order B-55-18	Governor Brown signed Executive Order B-55-18 in September 2018 to establish a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Policies and programs undertaken to achieve this goal shall: ● Seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities. ● Be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals. This Executive Order also calls for CARB to: ● Develop a framework for implementation and accounting that tracks progress toward this goal. ● Ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The 2022 Scoping Plan Update is designed to achieve carbon neutrality no later than 2045 and the modeling includes technology and fuel transitions to achieve that outcome.
Senate Bill 100 (SB 100) (De León, Chapter 312, Statutes of 2018) *California Renewables Portfolio Standard Program: emissions of greenhouse gases*	Under SB 100, the CPUC, CEC, and CARB shall use programs under existing laws to achieve 100 percent clean electricity. The statute requires these agencies to issue a joint policy report on SB 100 every four years. The first of these reports was issued in 2021. The 2022 Scoping Plan Update reflects the SB 100 Core Scenario resource mix with a few minor updates.
Assembly Bill 2127 (AB 2127) (Ting, Chapter 365, Statutes of 2018) *Electric Vehicle Charging Infrastructure: Assessment*	This bill requires the CEC, working with CARB and the CPUC, to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and of reducing emissions of GHGs to 40 percent below 1990 levels by 2030. The bill requires the CEC to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure. This bill supports the deployment of ZEVs as modeled in the 2022 Scoping Plan Update.
Senate Bill 30 (SB 30) (Lara, Chapter 614, Statutes of 2018) *Insurance: Climate Change*	This bill requires the Insurance Commissioner to convene a working group to identify, assess, and recommend risk transfer market mechanisms that, among other things, promote investment in natural infrastructure to reduce the risks of climate change related to catastrophic events, create incentives for investment in natural infrastructure to reduce risks to communities, and provide mitigation incentives for private investment in natural lands to lessen exposure and reduce climate risks to public safety, property, utilities,

Table 4
Major Climate Legislation and Executive Orders Enacted Since the 2017 Scoping Plan

Bill/Executive Order	Summary
	and infrastructure. The bill requires the policies recommended to address specified questions.
Assembly Bill 2061 (AB 2061) (Frazier, Chapter 580, Statutes of 2018) *Near-zero-emission and Zero-emission Vehicles*	Existing state and federal law sets specified limits on the total gross weight imposed on the highway by a vehicle with any group of two or more consecutive axles. Under existing federal law, the maximum gross vehicle weight of that vehicle may not exceed 82,000 pounds. AB 2061 authorizes a near-zero- emission vehicle or a zero-emission vehicle to exceed the weight limits on the power unit by up to 2,000 pounds. This bill supports the deployment of cleaner trucks as modeled in this 2022 Scoping Plan Update.

The 2022 Scoping Plan Scenario identifies the need to accelerate AB32's 2030 target, from 40 percent to 48 percent below 1990 levels. Cap-and-Trade regulation continues to play a large factor in the reduction of near-term emissions for meeting the 2030 reduction target. Every sector of the economy will need to begin to transition in this decade to meet these GHG reduction goals and achieve carbon neutrality no later than 2045. The 2022 Scoping Plan Update approaches decarbonization from two perspectives, managing a phasedown of existing energy sources and technologies, as well as increasing, developing, and deploying alternative clean energy sources and technology.

The Scoping Plan Scenario includes references to relevant statutes and Executive Orders, although it is not comprehensive of all existing new authorities for directing or supporting the actions described. Table 2-1 identifies actions related to a variety of sectors such as: smart growth and reductions in Vehicle Miles Traveled (VMT); light-duty vehicles (LDV) and zero-emission vehicles (ZEV); truck ZEVs; reduce fossil energy, emissions, and GHGs for aviation ocean-going vessels, port operations, freight and passenger rail, oil and gas extraction; and petroleum refining; improvements in electricity generation; electrical appliances in new and existing residential and commercial buildings; electrification and emission reductions across industries such as the for food products, construction equipment, chemicals and allied products, pulp and paper, stone/clay/glass/cement, other industrial manufacturing, and agriculture; retiring of combined heat and power facilities; low carbon fuels for transportation, business, and industry; improvements in non-combustion methane emissions, and introduction of low GWP refrigerants.

Achieving the targets described in the 2022 Scoping Plan Update will require continued commitment to and successful implementation of existing policies and programs, and identification of new policy tools and technical solutions to go further, faster. California's Legislature and state agencies will continue to collaborate to achieve the state's climate, clean air, equity, and broader economic and environmental protection goals. It will be necessary to maintain and strengthen this collaborative effort, and to draw upon the assistance of the federal government, regional and local governments, tribes, communities, academic institutions, and the private sector to achieve the state's near-term and longer-term emission reduction goals and a more equitable future for all Californians. The Scoping Plan acknowledges that the path forward is not dependent on one agency, one state, or even one country. However, the State can lead by engaging Californians and demonstrating how actions at the state, regional, and local levels of governments, as well as action at community and individual levels, can contribute to addressing the challenge.

Aligning local jurisdiction action with state-level priorities to tackle climate change and the outcomes called for in the 2022 Scoping Plan Update is identified as critical to achieving the statutory targets for 2030 and 2045. The 2022 Scoping Plan Update discusses the role of local governments in meeting the State's GHG reductions goals. Local governments have the primary authority to plan, zone, approve, and permit how and where land is developed to accommodate population growth, economic growth, and the changing needs of their jurisdictions. They also make critical decisions on how and when to deploy transportation infrastructure, and can choose to support transit, walking, bicycling, and neighborhoods that do not force people into cars. Local governments also have the option to adopt building ordinances that exceed statewide building code requirements, and play a critical role in facilitating the rollout of ZEV infrastructure. As a result, local government decisions play a critical role in supporting state-level measures to contain the growth of GHG emissions associated with the transportation system and the built environment—the two largest GHG emissions sectors over which local governments have authority. The City has taken the initiative in combating climate change by developing programs and regulations. Each of these is discussed further below.

California's Priority Climate Action Plan (PCAP). The PCAP was released on March 1, 2024 and is based on the goals set by AB 1279, which aims to reduce anthropogenic emissions by 85 percent below 1990 levels and achieve carbon neutrality by 2045. The PCAP also relies on the 2022 Scoping Plan to achieve these goals and focus on Statewide and/or regional measures focused on seven topics:

- Transportation
    - Create a Holistic, Heavy-Duty Zero-Emissions Vehicle Buydown Program
    - Install Truck Charging to Support Zero-Emissions Goods Movement at California Ports and Warehouse Districts
    - Advance the Deployment of Clean Off-Road Equipment
    - Bolster Investments in the State's Sustainable Port and Freight Infrastructure
    - Support Mobility Projects Uplifted by Communities
    - Allow for Local Deployment of ZEV Infrastructure and Low-Income ZEV Support
- Industrial
    - Accelerate Industrial Decarbonization
- Energy
    - Expand Decarbonization through the Energy Conservation Assistance Act
    - Create a Funding Program to Upgrade the Capacity of Distribution Systems
    - Expand the Success of California's Self-Generation Incentive Program for Behind-the-Meter Energy Storage
    - Bolster Healthy Landscapes and Resilient Communities through Expanding the Biomass to Carbon Negative Biofuels Program
    - Deploy Equitable Building Decarbonization
    - Implement Bioenergy Projects

- Enable Renewable Microgrids for Rural Communities and Tribes
- High Global Warming Potential
  - Expand F-gas Reduction Incentive Program
- Agriculture
  - Expand California's Healthy Soils Practices
  - Reduce Methane Emissions through Dairy Digesters
- Natural and Working Lands
  - Bolster California's Forest Health Program
  - Expand Urban and Community Forest Projects
  - Expand the State's Wetland Restoration Program
- Waste
  - Food Waste Prevention and Edible Food Recovery Program
  - Bolster Organics Recycling Infrastructure

These control strategies are intended to be implemented through Statewide or regional programs that would supplement the blueprint in the State's Scoping Plan. These strategies are generally not applicable to development projects in urban or suburban areas.

Advanced Clean Cars Regulations. In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for model years 2015–2025.[33] The components of the Advance Clean Car program include the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the ZEV regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.[34]

On September 23, 2020, Governor Gavin Newsom signed Executive Order No. N-79-20 that phases out sales of new gas-powered passenger cars by 2035 in California with an additional ten-year transition period for heavy vehicles. The state would not restrict used car sales, nor forbid residents from owning gas-powered vehicles. In accordance with the Executive Order, CARB is developing a 2020 Mobile Source Strategy, a comprehensive analysis that presents scenarios for possible strategies to reduce the carbon, toxic and unhealthy pollution from cars, trucks, equipment, and ships. The strategies will provide important information for numerous regulations and incentive programs going forward by conveying what is necessary to address the aggressive emission reduction requirements.

In November 2022, the ACC II regulations took effect, setting annual ZEV and plug-in hybrid vehicle sales requirements for model years 2026 to 2035 (ZEV program) and increasingly more stringent exhaust and evaporative emission standards (LEV program) to ensure automakers phase out new sales of internal combustion engine vehicles.

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33 California Air Resources Board, California's Advanced Clean Cars Program, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program

34 Ibid.

California Appliance Efficiency Regulations (Title 20, Sections 1601 through 1608). The 2014 Appliance Efficiency Regulations, adopted by the CEC, include standards for new appliances (e.g., refrigerators) and lighting, if they are sold or offered for sale in California. These standards include minimum levels of operating efficiency, and other cost- effective measures, to promote the use of energy- and water-efficient appliances.

California Building Energy Efficiency Standards (Title 24, Part 6). California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.[35] The 2022 standards continue to improve upon previous standards for new construction of, and additions and alterations to, residential and non-residential buildings and became effective January 1, 2023. Compliance with Title 24 is enforced through the building permit process. Key changes included encouraging heat pump technology for space and water heating, setting electric-ready requirements for single-family homes, expanding solar photovoltaic system and battery storage standards, and strengthening ventilation standards to improve indoor air quality.

California Green Building Standards (CALGreen Code). The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11) are mandatory green building standards for new structures. They focus on measures to reduce water consumption, GHG emissions, and materials and waste. These codes are updated every three years, with the 2022 CALGreen code updates effective January 1, 2023. New requirements address requirements for Level 2 electric vehicle chargers and use of solar photovoltaic shade structures instead of shade trees. Voluntary measures focus on higher EV charging requirements for parking facilities.

Regulatory Framework: Regional

South Coast Air Quality Management District. The South Coast Air Quality Management District (SCAQMD) adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- Phase out the use and corresponding emissions of chlorofluorocarbons, methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons by the year 2000;

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35 California Energy Commission, 2019 Building Energy Efficiency Standards, https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency, Accessed November 2023.

- Develop recycling regulations for hydrochlorofluorocarbons (e.g., SCAQMD Rules 1411 and 1415);

- Develop an emissions inventory and control strategy for methyl bromide; and

- Support the adoption of a California GHG emission reduction goal.

Southern California Association of Governments. To implement SB 375 and reduce GHG emissions by correlating land use and transportation planning, SCAG adopted the 2024-2050 RTP/SCS on April 4, 2024, to serve as the roadmap to fulfilling the region's compliance with GHG reduction targets. To this end, the 2024-2050 RTP/SCS recognizes that transportation investments and future land use patterns are inextricably linked and acknowledges how this relationship can help the region make choices that sustain existing resources while expanding efficiency, mobility, and accessibility for people across the region.

The 2024-2050 RTP/SCS calls for $751.7 billion in investments, including $303.3 billion for transit projects and operations, $75.4 billion for state highway operations and maintenance, $62.6 billion for goods movement, and $38 billion for active transportation. These investments would aim to achieve several key objective:

- A 11.6 percent reduction in overall vehicle miles traveled among passenger vehicles (from 2019).
- A 31.8 percent reduction in minutes of daily traffic delay per person (from 2019).
- Achievement of the region's targets for reducing greenhouse gases from autos and light-duty trucks by 19 percent per capita, from 2005 levels, by 2035.
- 465,000 new jobs supported by transportation investments or improved competitiveness each year.
- An overall return on investment of $2 for every $1 spent.

The 2024-2050 RTP/SCS land use pattern continues the trend of focusing new housing and employment growth in the region's Priority Development Areas (PDAs) and aims to enhance and build out the region's transit network. According to the 2024-2050 RTP/SCS, 66 percent of new households and 54 percent of new jobs between 2019–2050 will be located in PDAs, either near transit or in walkable communities.

Regulatory Framework: Local

City of Carson Building Code. The City's Building Code incorporates by reference the mandatory requirements of the 2022 California Building Standards Code and became effective January 1, 2023. The Building Code applies to dwellings, lodging houses, congregate residences, motels, apartments, or other similar residential uses.

Housing Element (Housing Needs Assessment). The Housing Element of the General Plan is prepared pursuant to state law and provides planning guidance in meeting housing needs identified in the SCAG Regional Housing Needs Assessment (RHNA). The current 2021-2029 Housing Element Update adopted in September 2022 identifies the City's housing conditions and needs, establishes the goals, objectives, and policies that are the foundation of the City's housing and growth strategy, and provides the array of programs the City intends to implement to create and preserve sustainable, mixed-income neighborhoods across the City.

The current Housing Needs Assessment chapter discusses the City's population and housing stock to identify housing needs for a variety of household types across the City. The Housing Element provides measures to streamline and incentivize development of affordable housing. Such measures include revising density bonuses for affordable housing; identifying locations which are ideal for funding programs to meet low-income housing goals; and rezoning areas to encourage low-income housing. With implementation of such measures to increase affordable housing, the Housing Element predicts a significant increase in housing production at all income ranges compared to previous cycles.

The Housing Element also promotes sustainability and resilience, and environmental justice through housing, as well as the need to reduce displacement. It encourages the utilization of alternatives to current parking standards that lower the cost of housing, support GHG and vehicle miles traveled (VMT) goals and recognize the emergence of shared and alternative mobility. The Element also identifies housing strategies for energy conservation, water conservation, alternative energy sources and sustainable development which support conservation and reduce demand.

Open Space and Environmental Conservation Element. The Open Space and Environmental Conservation Element of the City's General Plan was adopted on April 4, 2023, and sets forth the goals, objectives, and policies, which guide the City in the implementation of climate change programs and strategies. The Open Space and Environmental Conservation Element acknowledges the interrelationships among transportation and land use planning in meeting the City's mobility and air quality goals.

The Open Space and Environmental Conservation Element includes six key policies:

Policy OSEC-G-23: Undertake initiatives outlined in the Climate Action Plan to enhance sustainability by reducing the community's greenhouse gas(GHG) emissions and fostering green development patterns—including buildings, sites, and landscapes

Policy OSEC-G-24: Incorporate green infrastructure design in new projects to promote sustainability in the built environment.

Policy OSEC-G-25: Demonstrate leadership by reducing the use of energy and fossil fuel consumption in municipal operations, including transportation, waste and water reduction, recycling, and by promoting efficient building design and use.

Policy OSEC-G-26: Plan for extreme weather events by incorporating the potential effects and threats of cli-mate change into emergency management planning.

Policy OSEC-G-27: Reduce the impacts of extreme heat events resulting from global warming and climate change by diminishing urban heat island effects. Explore heat mitigation strategies including planting trees, limiting the use of heat-absorbing pavement, encouraging use of cool roofs and reflective pavements, and providing cooling elements in public spaces such as shade structures and water features.

Policy OSEC-G-28: Promote sustainable practices as well as environmental remediation for heavy industrial areas and seek to reduce trucking emissions.

City of Carson Climate Action Plan. The City's December 2017 Climate Action Plan (CAP) is designed to create sustainability-based performance targets through 2035 to advance economic, environmental, and equity objectives. The Plan calls for reducing GHG emissions Citywide by 49 percent below 2005 levels, which would put the City on a path to achieving long-term 2050 goals of reducing emissions by 80 percent below 1990 levels. The CAP includes strategies focused on the following sectors:

- Land Use and Transportation
    - Goal A: Accelerate the Market for EV Vehicles
        - Measure A1: EV Parking Policies
        - Measure A2: EV Charging Policies
        - Measure A3: Administrative Readiness
        - Measure A4: Public Information Programs
    - Goal B: Encourage Ride-Sharing
        - Measure B1: Facilitate Private and Public Mobility Services (Ride-Hailing, Ride-Sharing, Car-Sharing, Bike-Sharing)
    - Goal C: Encourage Transit Usage
        - Measure C1: Expand Transit Network
        - Measure C2: Increase Transit Frequency and Speed
    - Goal D: Adopt Active Transportation Initiatives
        - Measure D1: Provide Traffic Calming Measures
        - Measure D2: Improve Design of Development
    - Goal E: Parking Strategies
        - Measure E1: Limit Parking Supply
        - Measure E2: Unbundle Parking Costs from Property Costs
        - Measure E3: Implement On-Street Market Pricing
    - Goal F: Organizational Strategies
        - Measure F1: Encourage Telecommuting and Alternative Schedules
        - Measure F2: Implement Commute Trip Reduction Programs
    - Goal G: Land Use Strategies
        - Measure G1: Increase Density
        - Measure G2: Increase Diversity
        - Measure G3: Increase Transit Accessibility
        - Measure G4: Integrate Affordable and Below-Market-Rate Housing
        - Measure G5: Integrated Neighborhood Oriented Development Principles
    - Goal H: Digital Technology Strategies
        - Measure H1: Collaborate On and Implement the South Bay Digital Master Plan

- Energy Efficiency
    - Goal A: Increase Energy Efficiency in Existing Residential Units
        - Measure A1: EE Training, Education, and Recognition
        - Measure A2: Increase Participation in Existing EE Programs
        - Measure A3: Establish, Promote or Require Home Energy Evaluations
        - Measure A4: Promote, Incentivize or Require Residential Home Energy Renovations
    - Goal B: Increase Energy Efficiency in New Residential Developments
        - Measures B1: Encourage or Require EE Standards Exceeding Title 24
    - Goal C: Increase Energy Efficiency in Existing Commercial Units
        - Measure C1: Training and Education
        - Measure C2: Increase Participation in Existing EE Programs
        - Measure C3: Incentivize or Require Non-Residential Energy Audits
        - Measure C4: Promote or Require Commercial Energy Audits
    - Goal D: Increase Energy Efficiency in New Commercial Developments
        - Measure D1: Encourage or Require EE Standards Exceeding Title 24
    - Goal E: Increase Energy Efficiency Through Water Efficiency
        - Measure E1: Promote or Require Water Efficiency Through SB X7-7
        - Measure E2: Promoting Water Efficiency Standards Exceeding SB X7-7
    - Goal F: Decrease Energy Demand Through Reducing Urban Heat Island Effect
        - Measure F1: Promote Tree Planting for Shading and Energy Efficiency
        - Measure F2: Incentivize or Require Light-Reflecting Surfaces
    - Goal G: Participate in Education, Outreach and Planning for Energy Efficiency
        - Measure G1: Increase Energy Savings Through the SCE Energy Leader Partnership
    - Goal H: Increase Energy Efficiency in Municipal Buildings
        - Measure H1: Conduct Municipal Energy Audit
        - Measure H2: Implement Water Leak Detection Program
        - Measure H3: Participate in Demand Response Programs
        - Measure H4: Participate in Direction Install Program
        - Measure H5: Adopt a Procurement Policy for EE Equipment
        - Measure H6: Install Cool Roofs
        - Measure H7: Retrofit HVAC Equipment and Water Pumps
        - Measure H8: Track Additional Energy Savings
        - Measure H9: Utilize an Energy Management System
    - Goal I: Increase Energy Efficiency in City Infrastructure
        - Measure I1: Retrofit Traffic Signals and Outdoor Lighting
        - Measure I2: Upgrade or Incorporate Water-Conserving Landscape’
        - Measure I3: Plant Trees for Shade and Carbon Sequestration
- Solid Waste
    - Goal A: Increase Diversion and Reduction of Residential Waste
        - Measure A1: Education and Outreach to The Residents

    - Measure A2: Implement Residential Collection Programs to Increase Diversion of Waste
  - Goal B: Increase Diversion and Reduction of Commercial Waste
    - Measure B1: Education and Outreach to Businesses
    - Measure B2: Implement Commercial Collection Programs to Increase Diversion of Waste
    - Measure B3: Require Commercial Sector to Further Increase Diversion of Waste from Landfills
  - Goal C: Increase Diversion and Reduction of Overall Community Waste
    - Measure C1: Set a Community Goal to Divert Waste from Landfills
  - Goal D: Reduce and Divert Municipal Waste
    - Measure D1: Education and Program for Municipal Employees/Facilities
- Urban Greening
  - Goal A: Increase and Maintain Urban Greening in the Community
    - Measure A1: Increase Community Gardens
    - Measure A2: Increase Rooftop Gardens
    - Measure A3: Support Local Farms
  - Goal B: Increase and Maintain Urban Greening in Municipal Facilities
    - Measure B1: Restoration/Preservation of Landscapes
    - Measure B2: Increase Open Space
- Energy Generation and Storage
  - Goal A: Support Energy Generation and Storage in the Community
    - Measure A1: Community Choice Aggregation
    - Measure A2: Siting and Permitting
    - Measure A3: Policies and Ordinances
    - Measure A4: Education and Outreach
    - Measure A5: Explore Technologies in Municipal Facilities

It should be noted that the CAP is not considered a qualified GHG reduction plan under CEQA that would be the basis for tiering off in environmental analyses like this (see discussion on Page 27 about qualified plans). As such, this technical report does not tier from the 2017 CAP under the provisions of CEQA.

Existing Conditions

Existing Statewide GHG Emissions. GHG emissions are the result of both natural and human-influenced activities. Regarding human-influenced activities, motor vehicle travel, consumption of fossil fuels for power generation, industrial processes, heating and cooling, landfills, agriculture, and wildfires are the primary sources of GHG emissions. Without human intervention, Earth maintains an approximate balance between the emission of GHG emissions into the atmosphere and the storage of GHG emissions in oceans and terrestrial ecosystems. Events and activities, such as the industrial revolution and the increased combustion of fossil fuels (e.g., gasoline, diesel, coal), have contributed to the rapid increase in atmospheric levels of GHG emissions over the last 150 years.

As reported by the CEC, California contributes approximately one percent of global and 8.2 percent of national GHG emissions. California represents approximately 12 percent of the national population. Approximately 80 percent of GHGs in California are CO_2 produced from fossil fuel combustion. The current California GHG inventory compiles statewide anthropogenic GHG emissions and carbon sinks/storage from years 2000 through 2021.[36] It includes estimates for CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. As shown in Table 5's GHG inventory for California for years 2015 through 2021, the GHG inventory for California in 2021 was 381.3 million $MTCO_2e$.

Table 5
California GHG Inventory
(metric tons of carbon dioxide equivalent [$MTCO_2e$])

	2015	2016	2017	2018	2019	2020	2021
Transportation	161.2	165.0	166.4	165.2	162.3	135.6	145.6
Electric Power	86.3	70.8	64.4	65.0	60.2	59.5	62.4
Industrial	82.7	81.2	81.4	82.0	80.8	73.3	73.9
Commercial & Residential	37.2	37.7	38.3	37.5	40.6	38.9	38.8
Agriculture	32.6	32.1	31.6	32.1	31.3	31.5	30.9
High GWP	18.8	19.4	20.1	20.5	20.7	21.3	21.3
Recycling & Waste	8.1	7.9	8.2	8.3	8.4	8.6	8.4
Total	426.9	414.2	410.4	410.7	404.4	368.7	381.3

Source: California Air Resources Board (2024). California Greenhouse Gas Emission Inventory. Data available at: https://ww2.arb.ca.gov/ghg-inventory-data

Existing Project Site Emissions. The Project Site is vacant. As such, there are no GHG emissions from anthropogenic sources on the Project Site.

36 A carbon inventory identifies and quantifies sources and sinks of greenhouse gases. Sinks are defined as a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period.

Methodology

CEQA Guidelines Section 15064.4(a) assist lead agencies in determining the significance of the impacts of GHG emissions, giving them discretion to determine whether to assess impacts quantitatively or qualitatively. It calls for a good-faith effort to describe and calculate emissions. This emissions inventory also demonstrates the reduction in a project's incremental contribution of GHG emissions that results from regulations and requirements adopted as implementation efforts for these plans for the reduction or mitigation of GHG emissions. As such, it provides further justification that a project is consistent with plans adopted for the purpose of reducing and/or mitigating GHG emissions by a project and over time. The significance of a project's GHG emissions impacts is not based on the amount of GHG emissions resulting from that project.

The City, SCAQMD, Office of Planning and Research (OPR), CARB, California Air Pollution Control Officers Association (CAPCOA), and other applicable agencies have not adopted a numerical threshold of significance for assessing impacts related to GHG emissions. As a result, the methodology for evaluating a project's impacts related to GHG emissions focuses on its consistency with statewide, regional, and local plans adopted for the purpose of reducing and/or mitigating GHG emissions.[37] This evaluation is the sole basis pursuant to CEQA for determining the significance of a project's GHG-related impacts on the environment.

Appendix D, Local Actions, of the 2022 Scoping Plan Update includes "recommendations intended to build momentum for local government actions that align with the State's climate goals, with a focus on local GHG reduction strategies (commonly referred to as climate action planning) and approval of new land use development projects, including through environmental review under the California Environmental Quality Act (CEQA)."

The State encourages local governments to adopt a CEQA-qualified Climate Action Plan (CAP) addressing the three priority areas (transportation electrification, VMT reduction, and building decarbonization). However, the State recognizes that almost 50 percent of jurisdictions do not have an adopted CAP, among other reasons because they are costly, requiring technical expertise, staffing, funding. Additionally, CAPs need to be monitored and updated as State targets change and new data is available. Jurisdictions that wish to take meaningful climate action (such as preparing a non-CEQA-qualified CAP or as individual measures) aligned with the State's climate goals in the absence of a CEQA-qualified CAP are advised to look to the three priority areas when developing local climate plans, measures, policies, and actions: (transportation electrification, VMT reduction, and building decarbonization). "By prioritizing climate action in these three priority areas, local governments can address the largest sources of GHGs within their jurisdiction."

The State also recognizes in Appendix D, Local Actions, of the Scoping Plan that each community or local area has distinctive situations and local jurisdictions must balance the urgent need for housing[38]

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37 CEQA Guidelines, Section 14 CCR 15064.4.

38 The State recognizes the need for 2.5 million housing units over the next eight years, with one million being affordable units. See page 20, Appendix D, *2022 Scoping Plan Update, November 2022*

while demonstrating that a Project is in alignment with the State's Climate Goals. The State calls for the climate crisis and the housing crisis to be confronted simultaneously. Jurisdictions should avoid creating targets that are impossible to meet as a basis to determine significance. Ultimately, targets that make it more difficult to achieve statewide goals by prohibiting or complicating projects that are needed to support the State's climate goals, like infill development, low-income housing or solar arrays, are not consistent with the State's goals. The State also recognizes the lead agencies' discretion to develop evidence-based approaches for determining whether a project would have a potentially significant impact on GHG emissions.

The analysis also calculates the amount of GHG emissions from the Project using recommended air quality models. The primary purpose of quantifying the Project's GHG emissions is to satisfy CEQA Guidelines Section 15064.4(a). The estimated emissions inventory is also used to determine if there would be a reduction in the Project's incremental contribution of GHG emissions because of compliance with regulations requirements adopted to implement plans for reducing or mitigating GHG emissions. However, the significance of the Project's GHG emissions is not based on the amount of emissions from the Project.

Consistency with Applicable Plans and Policies

A consistency analysis has been provided that describes the Project's conflict with applicable plans and policies adopted for the purpose of reducing GHG emissions, included in the applicable portions of CARB's *Climate Change Scoping Plan* and the 2024-2050 RTP/SCS. In addition, this analysis assesses the Project's consistency with other plans (e.g., the Climate Action Plan) for informational purposes.[39]

OPR encourages lead agencies to make use of programmatic mitigation plans and programs from which to tier when they perform project analyses. Statewide, the Climate Change Scoping Plan provides measures to achieve AB 32 and SB 32 targets. On a regional level, SCAG's 2024-2050 RTP/SCS contains measures to achieve VMT reduction required by SB 375. The City does not have a programmatic mitigation plan from which to tier from, though it has adopted plans to help reduce GHG emissions.

As noted in CEQA Guidelines Section 15064.4(b)(3), consistency with such plans and policies "must reduce or mitigate the project's incremental contribution of greenhouse gas emissions." To demonstrate such incremental reductions, this chapter estimates reductions of project-related GHG emissions resulting from consistency with plans. Consistent with evolving scientific knowledge, approaches to GHG quantification may continue to evolve in the future.

[39] As noted earlier, the State's Draft PCAP is intended to be implemented through Statewide or regional programs that would supplement the blueprint in the State's Scoping Plan and is generally not applicable to development projects in urban or suburban areas.

A consistency analysis is provided below that describes the Project's consistency with performance based standards in the applicable parts of CARB's *Climate Change Scoping* Plan and SCAG's 2024-2050 RTP/SCS.

Quantification of Emissions

This analysis quantifies the Project's GHG emissions for information purposes, considering the GHG reduction features that would be incorporated into the Project's design. It relies on the California Emissions Estimator Model® (CalEEMod) is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. CalEEMod was developed in collaboration with the air districts of California, who provided data (e.g., emission factors, trip lengths, meteorology, source inventory) to account for local requirements and conditions. The model is considered by SCAQMD to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California.[40]

This analysis quantifies the Project's emissions and compares them to a Project without Reduction Features scenario, as defined by CARB's most updated projections for AB 32 and SB 32. This comparison is included for informational purposes to disclose the relative carbon efficiency of the Project and to determine if there would be a reduction in the Project's incremental contribution of GHG emissions based on compliance with regulations and requirements adopted to implement plans for reducing GHG emissions. The Project Without Reduction Features scenario does not consider site-specific conditions, Project design features, or prescribed mitigation measures. This approach is consistent with the concepts used in the CARB's *Climate Change Scoping Plan* for the implementation of AB 32. This methodology is used to analyze consistency with applicable GHG reduction plans and policies and demonstrate the efficacy of the measures contained therein, but it is not a threshold of significance. The Project Without Reduction Features scenario is similar to the approach currently used by the City with respect to evaluating a proposed development project's consistency with CARB's Scoping Plans. Currently, the City evaluates the proposed project under two scenarios—one scenario without GHG reduction measures (akin to the Project Without Reduction Features scenario) and a second scenario with GHG reduction measures.

The Project without Reduction Features scenario also does not account for energy efficiency measures that would go beyond Title 24 building standards or trip reductions from the co-location of uses and availability of public transit. However, the Project without Reduction Features does consider regulatory measures included in CARB's *Climate Change Scoping Plan* and SCAG's 2024-2050 RTP/SCS.

Project GHG Emissions

The California Climate Action Registry (Climate Registry) General Reporting Protocol provides basic procedures and guidelines for calculating and reporting GHG emissions from a number of general and

[40] California Air Pollution Control Officers Association, California Emissions Estimator Model, CalEEMod™, www.caleemod.com, accessed November 2023.

industry-specific activities.[41] The General Reporting Protocol is based on the "Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard" developed by the World Business Council for Sustainable Development and the World Resources Institute through "a multi-stakeholder effort to develop a standardized approach to the voluntary reporting of GHG emissions."[42] Although no numerical thresholds of significance have been developed, and no specific protocols are available for land use projects, the General Reporting Protocol provides a basic framework for calculating and reporting GHG emissions from the project. The information provided in this section is consistent with the General Reporting Protocol's reporting requirements.

The General Reporting Protocol recommends the separation of GHG emissions into three categories that reflect different aspects of ownership or control over emissions. They include the following:

- Scope 1: Direct, onsite combustion of fossil fuels (e.g., natural gas, propane, gasoline, and diesel).
- Scope 2: Indirect, offsite emissions associated with purchased electricity or purchased steam.
- Scope 3: Indirect emissions associated with other emissions sources, such as third-party vehicles and embodied energy (e.g., energy used to convey, treat, and distribute water and wastewater).[43]

The General Reporting Protocol provides a range of basic calculations methods. However, the General Reporting Protocol calculations are typically designed for existing buildings or facilities. These retrospective calculation methods are not directly applicable to planning and development situations where buildings do not yet exist.

CARB recommends consideration of indirect emissions to provide a more complete picture of the GHG emissions footprint of a facility. Annually reported indirect energy usage aids the conservation awareness of a facility and provides information to CARB to be considered for future strategies.[44] For example, CARB has proposed requiring the calculation of direct and indirect GHG emissions as part of the AB 32 reporting requirements. Additionally, OPR has noted that lead agencies "should make a good-faith effort, based on available information, to calculate, model, or estimate… GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities."[45] Therefore, direct and indirect emissions have been calculated for the Project.

A fundamental difficulty in the analysis of GHG emissions is the global nature of the existing and cumulative future conditions. Changes in GHG emissions can be difficult to attribute to a particular planning program or project because the planning effort or project may cause a shift in the locale for

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41 California Climate Action Registry, General Reporting Protocol Version 3.1, January 2009.

42 Ibid.

43 Embodied energy is a scientific term that refers to the quantity of energy required to manufacture and supply to the point of use a product, material, or service.

44 California Air Resources Board, Initial Statement of Reasons for Rulemaking, Proposed Regulation for Mandatory Reporting of Greenhouse Gas Emissions Pursuant to the California Global Warming Solutions Act of 2006 (AB 32), Planning and Technical Support Division Emission Inventory Branch, October 19, 2007.

45 OPR Technical Advisory, p. 5.

some type of GHG emissions, rather than causing “new” GHG emissions. As a result, there is an inability to conclude whether a project’s GHG emissions represent a net global increase, reduction, or no change in GHG emissions that would exist if the project were not implemented. The analysis of the Project’s GHG emissions is particularly conservative in that it assumes all the GHG emissions are new additions to the atmosphere.

Construction

The Project’s construction emissions were calculated using CalEEMod Version 2022.1.1.29. Details of the modeling assumptions and emission factors are provided in the Technical Appendix. CalEEMod calculates emissions from off-road equipment usage and on-road vehicle travel associated with haul, delivery, and construction worker trips. GHG emissions during construction were forecasted based on the proposed construction schedule and included the mobile- source and fugitive dust emissions factors derived from CalEEMod.

The calculations of the emissions generated during Project construction activities reflect the types and quantities of construction equipment that would be used to remove existing pavement, grade, and excavate the Project Site; construct the proposed building and related improvements; and plant new landscaping within the Project Site.

In accordance with SCAQMD’s guidance, GHG emissions from construction were amortized (i.e., averaged annually) over the lifetime of the Project. Because emissions from construction activities occur over a relatively short-term period, they contribute a relatively small portion of the overall lifetime GHG emissions for the Project. In addition, GHG emissions reduction measures for construction equipment are relatively limited. Thus, SCAQMD recommends that construction emissions be amortized over a 30-year project lifetime, so that GHG emissions reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies.[46] As a result, the Project’s total construction GHG emissions were divided by 30 to determine an approximate annual construction emissions estimate comparable to operational emissions.

Operation

Similar to construction, CalEEMod is used to calculate potential GHG emissions generated by new land uses on the Project Site, including area sources, electricity, natural gas, mobile sources, stationary sources (i.e., emergency generators), solid waste generation and disposal, and water usage/wastewater generation.

Area source emissions include landscaping equipment that are based on the size of the land uses (e.g., square footage or dwelling unit), the GHG emission factors for fuel combustion, and the global warming potential (GWP) values for the GHG emissions emitted.[47]

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46 SCAQMD Governing Board Agenda Item 31, December 5, 2008.

47 In 2021, CARB adopted regulations requiring that all small (25 horsepower and below) spark-ignited off-road engines (e.g., lawn and gardening equipment) be zero emission starting in model year 2024. Standards for portable generators and large pressure washers are given until model year 2028 to be electric-powered.

GHG emissions associated with electricity demand are based on the size of the land uses, the electrical demand factors for the land uses, the GHG emission factors for the electricity utility provider, and the GWP values for the GHG emissions emitted. As with electricity, the emissions of GHG emissions associated with natural gas combustion are based on the size of the land uses, the natural gas combustion factors for the land uses in units of million British thermal units (MMBtu), the GHG emission factors for natural gas combustion, and the GWP values for the GHG emissions emitted.[48]

Mobile source GHG emissions are calculated based on an estimate of the Project's annual VMT, which is derived using CalEEMod based on the trip generation provided in the Transportation Study prepared for the Project. The CalEEMod-derived VMT values account for the daily and seasonal variations in trip frequency and length associated with new employee and visitor trips to and from the Project Site and other activities that generate a vehicle trip.

Stationary source GHG emissions are based on proposed stationary sources (i.e., emergency generators) that would be provided on the Project Site.

GHG emissions associated with solid waste disposal are based on the size of the Project's proposed land uses, the waste disposal rate for the land uses, the waste diversion rate, the GHG emission factors for solid waste decomposition, and the GWP values for the GHG emissions emitted.

GHG emissions related to water usage and wastewater generation are based on the size of the land uses, the water demand factors, the electrical intensity factors for water supply, treatment, and distribution, electrical intensity factors for wastewater treatment, the GHG emission factors for the electricity utility provider, and the GWP values for the GHG emissions emitted.

The analysis of Project GHG emissions at buildout uses assumptions in CARB's EMFAC2021 model (1.0.1) and considers actions and mandates expected to be in force in 2026 (e.g., Pavley I Standards, full implementation of California's 33 percent RPS by 2030 and 50 percent by 2050 and the California LCFS). In addition, because mobile source GHG emissions are directly dependent on the number of vehicle trips, a decrease in the number of project-generated trips because of project features (e.g., proximity to transit) would provide a proportional reduction in mobile source GHG emissions compared to a generic project without such locational benefits. Calculation of Project GHG emissions conservatively did not include actions and mandates that are not already in place but are expected to be enforced in 2026 (e.g., Pavley II, which could further reduce GHG emissions from use of light-duty vehicles by 2.5 percent). Similarly, emissions reductions regarding Cap-and-Trade were not included in this analysis as they applied to other future reductions in non-transportation sectors. As for the Cap-and-Trade program's benefits for the transportation sector, the analysis utilizes CARB's assumptions in EMFAC2021 for any short-term reductions in GHG emissions. By not speculating on potential regulatory conditions, the analysis takes a conservative approach that likely overestimates the Project's GHG emissions at buildout, because the state is expected to implement several policies and programs aimed

[48] Energy consumption estimates with CalEEMod 2022.1.1.29 are based on the California Energy Commission's 2020 Residential Appliance Saturation Survey (residential uses) and 2021 Commercial Forecast database, both of which reflected the 2019 Title 24 energy efficiency standards. These energy consumption estimates were adjusted to reflect the 2022 Title 24 standards that cumulatively produce a 0.49 percent reduction in electricity use and 0.45 percent reduction in natural gas use when compared to the 2019 standards.

at reducing GHG emissions from the land use and transportation sectors to meet the state's long-term climate goals.

There are no GHG emissions thresholds adopted by the SCAQMD that are applicable to the Project. In 2008, SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds.[49] Within its October 2008 document, the SCAQMD proposed the use of a percent emission reduction target to determine significance for commercial/residential projects that emit greater than 3,000 $MTCO_2e$ per year. Under this proposal, such commercial and residential projects would have been assumed to have a less than significant impact on climate change. However, this proposed screening threshold was not adopted by the SCAQMD.

Consistency with Applicable Plans and Policies

A consistency analysis has been provided that describes the Project's compliance with or exceedance of performance-based standards, and consistency with applicable plans and policies adopted for the purpose of reducing GHG emissions, included in the applicable portions of the *Climate Change Scoping Plan* and the 2024-2050 RTP/SCS.

As part of the *Climate Change Scoping Plan*, a statewide emissions inventory was developed as required by AB 32 which directs CARB to develop and track GHG emissions reductions to document progress towards the state GHG target. The emissions inventory also considers GHG emissions reduction measures developed by CARB to achieve state targets. Consistency with the *Climate Change Scoping Plan* is evaluated by comparing the Project's GHG reduction measures to those contained in the Scoping Plan.

As noted in CEQA Guidelines Section 15064.4(b)(3), consistency with such plans and policies "must reduce or mitigate the project's incremental contribution of greenhouse gas emissions." To demonstrate such incremental reductions, this chapter estimates reductions of project-related GHG emissions resulting from consistency with plans. Consistent with evolving scientific knowledge, approaches to GHG quantification may continue to evolve in the future.

While there are many ways to quantify the efficiency of the GHG reduction measures provided for in the plans and policies, this analysis compares the Project's GHG emissions to the emissions that would be generated by the Project in the absence of any GHG reduction measures (i.e., the Project Without Reduction Features scenario. This approach is consistent with the concepts used in CARB's 2017 Climate Change Scoping Plan. This methodology is used to analyze consistency with applicable GHG reduction plans and policies and demonstrate the efficacy of the measures contained therein, but it is not a threshold of significance.

The analysis in this section includes potential emissions under a Project Without Reduction Features scenarios and from the Project at build-out based on actions and mandates expected to be in force in 2026. Early-action measures identified in the Climate Change Scoping Plan that have not been approved were not credited in this analysis. By not speculating on potential regulatory conditions, the analysis takes a conservative approach that likely overestimates the Project's GHG emissions at build-out. The Project Without Reduction Features scenario is used to establish a comparison with project-generated GHG emissions. The Project Without Reduction Features scenario does not consider site-specific conditions, project design features, or prescribed mitigation measures. As an example, a Project Without Reduction Features scenario would apply a base ITE trip-generation rate for the project and would not consider site-specific benefits resulting from the proximity to public transportation.

Thresholds of Significance

State CEQA Guidelines Appendix G

In accordance with Appendix G of the State CEQA Guidelines (Appendix G), a project would have a significant impact related to GHG emissions if the project would do the following:

a) **Generate GHG 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 GHG emissions.**

The Project would comply with all applicable state and local regulatory requirements, including the provisions set forth in the City's Building Ordinance. Furthermore, the Project would also include sustainability features related to water conservation and waste reduction.

Project Impacts

Consistency with Applicable Plans and Policies

The discussion below describes the extent the Project complies with or exceeds the performance-based standards included in the regulations outlined in the *Climate Change Scoping Plan* and the 2024-2050 RTP/SCS, each of which identify GHG-reducing measures that directly and indirectly apply to the Proposed Project. This analysis also evaluates the Project's consistency with City plans and programs that generally address climate change, namely the City's General Plan Open Space and Environmental Conservation Element, and the City's CAP. As shown herein, the Project would be consistent with the applicable GHG reduction plans and policies.

Statewide: Climate Change Scoping Plan

As discussed above, jurisdictions that want to take meaningful climate action (such as preparing a non-CEQA-qualified CAP or as individual measures) aligned with the State's climate goals in the absence of a CEQA-qualified CAP should also look to the three priority areas (transportation electrification, VMT reduction, and building decarbonization). To assist local jurisdictions, the 2022 Scoping Plan Update presents a non-exhaustive list of impactful GHG reduction strategies that can be implemented by local governments within the three priority areas (Priority GHG Reduction Strategies for Local Government Climate Action Priority Areas).[50] A detailed assessment of goals, plans, policies implemented by the City which would support the GHG reduction strategies in the three priority areas is provided below. In addition, further details are provided regarding the correlation between these reduction strategies and applicable actions included in Table 2-1 (page 72) of the Scoping Plan (Actions for the Scoping Plan Scenario).

Transportation Electrification

The priority GHG reduction strategies for local government climate action related to transportation electrification are discussed below and would support the Scoping Plan action to have 100 percent of all new passenger vehicles to be zero-emission by 2035 (see Table 2-1 of the Scoping Plan).

- **Convert local government fleets to zero-emission vehicles (ZEV)**

CARB approved the Advanced Clean Cars II rule which codifies Executive Order N-79-20 and requires 100 percent of new cars and light trucks sold in California be zero-emission vehicles by 2035. The State has also adopted AB 2127, which requires the CEC to analyze and examine charging needs to support California's EVs in 2030. This report would help decision-makers allocate resources to install new EV chargers where they are needed most.

On April 18, 2023, the City adopted a Zero-Emission Bus Rollout Plan that calls for a full transition to zero-emission buses by 2032. This was to include purchasing four battery-electric buses by 2032 to replace compressed natural gas and diesel buses and did not involve early retirement of conventional transit buses. In March 2021, the City also approved a FY 23/24 vision for a multi-year fleet replacement plan that prioritizes the transition to electric vehicles. This includes developing a plan to transition some diesel- and gas-powered equipment to electric technology.

The City's goals of converting the municipal fleet to zero emissions would be consistent with the Scoping Plan goals of transitioning to EVs. Although this measure mainly applies to City fleets, the Project would not conflict with these goals by installing EV charging stations and pre-wiring other spaces for future charging facilities.

- **Create a jurisdiction-specific ZEV ecosystem to support deployment of ZEVs statewide (such as building standards that exceed state building codes, permit streamlining, infrastructure siting, consumer education, preferential parking policies, and ZEV readiness plans)**

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50 Table 1 of Appendix D, 2022 Scoping Plan Update, November 2022.

The State has adopted AB 1236 and AB 970, which require cities to adopt streamline permitting procedures for EV charging stations. As a result, the City uses the CALGreen 2022 requirements of 20 percent of new parking spaces as EV capable. The ordinance also requires new construction to install EVSE at 10 percent of total parking spaces. This requirement also exceeds the CALGreen 2022 requirements of installing electric vehicle supply equipment (EVSE) for 25 percent of EV capable parking spaces.

The City also has committed to modifications to its Corporate Yard to facilitate the bus fleet's transition to zero-emission vehicles. This included new electric charging stations at its municipal facility at 18601 South Main Street by 2025.

The City's goals of installing EV chargers throughout the City and at its Corporate Yard would be consistent with the Scoping Plan goals of transitioning to EVs. The Project would contribute to this by installing EV charging stations and pre-wiring other spaces for future charging facilities.

VMT Reduction

The priority GHG reduction strategies for local government climate action related to VMT reduction are discussed below and would support the Scoping Plan action to reduce VMT per capita 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045.

- **Reduce or eliminate minimum parking standards in new developments**
- **Implement parking pricing or transportation demand management pricing strategies**

The CAP includes a number of policies that would advance these parking strategies that would reduce VMT. This includes a policy that reduces or eliminates parking minimums in new development (Policy LUT: E1.1) and another that reduces or eliminates parking minimums for mixed-use, pedestrian, and transit-oriented development. This also includes policies calling for free parking for electric vehicles (Policy LUT: A1.1) and lower parking minimums for projects providing electric vehicle parking (Policy LUT: A1.3). The CAP also calls for unbundling parking from property costs (Policy LUT: E2.1) and implementing on-street market pricing (LUT: E3.1).

While the State calls for the City to implement these Citywide policies, the Project would not conflict with this reduction strategy to reduce parking standards.

- **Implement Complete Streets policies and investments, consistent with general plan circulation element requirements**

Carson developed a Complete Streets and Green Streets Policy in May 2022 that call for balanced infrastructure investments that support active transportation and public transit. The City adopted an Active Transportation Plan in June 2015 calls for creation of citywide pedestrian neighborhoods, bicycle infrastructure, and transit improvements that would advance Complete Streets policies.

This reduction strategy mainly applies to infrastructure investments that address traffic circulation. Nevertheless, the Project would not conflict with implementation of Complete Streets policies.

- **Increase access to public transit by increasing density of development near transit, improving transit service by increasing service frequency, creating bus priority lanes, reducing or eliminating fares, microtransit, etc.**

- **Increase public access to clean mobility options by planning for and investing in electric shuttles, bike share, car share, and walking**

- **Amend zoning or development codes to enable mixed-use, walkable, transit-oriented, and compact infill development (such as increasing the allowable density of a neighborhood)**

- **Preserve natural and working lands by implementing land use policies that guide development toward infill areas and do not convert "greenfield" land to urban uses (e.g., green belts, strategic conservation easements).**

These reduction strategies are supported through implementation of SB 375 which requires integration of planning processes for transportation, land-use and housing and generally encourages jobs/housing proximity, promote transit-oriented development (TOD), and encourages high-density residential/ commercial development along transit corridors. To implement SB 375 and reduce GHG emissions by correlating land use and transportation planning, SCAG adopted the 2020–2045 RTP/SCS, also referred to as Connect SoCal. The 2020–2045 RTP/SCS' "Core Vision" prioritizes the maintenance and management of the region's transportation network, expanding mobility choices by co-locating housing, jobs, and transit, and increasing investment in transit and complete streets.

The Project is an infill development in an urbanized area that would concentrate new development consistent with the growth pattern encouraged in the RTP/SCS. The Project's convenient access to public transit and opportunities for walking and biking would reduce vehicle trips, VMT, and GHG emissions. The Project Site's proximity to commercial uses and services would encourage residents to walk to nearby destinations to meet their shopping needs, thereby reduce VMT and GHG emissions. Therefore, the Project would be consistent with these reduction strategies.

California continues to experience a severe housing shortage. The State must plan for more than 2.5 million residential units over the next eight years, and no less than one million of those residential units must be affordable to lower-income households.[51] This represents more than double the housing planned for during the last eight years.[52] The housing crisis and the climate crisis must be confronted simultaneously, and it is possible to address the housing crisis in a manner that supports the State's

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51 California Department of Housing and Community Development. 2022. Statewide Housing Plan. Available at www.hcd.ca.gov/docs/statewide-housing-plan.pdf.

52 Ibid.

climate and regional air quality goals.[53] CAPCOA's Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (CAPCOA's Handbook) provides a VMT reduction measurement for incorporation of low-income housing. Measure T-4 (Integrate Affordable and Below Market Rate Housing) shows a 28.6 percent reduction in VMT for low-income units in comparison to market rate units.

As discussed above, the City's Housing Element of the General Plan provides planning guidance in meeting housing needs identified in the SCAG Regional Housing Needs Assessment (RHNA). The Housing Element identifies measures to encourage development of affordable housing such as revising density bonuses for affordable housing; identify locations which are ideal for funding programs to meet low-income housing goals; and rezone areas to encourage low-income housing. The Housing Element estimates that implementation of these measures would increase housing production at all income ranges compared to previous cycles.

The Project would expand the supply of housing in the City of Carson. Further, the Project's location in an urbanized area with access to transportation alternatives would help reduce living costs and further the City's goals for promoting housing.

Building Decarbonization

The priority GHG reduction strategies for local government climate action related to electrification are discussed below and would support the Scoping Plan actions regarding meeting increased demand for electrification without new fossil gas-fire resources and all electric appliances beginning in 2026 (residential) and 2029 (commercial) (see Table 2-1 of the Scoping Plan).

- **Adopt all-electric new construction reach codes for residential and commercial uses**

California's transition away from fossil fuel–based energy sources will bring the project's GHG emissions associated with building energy use down to zero as our electric supply becomes 100 percent carbon free. California has committed to achieving this goal by 2045 through SB 100, the 100 Percent Clean Energy Act of 2018. SB 100 strengthened the State's Renewables Portfolio Standard (RPS) by requiring that 60 percent of all electricity provided to retail users in California come from renewable sources by 2030 and that 100 percent come from carbon-free sources by 2045. The land use sector will benefit from RPS because the electricity used in buildings will be increasingly carbon-free, but implementation does not depend (directly, at least) on how buildings are designed and built.

The City has updated the Building Code with requirements for all new buildings which will reduce GHG emissions related to natural gas combustion. Space heating, water heating and cooking for non-restaurant uses would be required to be powered by electricity. In future years, SCE will be required to increase the amount of renewable energy in the power mix to comply with SB 100 requirements. The increasing availability of renewable energy will serve to reduce GHG emissions from sources traditionally

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[53] Elkind, E. N., Galante, C., Decker, N., Chapple, K., Martin, A., & Hanson, M. 2017. Right Type, Right Place: Assessing the Environmental and Economic Impacts of Infill Residential Development through 2030. Available at https://ternercenter.berkeley.edu/research-and-policy/right-type-right-place/.

powered by natural gas. Therefore, the Project would be consistent with the Building Code and not conflict with State and local decarbonization objectives.

- **Adopt policies and incentive programs to implement energy efficiency retrofits for existing buildings, such as weatherization, lighting upgrades, and replacing energy-intensive appliances and equipment with more efficient systems (such as Energy Star-rated equipment and equipment controllers)**

This reduction strategy would support the Scoping Plan action regarding electrification of appliances in existing residential buildings (see Table 2-1 of the Scoping Plan). The City and SCE have established rebate programs to promote use of energy-efficient products and home upgrades.

While the Project would not involve retrofit of existing buildings, it would design the HVAC system to be compliant with Title 24 and green building codes for energy efficiency.

Table 6 evaluates the Project's consistency with applicable reduction actions/strategies by emissions source category outlined in the *2022 Climate Change Scoping Plan Update*.[54] When compared to SB 32, the Proposed Project would be consistent with its objectives and the GHG reduction-related actions and strategies of the 2022 Scoping Plan. Table 6 confirms that the Proposed Project is consistent with the Scoping Plan's focus on increasing renewable energy use, imposing tighter limits on the carbon content of gasoline and diesel fuel, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries. Although a number of these strategies are currently promulgated, some have not yet been formally proposed or adopted. It is expected that these measures or similar actions to reduce GHG emissions will be adopted as required to achieve statewide GHG emissions targets. Based on the following analysis, the Project would be consistent with the State's Climate Change Scoping Plan's objective of achieving carbon neutrality statewide by 2045 and reducing 2030 GHG emissions in accord with SB 32.

Based on the analysis in Table 6, the Project would be consistent with the State's 2022 Climate Change Scoping Plan and, thus, impacts related to consistency with the Scoping Plan would be less than significant impact.

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54 An evaluation of stationary sources is not necessary as the stationary sources emissions will be created by emergency generators that would only be used in an emergency.

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
Smart Growth / Vehicle Miles Traveled (VMT)	VMT per capita reduced 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045	SB 375: Reduce demand for fossil transportation fuels and GHG	**No Conflict.** The Project represents an infill development within an urbanized area that would concentrate new residences within an HQTA and reduce per capita VMT and GHG emissions. The Project would be consistent with SB 375 and its VMT reduction goals, as well as the GHG and transportation goals of the 2024-2050 RTP/SCS.
Light-duty Vehicle (LDV) Zero Emission Vehicles (ZEVs)	100% of Light Duty Vehicle sales are ZEV by 2035	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. In November 2022, the Advanced Clean Cars II regulations took effect, setting ZEV and plug-in hybrid vehicle sales requirements for model years 2026 to 2035 (ZEV program) and increasingly stringent emission standards (LEV program) to ensure automakers phase out sales of internal combustion engine vehicles.	**No Conflict.** Emissions from vehicle engines from the Project would be regulated by State regulations governing technology and cleaner emissions.
Truck ZEVs	100% of medium-duty (MDV)/HDV sales are ZEV by 2040 (AB 74 University of California Institute of Transportation Studies [ITS] report)	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. CARB's Advanced Clean Truck Regulation accelerates the transition of zero-emission medium- and heavy-duty vehicles from 2024 to 2035. CARB also adopted the Innovative Clean Transit measure in 2018 that requires all public transit agencies to transition to zero emission fleets.	**No Conflict.** While the Project would not generate substantial medium- and heavy-duty truck traffic, it would not impede the advancement of cleaner trucks over time.

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
Aviation	20% of aviation fuel demand is met by electricity (batteries) or hydrogen (fuel cells) in 2045. Sustainable aviation fuel meets most or the rest of the aviation fuel demand that has not already transitioned to hydrogen or batteries.	CARB focuses on reducing emissions from ground support equipment and airport transit vehicles. It is also working with national and international entities to tighten aircraft emission standards. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** While the Project would not directly impact aviation industry, it would not impede the advancement of a cleaner aviation industry over time.
Ocean-going Vessels (OGVs)	2020 OGV At-Berth regulation fully implemented, with most OGVs utilizing shore power by 2027. 25% of OGVs utilize hydrogen fuel cell electric technology by 2045.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In 2015, Executive Order B-32-15 called. For a less polluting freight transport system that addressed OGVs, transport refrigeration units, and clean trucks.	**No Conflict.** While the Project would not directly impact trade or OGVs, it would not impede the advancement of a cleaner on- or off-shore sources over time.
Port Operations	100% of cargo handling equipment is zero-emission by 2037. 100% of drayage trucks are zero emission by 2035.	Executive Order N-79-20: Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory. In 2015, Executive Order B-32-15 called. For a less polluting freight transport system that addressed OGVs, transport refrigeration units, and clean trucks.	**No Conflict.** While the Project would not directly impact trade or port operations, it would not impede the advancement of a cleaner on-shore sources over time.
Freight and Passenger rail	100% of passenger and other locomotive sales are ZEV by 2030. 100% of line haul locomotive sales are ZEV by 2035. Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In 2015, Executive Order B-32-15 called. For a less polluting freight transport system that addressed OGVs, transport refrigeration units, and clean trucks.	**No Conflict.** While the Project would not directly impact freight or passenger rail, it would not impede the advancement of a cleaner locomotives over time. The Project's land uses would not include freight transportation or warehousing that would be subject to the California Sustainable Freight

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
			Action Plan. Therefore, the Project would not interfere or impede the implementation of the Sustainable Freight Action Plan.
Oil and Gas Extraction	Reduce oil and gas extraction operations in line with petroleum demand by 2045.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** While the Project would not directly impact oil extraction, it would help reduce demand for petroleum products from energy, area, and mobile sources.
Petroleum Refining	CCS on majority of operations by 2030, beginning in 2028 Production reduced in line with petroleum demand.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** While the Project would not directly impact oil extraction, it would help reduce demand for petroleum products that require refining.
Electricity Generation	Sector GHG target of 38 $MMTCO_2e$ in 2030 and 30 $MMTCO_2e$ in 2035. Retail sales load coverage 20 gigawatts (GW) of offshore wind by 2045. Meet increased demand for electrification without new fossil gas-fired resources.	SB 350 and SB 100: Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of electricity generation.
New Residential and Commercial Buildings	All electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would incorporate appliances that are consistent with Title 24 and Green Building requirements and consistent with the reduction of residential energy use.
Existing Residential Buildings	80% of appliance sales are electric by 2030 and 100% of appliance sales are electric by 2035. Appliances are replaced at end of life such that by 2030 there are 3 million all-electric and	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would comply with Title 24 and Green Building requirements during construction and any future retrofit or appliance replacement requirements.

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
	electric-ready homes—and by 2035, 7 million homes—as well as contributing to 6 million heat pumps installed statewide by 2030.		
Existing Commercial Buildings	80% of appliance sales are electric by 2030, and 100% of appliance sales are electric by 2045. Appliances are replaced at end of life, contributing to 6 million heat pumps installed statewide by 2030.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** While the Project is not a commercial development, it would not interfere with any future requirements to retrofit commercial appliances.
Food Products	7.5% of energy demand electrified directly and/or indirectly by 2030; 75% by 2045	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of energy for food production.
Construction Equipment	25% of energy demand electrified by 2030 and 75% electrified by 2045	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of energy for construction equipment.
Chemicals and Allied Products; Pulp and Paper	Electrify 0% of boilers by 2030 and 100% of boilers by 2045. Hydrogen for 25% of process heat by 2035 and 100% by 2045 Electrify 100% of other energy demand by 2045.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of energy for boilers.
Stone, Clay, Glass, and Cement	CCS on 40% of operations by 2035 and on all facilities by 2045 Process emissions reduced through alternative materials and CCS	SB 596: Reduce demand for fossil energy, process emissions, and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of energy for stone, clay, glass, and cement facilities.
Other Industrial Manufacturing	0% energy demand electrified by 2030 and 50% by 2045	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not directly impact the sources of energy for industrial facilities.

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
Combined Heat and Power	Facilities retire by 2040.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not affect facilities that produced heat and power.
Agriculture Energy Use	25% energy demand electrified by 2030 and 75% by 2045	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory	**No Conflict.** The Project would not affect directly agricultural sources of energy.
Low Carbon Fuels for Transportation	Biomass supply is used to produce conventional and advanced biofuels, as well as hydrogen.	AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In November 2022, the Advanced Clean Cars II regulations took effect, setting low emission standards for transportation.	**No Conflict.** This regulatory program applies to fuel suppliers, not directly to land use development. GHG emissions related to vehicular travel associated with the Project would benefit from this regulation because fuel used by Project-related vehicles would be required to comply with the LCFS. Mobile source GHG emissions estimates were calculated using CalEEMod that includes implementation of the LCFS into mobile source emission factors. The current LCFS targets a 20% reduction in CI from a 2010 baseline by 2030. GHG emissions generated by Project-related vehicular travel would benefit from the Advanced Clean Cars Program.
Low Carbon Fuels for Buildings and Industry	In 2030s biomethane blended in pipeline Renewable hydrogen blended in fossil gas pipeline at 7% energy (~20% by volume), ramping up between 2030 and 2040 In 2030s, dedicated hydrogen pipelines constructed to serve certain industrial clusters	SB 350: The Clean Energy and Pollution Reduction Act of 2015 increases the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by 2030. Required measures include increasing RPS to 50 percent of retail sales by 2030, establishing annual	**No Conflict.** The Project would comply with this this action/strategy being located within the SCE and SCG service area and would comply with CalGreen and Title 24 energy efficiency standards. SCE must generate electricity that would increase renewable energy resources

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
		targets for statewide energy efficiency that achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030. SB 100: The California Renewables Portfolio Standard Program (2018) requires retail sellers to procure renewable energy that is at least 50 percent by December 31, 2026 and 60 percent by December 31, 2030. It requires local publicly owned electric utilities to procure a minimum quantity of electricity from renewable energy resources of 44 percent of retail sales by December 31, 2024 and 60 percent by December 31, 2030.	to 33 percent by 2020 and 50 percent by 2030. As SCE would provide electricity service to the Project Site, by 2030 the Project would use electricity consistent with the requirements of SB 350. As required under SB 350, doubling of the energy efficiency savings from retail customers by 2030 would primarily rely on the existing suite of building energy efficiency standards under CCR Title 24, Part 6 (consistency with this regulation is discussed below) and utility-sponsored programs such as rebates for high-efficiency appliances, HVAC systems, and insulation.
Non-combustion Methane Emissions	Increase landfill and dairy digester methane capture. Some alternative manure management deployed for smaller dairies Moderate adoption of enteric strategies by 2030 Divert 75% of organic waste from landfills by 2025. Oil and gas fugitive methane emissions reduced 50% by 2030 and further reductions as infrastructure components retire in line with reduced fossil gas demand	SB 1383 (2016) requires CARB to set 2030 emission reduction targets of 40 percent for methane and hydrofluorocarbons and 50 percent black carbon emissions below 2013 levels. The Project would comply with the CARB SLCP Reduction Strategy by using HVAC equipment with lower GWP refrigerants.	**No Conflict.** This program applies to State regulators looking to reduce methane emissions from landfill and dairy facilities and is not directly related to development of the Project. However, the Project would not interfere or impede efforts to reduce such pollutants.
High GWP Potential Emissions	Low GWP refrigerants introduced as building electrification	SB 605 (2014) directed CARB to develop a comprehensive Short-Lived Climate Pollutant (SLCP) strategy.	**No Conflict.** This program applies to State regulators looking to reduce high GWP refrigerants and is not directly

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
	increases, mitigating HFC emissions		related to development of the Project. However, the Project would not interfere or impede efforts to reduce such pollutants.
Natural and Working Lands	Conserve 30% of the state's NWL and coastal waters by 2030. Implement near- and long-term actions to accelerate natural removal of carbon and build climate resilience in our forests, wetlands, urban greenspaces, agricultural soils, and land conservation activities in ways that serve all communities—and in particular low-income, disadvantaged, and vulnerable communities.	EO N-82-20 and SB 27: CARB to include an NWL target in the Scoping Plan. AB 1757: Establish targets for carbon sequestration and nature-based climate solutions. SB 1386: NWL are an important strategy in meeting GHG reduction goals.	**No Conflict.** This program applies to State regulators governing Natural and Working Lands and is not directly related to development of the Project. However, the Project would not interfere or impede implementation of the Integrated Natural and Working Lands Implementation Plan, EO N-82-20, SB 27, or SB 1386.
Forests and Shrublands	At least 2.3 million acres treated statewide annually in forests, shrublands/chaparral, and grasslands, comprised of regionally specific management strategies that include prescribed fire, thinning, harvesting, and other management actions. No land conversion of forests, shrublands/chaparral, or grasslands.	Restore health and resilience to overstocked forests and prevent carbon losses from severe wildfire, disease, and pests. Improve air quality and reduce health costs related to wildfire emissions. Improve water quantity and quality and improve rural economies. Provide forest biomass for resource utilization. EO B-52-18: CARB to increase the opportunity for using prescribed fire. AB 1504 (Skinner, Chapter 534, Statutes of 2010): CARB to recognize the role forests play in carbon sequestration and climate mitigation.	**No Conflict.** This program applies to State regulators governing forest and shrubland management and is not directly related to development of the Project. However, the Project would not interfere or impede implementation of EO B-52-18, AB 1504, or the Forest Carbon Plan.
Grasslands	At least 2.3 million acres treated includes increased management of grasslands interspersed in forests to reduce fuels		**No Conflict.** This program applies to State regulators of grasslands and is not directly related to development of the Project. However, the Project

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
	surrounding communities using management strategies appropriate for grasslands. No land conversion of forests, shrublands/chaparral, or grasslands.		would not interfere or impede efforts to reduce fuels in grasslands surrounding communities.
Croplands	Implement climate smart practices for annual and perennial crops on ~80,000 acres annually. Land easements/ conservation on annual crops at ~5,500 acres annually. Increase organic agriculture to 20% of all cultivated acres by 2045 (~65,000 acres annually).	SB 859: Recognizes the ability of healthy soils practices to reduce GHG emissions from agricultural lands.	**No Conflict.** This program applies to State regulators overseeing croplands and is not directly related to development of the Project. However, the Project would not interfere or impede SB 859 and efforts to increase organic agriculture and conserve croplands.
Developed Lands	Increase urban forestry investment by 200% above current levels and utilize tree watering that is 30% less sensitive to drought. Establish defensible space that accounts for property boundaries.	AB 2251 (Calderon, Chapter 186, Statutes of 2022): Increase urban tree canopy 10% by 2035.	**No Conflict.** This program applies to State regulators addressing urban forestry and is not directly related to development of the Project. However, the Project would not interfere or impede implementation of AB 2251 and efforts to increase the urban canopy.
Wetlands	Restore 60,000 acres of Delta wetlands		**No Conflict.** This program applies to State regulators restoring Delta wetlands and is not directly related to development of the Project. However, the Project would not interfere or impede efforts to restore wetland ecologies.
Sparsely Vegetated Lands	Land conversion at 50% of the Reference Scenario land conversion rate.		**No Conflict.** This program applies to State regulators slowing the conversion of sparsely vegetated lanes and is not directly related to

Table 6
Consistency Analysis—2022 Scoping Plan Update

Sector	Actions and Strategies	Statutes, Executive Orders, Other Direction	Project Consistency Analysis
			development of the Project. However, the Project would not interfere or impede efforts to slow urban conversion of such lands.
Cap-and-Trade Program	Implement the post-2020 Cap-and-Trade Program with declining annual caps.	AB 398 was enacted in 2017 to extend and clarify the role of the state's Cap-and-Trade Program from January 1, 2021, through December 31, 2030. As part of AB 398, refinements were made to the Cap-and-Trade program to establish updated protocols and allocation of proceeds to reduce GHG emissions.	**Not Applicable.** This applies to the market-based program to reduce GHG emissions over time and is not applicable to a development project.
Source: DKA Planning, 2024 based on California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, Scoping Plan Scenario.			

Based on the consistency discussion in Table 6, the Project would be consistent with the State's Climate Change Scoping Plan and thus, Project impacts related to consistency with the Scoping Plan would be less than significant impact.

In addition to the Project's consistency with applicable GHG emissions reduction regulations and strategies, the Project would not conflict with future anticipated statewide GHG emissions reductions goals. Specifically, CARB has outlined strategies for achieving the 2030 reduction target of 40 percent below 1990 levels, as mandated by SB 32 as well as carbon neutrality by 2045. These strategies include renewable resources for the state's electricity, increasing the fuel economy of vehicles and the penetration of zero-emission or hybrid vehicles into the vehicle fleet, reducing the rate of growth in VMT, supporting high-speed rail and other alternative transportation options, and use of high-efficiency appliances, water heaters, and HVAC systems.

The Project would also benefit from statewide and utility-provider efforts towards increasing the portion of electricity provided from renewable resources. SCE has committed to increasing renewable sources that exceed the Renewables Portfolio Standard requirements. The Project would include energy efficient mechanical systems, energy efficient glazing and window frames, Energy-Star appliances to be installed on-site, and the use of high-efficiency lighting. The Project would also benefit from statewide efforts to improve fuel economy of vehicles. The Project would also help reduce VMT growth given its design and location at an infill site that is accessible to existing public transit.

Regional: 2024-2050 Regional Transportation Plan/Sustainable Communities Strategy

Table 7 provides a comparison of the Project against the GHG-related performance measures of the 2024-2050 RTP/SCS.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Decrease average distance traveled for work trips from 16.2 to 15.9 miles by 2050.	**Consistent.** The Project is an infill development that would locate more diverse housing options on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. While 60 percent of work trips were less than 30 minutes, the Project would increase the density of development on the Project Site, the Harbor Gateway, and the South Bay that would potentially decrease distance for commutes within these job centers.[55]
Decrease average distance traveled for non-work trips to 6.1 miles by 2050.	**Consistent.** The Project is an infill development that would focus on growth on the Carson Street corridor and within an HQTC. It would increase the density of development on the Project Site that would potentially reduce the need for longer

[55] Southern California Association of Governments, Profile of the City of Carson; May 2019.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
	travel to non-work destinations, which averaged 27 minutes per trip in 2018.[56]
Increase share of all trips ten miles or less from 46.9 to 47.6 percent by 2050.	**Consistent.** The Project is an infill development that would focus on growth on the Carson Street corridor and within an HQTC. It would increase the density of development on the Project Site that would potentially reduce the need for longer travel to destinations outside of the Harbor Gateway and South Bay in general.
Increase share of all trips 25 miles or less from 80.1 to 80.7 percent by 2050.	**Consistent.** The Project is an infill development that would focus on growth on the Carson Street corridor and within an HQTC. It would increase the density of development on the Project Site that would potentially reduce the need for longer travel to destinations outside of the Harbor Gateway and South Bay in general.
Increase share of work trips by SOV from 65.9 to 61.9 percent by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of growth in SOV use and congestion by virtue of its transit accessibility along this corridor, with bus stops in front of the Project Site on Carson Street and other transit service nearby on Avalon Boulevard
Increase share of all trips by SOV from 37.0 to 34.7 percent by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of growth in SOV use and congestion by virtue of its transit accessibility along this corridor.
Decrease share of work trips by SOV from 23.9 to 21.7 percent by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of growth in SOV use by centralizing more diverse housing options on the Project Site.
Decrease share of all trips by SOV from 48.7 to 46.3 percent by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of growth in SOV use by virtue of its transit accessibility along this corridor, with bus stops in front of the Project Site on Avalon Boulevard and other transit service nearby on Carson Street.
Increase share of work trips by transit from 4.6 to 7.9 percent by 2050.	**Consistent.** The Project would increase the density of development and housing on the Project Site and increase transit ridership by virtue of its bus stops in front of the Project Site on Carson Street and other transit service nearby on Avalon Boulevard. These stops are located within walking distance of the Project Site and could increase transit boardings over existing conditions.

[56] Southern California Association of Governments, Profile of the City of Carson; May 2019.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Increase share of all trips by transit from 3.9 to 5.3 percent by 2050.	**Consistent.** The Project would increase the density of development and housing on the Project Site and increase transit ridership by virtue of its bus stops in front of the Project Site on Carson Street and other transit service nearby on Avalon Boulevard. These stops are located within walking distance of the Project Site and could increase transit boardings over existing conditions.
Increase share of work trips by walking from 3.6 to 4.3 percent by 2050.	**Consistent.** The Project would increase the density of development and housing on the Project Site, which is served by developed sidewalks. As such, the Project could increase the share of walking commute trips over existing conditions.
Increase share of all trips by walking from 8.8 to 10.2 percent by 2050.	**Consistent.** The Project would increase the density of development on the Project Site, which is served by sidewalks. As such, the Project could increase the share of walking trips over existing conditions.
Increase share of work trips by bicycle from 1.9 to 4.1 percent by 2050.	**Consistent.** The Project would increase the density of development and jobs on the Project Site, which is served by flat streets. As such, the Project could increase the share of bicycling commute trips over existing conditions.
Increase share of all trips by bicycle from 1.6 to 3.5 percent.	**Consistent.** The Project would increase the density of development on the Project Site, which is served by flat streets. As such, the Project could increase the share of bicycling trips over existing conditions.
Reduce person hours of delay on highways from 1,266,283 to 1,024,863 by 2050.	**Consistent.** The Project's focus on housing options would increase the potential for more local, non-highway-based trips. As such, the Project would not promote highway-based driving that would contribute to congestion and delay.
Reduce person hours of delay on HOV lanes from 84,351 to 12,345 by 2050.	**Consistent.** The Project's focus on housing options would increase the potential for more local, non-highway-based trips. As such, the Project would not promote highway-based driving that would contribute to congestion and delay.
Reduce person hours of delay on arterials from 1,245,043 to 927,265 by 2050.	**Consistent.** The Project is an infill development that would create more housing, consistent with the 2024-2050 RTP/SCS policies. Residents would have access to four local and rapid bus routes on Avalon Boulevard and Carson Street that could increase transit use and reduce the growth of delay on arterials.
Reduce person hours of delay on all facilities from 2,868,470 to 2,184,952 by 2050.	**Consistent.** The Project is an infill development that would create more housing, consistent with the 2024-2050 RTP/SCS policies. Residents would have access to four local and rapid bus routes on Avalon Boulevard and Carson Street that could increase transit use and reduce the growth of delay on all facilities.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Reduce daily minutes of delay per capita from 8.2 to 6.3 by 2050.	**Consistent.** The Project is an infill development that would create more housing, consistent with the 2024-2050 RTP/SCS policies. Residents would have access to four local and rapid bus routes on Avalon Boulevard and Carson Street that could increase transit use and reduce the delay per capita.
Reduce truck delay on highways from 140,249 to 119,137 hours by 2050.	**Consistent.** The Project's focus on local housing would generally not involve use of long-distance heavy-duty trucks. As such, the Project would not promote highway-based use of heavy-dusty trucks that would contribute to congestion and delay.
Reduce truck delay on arterials from 28,457 to 22,621 hours by 2050.	**Consistent.** The Project's focus on local housing would generally not involve use of heavy-duty trucks. As such, the Project would not promote use of heavy-dusty trucks that would contribute to congestion and delay on arterials.
Reduce truck delay on all facilities from 173,039 to 144,812 hours by 2050.	**Consistent.** The Project's focus on local housing would generally not involve use of heavy-duty trucks. As such, the Project would not promote use of heavy-dusty trucks that would contribute to congestion and delay on all facilities.
Reduce average travel time to work from 27.8 to 27.1 minutes by 2050.	**Consistent.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. While 60 percent of work trips were less than 30 minutes, the Project would increase the density of development on the Project Site, the Harbor Gateway, and the South Bay that would potentially decrease distance for commutes within these job centers.
Increase annual number of transit boardings per capita from 47.2 to 77.5 by 2050.	**Consistent.** The Project would increase the density of development and housing on the Project Site and increase transit ridership by virtue of its bus stops in front of the Project Site on Carson Street and other transit service nearby on Avalon Boulevard. These stops are located within walking distance of the Project Site and could increase transit boardings over existing conditions.
Increase share of jobs accessible within 30 minutes by auto from 12.2 to 13.4 percent by 2050.	**Consistent.** The Project is an infill development that would locate more housing solutions on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. While 60 percent of work trips were less than 30 minutes, the Project would increase the density of development on the Project Site, the Harbor Gateway, and the South Bay that would potentially decrease distance for commutes within these job centers.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Increase share of jobs accessible within 45 minutes by transit from 1.8 to 2.6 percent by 2050.	**Consistent.** The Project is an infill development that would create more service-related jobs, consistent with the 2024-2050 RTP/SCS policies and would focus on job growth on the Carson Street corridor and within an HQTC. It would increase the density of development on the Project Site that would potentially increase on-site employment and the share of work trips amenable to public transit.
Increase share of shopping destinations accessible within 15 minutes by auto from 4.2 to 4.6 percent by 2050.	**No Conflict.** The Project does not include shopping destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of shopping options in metropolitan Los Angeles County.
Increase share of shopping destinations accessible within 30 minutes by transit from 0.4 to 0.6 percent by 2050.	**No Conflict.** The Project does not include shopping destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of shopping options in metropolitan Los Angeles County near public transit.
Increase share of educational destinations accessible within 30 minutes by auto from 12.1 to 13.4 percent by 2050.	**No Conflict.** The Project does not include educational destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of educational options in metropolitan Los Angeles County.
Increase share of educational destinations accessible within 30 minutes by transit from 0.2 to 0.4 percent by 2050.	**No Conflict.** The Project does not include educational destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of educational options in metropolitan Los Angeles County near public transit.
Increase share of healthcare destinations accessible within 30 minutes by auto from 16.7 to 18.4 percent by 2050.	**No Conflict.** The Project does not include healthcare destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of healthcare options in metropolitan Los Angeles County.
Increase share of healthcare destinations accessible within 30 minutes by transit from 0.3 to 0.5 percent by 2050.	**No Conflict.** The Project does not include healthcare destinations. Nevertheless, it would not inhibit the region's efforts to add to the supply of healthcare options in metropolitan Los Angeles County near public transit.
Increase share of work trips less than three miles from 16.5 to 16.7 percent by 2050.	**No Conflict.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. While 60 percent of work trips were less than 30 minutes, the Project would increase the density of development on the Project Site, the Harbor Gateway, and the South Bay that would potentially decrease distance for commutes within these job centers.[57]

[57] Southern California Association of Governments, Profile of the City of Carson; May 2019.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Increase share of non-work trips less than three miles to 41.8 percent	**No Conflict.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. While 60 percent of work trips were less than 30 minutes, the Project would increase the density of development on the Project Site, the Harbor Gateway, and the South Bay that would potentially decrease distance for commutes within these job centers.[58]
Increase share of regional housing units within designated Priority Development Areas (PDAs) from 57.0 to 61.1 percent by 2050.	**Consistent.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. As such, it would advance the region's efforts to add to housing units in PDAs.
Increase share of population able to reach a park within 30 minutes by auto to 99.6 percent by 2050.	**Consistent.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. Both Dolphin Park and Calas Park are within 3,000 feet of the Project Site. As such, it would advance the region's efforts to add to housing units near local parks.
Increase share of population able to reach a park within 30 minutes by transit from 57.6 to 62.1 percent by 2050.	**Consistent.** The Project is an infill development that would locate more housing on the Carson Street corridor and within an HQTC, consistent with the 2024-2050 RTP/SCS policies. Both Dolphin Park and Calas Park are within 3,000 feet of the Project Site. As such, it would advance the region's efforts to add access to parklands.
Decrease daily VMT per capita from 20.7 to 19.4 by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of growth in auto traffic and congestion by virtue of its transit accessibility. As such, it is consistent with AB 32, SB 32, SB 375, and other initiatives designed to reduce per capita GHG emissions from 2005 levels.
Decrease total square miles of greenfield and rural lands converted to urban use from 79.3 to 41.8 by 2050.	**Consistent.** The Project is an infill development in the dense Carson Street corridor that will reduce the rate of urban sprawl and the conversion of greenfield and rural lands. As such, it is consistent with AB 32, SB 32, SB 375, and other initiatives designed to reduce GHG emissions.
Decrease energy consumption per household from 45.8 to 44.6 million BTUs by 2050.	**Consistent.** The Project would comply with Title 24 and the State's environmental regulations and the region's efforts to add to improve energy efficiency in residences.

[58] Southern California Association of Governments, Profile of the City of Carson; May 2019.

Table 7
Consistency with the 2024 RTP/SCS

Performance Measure	Consistency Analysis[a]
Decreases urban water consumption per household from 75,100 to 74,600 gallons by 2050.	**Consistent.** The Project would comply with Title 24 and the State's environmental regulations and the region's efforts to add to reduce water consumption per capita in residences.
Source: DKA Planning, 2024.	

Locally, the City has several conservation-based plans, programs, and requirements that also indirectly produce GHG reductions. While these are not considered climate action plans, the Proposed Project's consistency with these local initiatives is summarized.

Local: City of Carson General Plan Open Space and Environmental Conservation Element

The Project would be consistent with the City's General Plan Open Space and Environmental Conservation Element. Table 8 summarizes the Project's consistency with the General Plan.

Table 8
Consistency with City of Carson Open Space and Environmental Conservation Element

Policy	Consistency Analysis
Policy OSEC-G-23: Undertake initiatives outlined in the Climate Action Plan to enhance sustainability by reducing the community's greenhouse gas (GHG) emissions and fostering green development patterns—including buildings, sites, and landscapes.	**No Conflict.** While the Policy calls on the City to advance citywide policies and isn't directly applicable to development projects, the Project would comply with Building Code and Title 24 requirements that reduce energy and water consumption and GHG emissions.
Policy OSEC-G-24: Incorporate green infrastructure design in new projects to promote sustainability in the built environment.	**Consistent.** The Project would comply with Building Code and Title 24 requirements that would reduce energy and water consumption as well as GHG emissions.
Policy OSEC-G-25: Demonstrate leadership by reducing the use of energy and fossil fuel consumption in municipal operations, including transportation, waste and water reduction, recycling, and by promoting efficient building design and use.	**No Conflict.** While the Policy calls on the City to advance citywide policies and isn't directly applicable to development projects, the Project would comply with Building Code and Title 24 requirements that would reduce energy and water consumption and GHG emissions.
Policy OSEC-G-26: Plan for extreme weather events by incorporating the potential effects and threats of climate change into emergency management planning.	**No Conflict.** The Policy calls on the City to advance citywide policies that address emergency planning and isn't directly applicable to development projects,
Policy OSEC-G-27: Reduce the impacts of extreme heat events resulting from global warming and climate change by diminishing urban heat island effects. Explore heat mitigation strategies including planting trees, limiting the use of heat-absorbing pavement,	**No Conflict.** The Policy calls on the City to advance citywide policies that address climate adaptation and isn't directly applicable to development projects,

Table 8
Consistency with City of Carson Open Space and Environmental Conservation Element

Policy	Consistency Analysis
encouraging use of cool roofs and reflective pavements, and providing cooling elements in public spaces such as shade structures and water features.	
Policy OSEC-G-28: Promote sustainable practices as well as environmental remediation for heavy industrial areas and seek to reduce trucking emissions.	**No Conflict.** This policy focuses on growth in industrial areas and is not applicable to the Proposed Project.
Source: DKA Planning, 2024.	

Local: City of Carson Climate Action Plan

The CAP's focus on land use and transportation, energy efficiency, solid waste, urban greening, and energy generation and storage are aimed at City leadership and the development of citywide regulations and programs that advance carbon reduction. While the CAP's policies are generally not applicable to development projects, the Proposed Project would comply with the Building Code and Title 24's conservation requirements that would reduce GHG emissions from construction, energy, water, waste, area sources, transportation, and other sources of carbon-based emissions. As such, the Project would be consistent with the City's implementation of the CAP over time.

Conclusion

In summary, the plan consistency analysis provided above demonstrates that the Project complies with the applicable plans, policies, regulations and GHG emissions reduction actions/strategies outlined in the *Climate Change Scoping Plan and Update*, the 2024-2050 RTP/SCS, the City's General Plan Open Space and Environmental Conservation Element, and the City's CAP. Consistency with the above plans, policies, regulations, and GHG emissions reduction actions/strategies would reduce the Project's incremental contribution of GHG emissions. Thus, the Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing emissions of GHG emissions. Furthermore, because the Project is consistent and does not conflict with these plans, policies, and regulations, the Project's incremental increase in GHG emissions as described above would not result in a significant impact on the environment. Therefore, Project-specific impacts regarding climate change would be less than significant.

Project Emissions

In support of the consistency analysis above that describes the Project's compliance with, or exceedance of performance-based standards included in the regulations and policies outlined in the applicable portions of the *Climate Change Scoping Plan*, the 2024-2050 RTP/SCS, the City's

General Plan Open Space and Environmental Conservation Element, and the CAP, quantitative calculations are provided below.

The Project would generate direct and indirect GHG emissions because of different types of emissions sources, including the following:

- Construction: emissions associated with demolition of the existing motel uses and parking areas, shoring, excavation, grading, and construction-related equipment and vehicular activity;
- Area source: emissions associated with landscape equipment;
- Energy source (building operations): emissions associated with electricity and natural gas use for space heating and cooling, water heating, energy consumption, and lighting;
- Stationary source: emissions associated with stationary equipment (e.g., emergency generators);
- Mobile source: emissions associated with vehicles accessing the Project Site;
- Solid Waste: emissions associated with the decomposition of the waste, which generates methane based on the total amount of degradable organic carbon; and
- Water/Wastewater: emissions associated with energy used to pump, convey, deliver, and treat water.
- Refrigerants: These are substances used in equipment for air conditioning and refrigeration. Most refrigerants are HFCs or blends of them, which can have high GWP values.
- Vegetation: emissions from land use change and changes in sequestration from tree removal and planting.

The Project would generate an incremental contribution to and a cumulative increase in GHG emissions. A specific discussion regarding potential GHG emissions associated with the construction and operational phases of the Project is provided below.

Construction

Project construction is anticipated to be completed in 2026 with occupancy in 2027. A summary of construction details (e.g., schedule, equipment mix, and vehicular trips) and CalEEMod modeling output files are provided in the Technical Appendix. The GHG emissions associated with construction of the Project were calculated for each year of construction activity.

Construction of the Project is estimated to generate a total of 555 $MTCO_2e$ (Table 9). As recommended by the SCAQMD, the total GHG construction emissions were amortized over the 30-year lifetime of the Project (i.e., total construction GHG emissions were divided by 30 to determine an annual construction emissions estimate that can be added to the Project's operational emissions) to determine the Project's annual GHG emissions inventory.[59] This results in annual Project construction emissions of 18 $MTCO_2e$. A complete listing of the construction equipment by on-site and off-site activities, duration, and emissions estimation model input assumptions used in this analysis is included within the emissions calculation worksheets that are provided in the Technical Appendix.

Table 9
Combined Construction-Related Emissions ($MTCO_2e$)

Year	$MTCO_2e$[a]
2025	192
2026	363
Total	**555**
Amortized Over 30 Years	**18**

a CO_2e was calculated using CalEEMod version 2022.1.1.29. Detailed results are provided in the Technical Appendix.
Source: DKA Planning, 2024.

Operation

Area Source Emissions

Area source emissions were calculated using the CalEEMod emissions inventory model, which includes landscape maintenance equipment, use of consumer products, and other everyday sources. While CARB's 2022 regulations governing small-engine equipment require that model year 2024 and after landscaping equipment be zero-emission, the current version of CalEEMod has not factored in this development; as such, landscaping emissions are overstated. As shown in Table 10, the Project would result in one $MTCO_2e$ per year from area sources.

59 SCAQMD Governing Board Agenda Item 31, December 5, 2008.

Table 10
Annual GHG Emissions Summary (Buildout)[a]
(metric tons of carbon dioxide equivalent [MTCO2e])

Year	$MTCO_2$[a]
Area[b]	1
Energy[c] (electricity and natural gas)	74
Mobile	426
Solid Waste[d]	17
Water/Wastewater[e]	6
Refrigerants	<1
Vegetation	2
Construction	18
Total Emissions	**544**

[a] *CO_2e was calculated using CalEEMod and the results are provided in the Technical Appendix.*
[b] *Area source emissions are from landscape equipment and other operational equipment only; hearths omitted.*
[c] *Energy source emissions are based on CalEEMod default electricity and natural gas usage rates.*
[d] *Solid waste emissions are calculated based on CalEEMod default solid waste generation rates.*
[e] *Water/Wastewater emissions are calculated based on CalEEMod default water consumption rates.*
Source: DKA Planning, 2024.

Electricity and Natural Gas Generation Emissions

GHG emissions are emitted because of activities in buildings when electricity and natural gas are used as energy sources. Combustion of any type of fuel emits CO_2 and other GHG emissions directly into the atmosphere. When electricity is used in a building, the electricity generation typically takes place off-site at the power plant; electricity use in a building generally causes emissions in an indirect manner.

Electricity and natural gas emissions were calculated for the Project using the CalEEMod emissions inventory model, which multiplies an estimate of the energy usage by applicable emissions factors chosen by the utility company. GHG emissions from electricity use are directly dependent on the electricity utility provider. In this case, GHG emissions intensity factors for SCE were selected in CalEEMod. The carbon intensity (pounds per megawatt an hour (lbs/MWh)) for electricity generation was calculated for the Project buildout year based on SCE projections. A straight-line interpolation was performed to estimate the SCE carbon intensity factor for the Project buildout year. SCE's carbon intensity projections also consider SB 350 RPS requirements for renewable energy.

This approach is conservative, given the 2018 chaptering of SB 100 (De Leon), which requires electricity providers to provide renewable energy for at least 60 percent of their delivered power by 2030 and 100 percent use of renewable energy and zero-carbon resources by 2045. SB 100 also increases existing renewable energy targets, called Renewables Portfolio Standard (RPS), to 44 percent by 2024 and 52 percent by 2027.

The 2022 Title 24 standards contain more substantial energy efficiency requirements for new construction, emphasizing the importance of building design and construction flexibility to establish performance standards that substantially reduce energy consumption for water hating, lighting, and insulation for attics and walls.

Energy use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building, such as in plug-in appliances. CalEEMod calculates energy use from systems covered by Title 24 (e.g., HVAC system, water heating system, and lighting system); energy use from lighting; and energy use from office equipment, appliances, plug-ins, and other sources not covered by Title 24 or lighting.

CalEEMod electricity and natural gas usage rates are based on the CEC-sponsored California Commercial End-Use Survey (CEUS) and the California Residential Appliance Saturation Survey (RASS) studies.[60] The data are specific for climate zones; therefore, Zone 11 was selected for the Project Site based on the zip code tool.

As shown in Table 10, Project GHG emissions from electricity and natural gas usage would result in a total of 74 $MTCO_2e$ per year.

<u>Mobile Source Emissions</u>

Mobile-source emissions were calculated using the SCAQMD-recommended CalEEMod emissions inventory model. CalEEMod calculates the emissions associated with on-road mobile sources associated with residents, employees, visitors, and delivery vehicles visiting the Project Site based on the number of daily trips generated and VMT.

Mobile source operational GHG emissions were calculated using CalEEMod and are based on the Project trip-generation estimates. To calculate daily trips, the number of hotel rooms and amount of building area for the restaurant uses were multiplied by the applicable trip-generation rates based on the ITE's *Trip Generation, 11th Edition*.

The Project represents an infill development within an urbanized area that would concentrate self-storage uses within an HQTA.[61] The Project Site is in the dense Carson Street corridor with

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60 California Energy Commission, Commercial End-Use Survey, March 2006, and California Residential Appliance Saturation Survey, October 2010.

61 The Project Site is also located in Transit Priority Area as defined by Public Resources Code Section 20199. Public Resources Code Section 21099 defines a "transit priority area" as an area within 0.5 miles of a major transit stop that is "existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program adopted pursuant to Section 450.216 or 450.322 of Title 23 of the Code of Federal Regulations." Public Resources Code Section 21064.3 defines "major transit stop" as "a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or

proximity to local bus services. The Project would also incorporate characteristics that would reduce trips and VMT as compared to standard ITE trip generation rates. The Project characteristics listed below are consistent with the CAPCOA guidance document, *Quantifying Greenhouse Gas Mitigation Measures*, which provides emission reduction values for transportation related design techniques.[62] These techniques would reduce vehicle trips and VMT associated with the Project relative to the standard ITE trip generation rates, which would result in a comparable reduction in VMT and associated GHG emissions. Techniques applicable to the Project include the following (a brief description of the Project's relevance to the measure is also provided):

- **CAPCOA Measure LUT-1 – Increase Density:** Increased density, measured in terms of persons, jobs, or dwelling units per unit area, reduces emissions associated with transportation as it reduces the distance people travel for work or services and provides a foundation for the implementation of other strategies, such as enhanced transit services.

- **CAPCOA Measure LUT-3 – Increase Diversity of Urban and Suburban Developments (Mixed-Use):** The Project would introduce new residences on the Project Site. The increase of would reduce vehicle trips and VMT by locating more housing in the jobs-rich South Bay and Harbor Gateway would result in corresponding reductions in transportation-related emissions.

- **CAPCOA Measure LUT-4 – Increase Destination Accessibility:** The Project Site is in the dense Carson Street corridor, a regional job center, also easily accessible by public transportation. Access to multiple destinations would reduce vehicle trips and VMT compared to the statewide average and encourage walking and non-automotive forms of transportation and would result in corresponding reductions in transportation-related emissions because of the Project.

- **CAPCOA Measure LUT-5 – Increase Transit Accessibility:** The Project would be located near several bus routes on Cn Street and Avalon Boulevard to the west. The Project would also provide bicycle parking spaces to encourage utilization of alternative modes of transportation.

- **CAPCOA Measure LUT-9 – Improve Design of Development:** The Project would enhance the pedestrian and bicycle environment through an attractive open space component and improved sidewalk and streetscape, which would enhance walkability in the Project vicinity. The Project would also locate a development with a high level of street access, which improves street accessibility and connectivity.

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the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods." Also refer to the City's ZIMAS System regarding the location of the Project Site within a Transit Priority Area.

62 CAPCOA, Quantifying Greenhouse Gas Mitigation Measures, 2010.

- **CAPCOA Measure SDT-2 – Traffic Calming Measures:** Providing traffic calming measures encourages people to walk or bike instead of using a vehicle. This mode shift results in a decrease in VMT. Streets within a half mile of the Project Site are equipped with sidewalks, and several of the intersections include marked crosswalks and/or count-down signal timers that calm traffic.

CalEEMod calculates VMT based on the type of land use, trip purpose, and trip type percentages for each land use subtype in the project (primary, diverted, pass-by). As shown in Table 10, the Project GHG emissions from mobile sources would result in a total of 426 $MTCO_2e$ per year. This estimate reflects reductions attributable to the Project's characteristics (e.g., infill project near transit that supports multi-modal transportation options), as described above.

Solid Waste Generation Emissions

Emissions related to solid waste were calculated using the CalEEMod emissions inventory model, which multiplies an estimate of the waste generated by applicable emissions factors provided in Section 2.4 of the USEPA's AP-42, Compilation of Air Pollutant Emission Factors. CalEEMod solid waste generation rates for each applicable land use were selected for this analysis. As shown in Table 10, the Project scenario is expected to result in a total of 17 $MTCO_2e$ per year from solid waste that accounts for a 50-percent recycling/diversion rate.[63]

Water Usage and Wastewater Generation Emissions

GHG emissions are related to the energy used to convey, treat, and distribute water, and treat wastewater. Thus, these emissions are generally indirect emissions from the production of electricity to power these systems. Three processes are necessary to supply potable water; these include (1) supply and conveyance of the water from the source; (2) treatment of the water to potable standards; and (3) distribution of the water to individual users. After use, energy is used as the wastewater is treated and reused as reclaimed water.

Emissions related to water usage and wastewater generation were calculated for the Project using the CalEEMod emissions inventory model, which multiplies an estimate of the water usage by the applicable energy intensity factor to determine the embodied energy necessary to supply potable water.[64] GHG emissions are then calculated based on the amount of electricity consumed multiplied by the GHG emissions intensity factors for the utility provider. In this case, embodied energy for Southern California supplied water and GHG emissions intensity factors for SCE and SCG were selected in CalEEMod. Water usage rates were calculated consistent with the requirements under City Ordinances.

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63 AB 341 (2012) increased the Statewide waste diversion goal from 50 to 75 percent from baseline rates established by CalRecycle by 2020 and beyond. Further, SB 1383 (2016) requires jurisdictions to reduce 75 percent of organic waste disposal in landfills by 2030.

64 The intensity factor reflects the average pounds of CO_2e per megawatt generated by a utility company.

SCE's programs includes programs designed to reduce indoor water consumption and wastewater generation by 20 percent. These include the 2022 requirements for installation of the latest ultra-high efficiency plumbing fixtures, the standards that promote increasing water-resistant turf and incorporating rainfall capture techniques in project designs, aggressive outdoor water consumption programs through its Landscape ordinance, and water recycling programs designed to increase recycled water to 59,000 acre-feet by 2035.

As shown in Table 10, Project GHG emissions from water/wastewater usage would result in a total of six $MTCO_2e$ per year, which reflects a 20-percent reduction in water/wastewater emissions consistent with building code requirements as compared to the Project without sustainability features related to water conservation.

Refrigerants

Emissions related to cooling structures and refrigeration needs were calculated using the CalEEMod emissions inventory model. As shown in Table 10, the Project scenario is expected to result in less than one $MTCO_2e$ per year from use of refrigerants that used HFCs and have high GWP values.

Vegetation

The planting of trees throughout the Project Site would serve as a carbon sink that absorbs carbon dioxide. As shown in Table 10, the Project scenario is expected to result in an increase of two $MTCO_2e$ per year based on the removal of three dozen trees.

Combined Construction and Operational Emissions

As shown in Table 10, when taking into consideration implementation of project design features, including the requirements set forth in the City's Green Building Code and the full implementation of current state mandates, the GHG emissions for the Project would equal 533 $MTCO_2e$ annually (as amortized over 30 years).

Estimated Reduction of Project Related GHG Emissions Resulting from Consistency with Plans

As noted earlier, one approach to demonstrating a project's consistency with GHG plans is to show how a project will reduce its incremental contribution through a Project Without Reduction Features comparison. The analysis in this section includes potential emissions under a Project Without Reduction Features scenario and from the Project at build-out based on actions and mandates in force in 2027.

As shown in Table 11, the emissions for the Project and its associated CARB 2027 Project Without Reduction Features scenario are estimated to be 533 and 767 $MTCO_2e$ per year, respectively, which shows the Project would reduce emissions by 30.6 percent from CARB's 2027 Project Without Reduction Features scenario.

The analysis in this section uses the Scoping Plan's statewide goals as one approach to evaluate the Project's incremental contribution to climate change. The methodology is to compare the Project's emissions as proposed to the Project's emissions as if the Project were built using a Project Without Reduction Features approach in terms of design, methodology, and technology. This means the Project's emissions were calculated as if the Project was constructed with project design features to reduce GHG emissions that are not required by state or local code and with several regulatory measures adopted in furtherance of AB 32.

While the AB 32 Scoping Plan's cumulative statewide objectives were not intended to serve as the basis for project-level assessments, this analysis finds that its Project Without Reduction Features comparison based on the Scoping Plan is appropriate, because the Project would contribute to statewide GHG emissions reduction goals. Specifically, the Project's location in an existing urban setting provide opportunities to reduce transportation-related emissions.

Table 11
Estimated Reduction of Project-Related GHG Emissions Resulting from Consistency with Plans

Scenario and Source	Project Without Reduction Features Scenario*	As Proposed Scenario	Reduction from Project Without Reduction Features Scenario	Change from Project Without Reduction Features Scenario
Area Sources	1	1	-	0%
Energy Sources	128	74	-54	-42%
Mobile Sources	607	426	-181	-30%
Waste Sources	17	17	-	0%
Water Sources	6	6	-	0%
Refrigerants	<1	<1	-	0%
Vegetation	2	2	-	0%
Construction	7	7	-	0%
Total Emissions	767	533	-234	-30.6%

Daily construction emissions amortized over 30-year period pursuant to SCAQMD guidance. Annual construction emissions derived by taking total emissions over duration of activities and dividing by construction period.
** Project Without Reduction Features scenario does not assume 30% reduction in in mobile source emissions from Pavley emission standards (19.8%), low carbon fuel standards (7.2%), vehicle efficiency measures 2.8%); does not assume 42% reduction in energy production emissions from the State's renewables portfolio standard (33%), natural gas extraction efficiency measures (1.6%), and natural gas transmission and distribution efficiency measures (7.4%).*
Source: DKA Planning, 2024.

Post-2030 Analysis

Recent studies show that the state's existing and proposed regulatory framework will put the state on a pathway to reduce its GHG emissions level to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050 if additional appropriate reduction measures are adopted.[65] 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. After the findings of these studies, SB 32 was passed on September 8, 2016, and would require the state board to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030. As discussed above, the new plan, outlined in SB 32, involves increasing renewable energy use, imposing tighter limits on the carbon content of gasoline and diesel fuel, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries.

As discussed above, SCAG's 2024-2050 RTP/SCS establishes a regulatory framework for achieving GHG reductions from the land use and transportation sectors pursuant to SB 375 and the state's long-term climate policies. The 2024-2050 RTP/SCS ensures VMT reductions and other measures that reduce regional emissions from the land use and transportation sectors.

The Project is the type of land use development that is encouraged by the RTP/SCS to reduce VMT and expand multi-modal transportation options for the region to achieve the GHG reductions from the land use and transportation sectors required by SB 375, which, in turn, advances the state's long-term climate policies. By furthering implementation of SB 375, the Project supports regional land use and transportation GHG reductions consistent with state climate targets for 2020 and beyond. In addition, the Project would be consistent with the Actions and Strategies set forth in the 2024-2050 RTP/SCS. Therefore, the Project would be consistent with the 2024-2050 RTP/SCS.

Conclusion

Given the Project's consistency with state, SCAG, and City GHG emissions reduction goals and objectives, the Project is consistent with applicable plans, policies, and regulations adopted for the purpose of reducing the emissions of GHGs. In the absence of adopted standards and

65 Energy and Environmental Economics (E3). "Summary of the California State Agencies' PATHWAYS Project: Long-term Greenhouse Gas Reduction Scenarios" (April 2015); Greenblatt, Jeffrey, Energy Policy, "Modeling California Impacts on Greenhouse Gas Emissions" (Vol. 78, pp. 158–172). The California Air Resources Board, California Energy Commission, California Public Utilities Commission, and the California Independent System Operator engaged E3 to evaluate the feasibility and cost of a range of potential 2030 targets along the way to the state's goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. With input from the agencies, E3 developed scenarios that explore the potential pace at which emission reductions can be achieved, as well as the mix of technologies and practices deployed. E3 conducted the analysis using its California PATHWAYS model. Enhanced specifically for this study, the model encompasses the entire California economy with detailed representations of the buildings, industry, transportation, and electricity sectors.

established significance thresholds, and given this consistency, it is concluded that the Project's incremental contribution to greenhouse gas emissions and their effects on climate change would not be cumulatively considerable.

Cumulative Impacts

As explained above, the analysis of a project's GHG emissions is inherently a cumulative impacts analysis, because climate change is a global problem, and the emissions from any single project alone would be negligible. Accordingly, the analysis above considered the potential for the Project to contribute to the cumulative impact of global climate change.

The analysis shows that the Project is consistent with CARB's *Climate Change Scoping Plan*, particularly its emphasis on the identification of emission reduction opportunities that promote economic growth while achieving greater energy efficiency and accelerating the transition to a low-carbon economy. The analysis also shows that the Project would be consistent with the 2024-2050 RTP/SCS, which would serve to reduce regional GHG emissions from the land use and transportation sectors by 2020 and 2035. Furthermore, the Project would generally comply with the aspirations of the City's General Plan and CAP, which includes specific targets related to housing and development, and mobility and transit. Given the Project's consistency with statewide, regional, and local plans adopted for the reduction of GHG emissions, it is concluded that the Project's incremental contribution to greenhouse gas emissions and their effects on climate change would not be cumulatively considerable. For these reasons, the Project's cumulative contribution to global climate change is less than significant.

TECHNICAL APPENDIX

DouglasKim+Associates, LLC

GREENHOUSE GAS EMISSIONS OVERVIEW

21611 Perry Street Project

GHG Emissions Impact Compared to "Project Without Reduction Features" Scenario

Source	Project Without Reduction Features (2027)	As Proposed (2027)	Reduction from Project Without Reduction Features	Change from Project Without Reduction Features Scenario
Area	1	1	-	0%
Energy	128	74	(54)	-42%
Mobile	607	426	(181)	-30%
Waste	17	17	-	0%
Water	6	6	-	0%
Refrigerants	0	0	-	0%
Vegetation	2	2		
Construction	18	18	-	0%
Total Emissions	779	544	(234)	-30.1%

DOUGLASKIM+ASSOCIATES,LLC

FUTURE EMISSIONS

21611 Perry Street (Future) Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	21611 Perry Street (Future)
Construction Start Date	5/1/2025
Operational Year	2027
Lead Agency	City of Carson
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.50
Precipitation (days)	17.4
Location	21611 S Perry St, Carson, CA 90745, USA
County	Los Angeles-South Coast
City	Carson
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4622
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Apartments Mid Rise	62.0	Dwelling Unit	2.55	134,196	28,853	—	213	—

Parking Lot	28.0	Space	0.25	0.00	218	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Unmit.	—	4,339	4,339	0.19	0.30	4.61	4,437
Daily, Winter (Max)	—	—	—	—	—	—	—
Unmit.	—	4,437	4,437	0.19	0.30	0.12	4,468
Average Daily (Max)	—	—	—	—	—	—	—
Unmit.	—	2,174	2,174	0.09	0.05	0.84	2,192
Annual (Max)	—	—	—	—	—	—	—
Unmit.	—	360	360	0.01	0.01	0.14	363

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—
2025	—	4,339	4,339	0.19	0.30	4.61	4,437
2026	—	3,267	3,267	0.13	0.07	3.01	3,295
Daily - Winter (Max)	—	—	—	—	—	—	—
2025	—	4,437	4,437	0.19	0.30	0.12	4,468
2026	—	4,417	4,417	0.18	0.09	0.09	4,448

Average Daily	—	—	—	—	—	—	—
2025	—	1,143	1,143	0.05	0.05	0.42	1,158
2026	—	2,174	2,174	0.09	0.05	0.84	2,192
Annual	—	—	—	—	—	—	—
2025	—	189	189	0.01	0.01	0.07	192
2026	—	360	360	0.01	0.01	0.14	363

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Unmit.	33.1	3,408	3,442	3.50	0.13	9.91	3,577
Daily, Winter (Max)	—	—	—	—	—	—	—
Unmit.	33.1	3,278	3,311	3.51	0.13	1.19	3,440
Average Daily (Max)	—	—	—	—	—	—	—
Unmit.	33.1	3,013	3,046	3.49	0.12	4.41	3,174
Annual (Max)	—	—	—	—	—	—	—
Unmit.	5.48	499	504	0.58	0.02	0.73	525

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Mobile	—	2,924	2,924	0.14	0.11	8.95	2,971
Area	0.00	9.40	9.40	< 0.005	< 0.005	—	9.44
Energy	—	445	445	0.04	< 0.005	—	447
Water	4.43	17.4	21.9	0.46	0.01	—	36.5
Waste	28.7	0.00	28.7	2.87	0.00	—	100

Refrig.	—	—	—	—	—	0.96	0.96
Vegetation	—	12.0	12.0	—	—	—	12.0
Total	33.1	3,408	3,442	3.50	0.13	9.91	3,577
Daily, Winter (Max)	—	—	—	—	—	—	—
Mobile	—	2,803	2,803	0.14	0.12	0.23	2,842
Area	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	—	445	445	0.04	< 0.005	—	447
Water	4.43	17.4	21.9	0.46	0.01	—	36.5
Waste	28.7	0.00	28.7	2.87	0.00	—	100
Refrig.	—	—	—	—	—	0.96	0.96
Vegetation	—	12.0	12.0	—	—	—	12.0
Total	33.1	3,278	3,311	3.51	0.13	1.19	3,440
Average Daily	—	—	—	—	—	—	—
Mobile	—	2,532	2,532	0.13	0.11	3.45	2,570
Area	0.00	6.44	6.44	< 0.005	< 0.005	—	6.46
Energy	—	445	445	0.04	< 0.005	—	447
Water	4.43	17.4	21.9	0.46	0.01	—	36.5
Waste	28.7	0.00	28.7	2.87	0.00	—	100
Refrig.	—	—	—	—	—	0.96	0.96
Vegetation	—	12.0	12.0	—	—	—	12.0
Total	33.1	3,013	3,046	3.49	0.12	4.41	3,174
Annual	—	—	—	—	—	—	—
Mobile	—	419	419	0.02	0.02	0.57	426
Area	0.00	1.07	1.07	< 0.005	< 0.005	—	1.07
Energy	—	73.7	73.7	0.01	< 0.005	—	74.1
Water	0.73	2.89	3.62	0.08	< 0.005	—	6.05
Waste	4.75	0.00	4.75	0.47	0.00	—	16.6
Refrig.	—	—	—	—	—	0.16	0.16

Vegetation	—	1.99	1.99	—	—	—	1.99
Total	5.48	499	504	0.58	0.02	0.73	525

3. Construction Emissions Details

3.1. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,717	2,717	0.11	0.02	—	2,726
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	156	156	0.01	< 0.005	—	157
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	25.9	25.9	< 0.005	< 0.005	—	26.0
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Worker	—	104	104	< 0.005	< 0.005	0.38	105
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—
Worker	—	5.74	5.74	< 0.005	< 0.005	0.01	5.82
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	0.95	0.95	< 0.005	< 0.005	< 0.005	0.96
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,455	2,455	0.10	0.02	—	2,463
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,455	2,455	0.10	0.02	—	2,463
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	303	303	0.01	< 0.005	—	304
Dust From Material Movement	—	—	—	—	—	—	—

Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	50.1	50.1	< 0.005	< 0.005	—	50.3
Dust From Material Movement	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Worker	—	138	138	0.01	< 0.005	0.51	140
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	1,746	1,746	0.09	0.27	4.10	1,833
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	131	131	0.01	< 0.005	0.01	133
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	1,746	1,746	0.09	0.27	0.11	1,830
Average Daily	—	—	—	—	—	—	—
Worker	—	16.4	16.4	< 0.005	< 0.005	0.03	16.6
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	215	215	0.01	0.03	0.22	226
Annual	—	—	—	—	—	—	—
Worker	—	2.71	2.71	< 0.005	< 0.005	< 0.005	2.75
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	35.6	35.6	< 0.005	0.01	0.04	37.4

3.5. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,201	2,201	0.09	0.02	—	2,209
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	263	263	0.01	< 0.005	—	264
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	43.5	43.5	< 0.005	< 0.005	—	43.7
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	585	585	0.03	0.02	0.06	592
Vendor	—	210	210	0.01	0.03	0.01	219
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	70.9	70.9	< 0.005	< 0.005	0.12	71.8
Vendor	—	25.1	25.1	< 0.005	< 0.005	0.03	26.2
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	11.7	11.7	< 0.005	< 0.005	0.02	11.9
Vendor	—	4.16	4.16	< 0.005	< 0.005	< 0.005	4.34
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,201	2,201	0.09	0.02	—	2,208
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	2,201	2,201	0.09	0.02	—	2,208
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	1,439	1,439	0.06	0.01	—	1,444
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	238	238	0.01	< 0.005	—	239
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Worker	—	605	605	0.03	0.02	2.05	614
Vendor	—	207	207	0.01	0.03	0.56	216
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	573	573	0.03	0.02	0.05	580
Vendor	—	207	207	0.01	0.03	0.01	216
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	380	380	0.02	0.01	0.58	385
Vendor	—	135	135	0.01	0.02	0.16	141
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	63.0	63.0	< 0.005	< 0.005	0.10	63.8

Vendor	—	22.4	22.4	< 0.005	< 0.005	0.03	23.4
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	1,244	1,244	0.05	0.01	—	1,248
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	75.5	75.5	< 0.005	< 0.005	—	75.7
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	12.5	12.5	< 0.005	< 0.005	—	12.5
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	197	197	0.01	0.01	0.02	199
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	12.1	12.1	< 0.005	< 0.005	0.02	12.3

Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	2.00	2.00	< 0.005	< 0.005	< 0.005	2.03
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	1,244	1,244	0.05	0.01	—	1,248
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	75.4	75.4	< 0.005	< 0.005	—	75.7
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	12.5	12.5	< 0.005	< 0.005	—	12.5
Paving	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	193	193	0.01	0.01	0.02	195

Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	11.9	11.9	< 0.005	< 0.005	0.02	12.0
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	1.96	1.96	< 0.005	< 0.005	< 0.005	1.99
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	63.6	63.6	< 0.005	< 0.005	—	63.9
Architectural Coatings	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—

Off-Road Equipment	—	10.5	10.5	< 0.005	< 0.005	—	10.6
Architectural Coatings	—	—	—	—	—	—	—
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Worker	—	121	121	0.01	< 0.005	0.41	123
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	115	115	0.01	< 0.005	0.01	116
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	55.5	55.5	< 0.005	< 0.005	0.08	56.2
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	9.18	9.18	< 0.005	< 0.005	0.01	9.31
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Trenching (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Off-Road Equipment	—	207	207	0.01	< 0.005	—	208

Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Off-Road Equipment	—	11.9	11.9	< 0.005	< 0.005	—	12.0
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Off-Road Equipment	—	1.98	1.98	< 0.005	< 0.005	—	1.98
Onsite truck	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Worker	—	32.1	32.1	< 0.005	< 0.005	< 0.005	32.5
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—
Worker	—	1.87	1.87	< 0.005	< 0.005	< 0.005	1.90
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—
Worker	—	0.31	0.31	< 0.005	< 0.005	< 0.005	0.31
Vendor	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	2,924	2,924	0.14	0.11	8.95	2,971
Parking Lot	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	2,924	2,924	0.14	0.11	8.95	2,971
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	2,803	2,803	0.14	0.12	0.23	2,842
Parking Lot	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	2,803	2,803	0.14	0.12	0.23	2,842
Annual	—	—	—	—	—	—	—
Apartments Mid Rise	—	419	419	0.02	0.02	0.57	426
Parking Lot	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	419	419	0.02	0.02	0.57	426

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	216	216	0.02	< 0.005	—	217
Parking Lot	—	9.12	9.12	< 0.005	< 0.005	—	9.17
Total	—	225	225	0.02	< 0.005	—	226
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	216	216	0.02	< 0.005	—	217
Parking Lot	—	9.12	9.12	< 0.005	< 0.005	—	9.17
Total	—	225	225	0.02	< 0.005	—	226
Annual	—	—	—	—	—	—	—

Apartments Mid Rise	—	35.7	35.7	< 0.005	< 0.005	—	35.9
Parking Lot	—	1.51	1.51	< 0.005	< 0.005	—	1.52
Total	—	37.2	37.2	< 0.005	< 0.005	—	37.4

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	221	221	0.02	< 0.005	—	221
Parking Lot	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	221	221	0.02	< 0.005	—	221
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	221	221	0.02	< 0.005	—	221
Parking Lot	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	221	221	0.02	< 0.005	—	221
Annual	—	—	—	—	—	—	—
Apartments Mid Rise	—	36.5	36.5	< 0.005	< 0.005	—	36.6
Parking Lot	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	36.5	36.5	< 0.005	< 0.005	—	36.6

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	—	—	—	—	—	—	—

Architectural Coatings	—	—	—	—	—	—	—
Landscape Equipment	—	9.40	9.40	< 0.005	< 0.005	—	9.44
Total	0.00	9.40	9.40	< 0.005	< 0.005	—	9.44
Daily, Winter (Max)	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	—	—	—	—	—	—	—
Architectural Coatings	—	—	—	—	—	—	—
Total	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	—	—	—	—	—	—	—
Architectural Coatings	—	—	—	—	—	—	—
Landscape Equipment	—	1.07	1.07	< 0.005	< 0.005	—	1.07
Total	0.00	1.07	1.07	< 0.005	< 0.005	—	1.07

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	4.43	17.4	21.8	0.46	0.01	—	36.5
Parking Lot	0.00	0.02	0.02	< 0.005	< 0.005	—	0.02
Total	4.43	17.4	21.9	0.46	0.01	—	36.5
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	4.43	17.4	21.8	0.46	0.01	—	36.5
Parking Lot	0.00	0.02	0.02	< 0.005	< 0.005	—	0.02
Total	4.43	17.4	21.9	0.46	0.01	—	36.5

Annual	—	—	—	—	—	—	—
Apartments Mid Rise	0.73	2.88	3.62	0.08	< 0.005	—	6.04
Parking Lot	0.00	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005
Total	0.73	2.89	3.62	0.08	< 0.005	—	6.05

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	28.7	0.00	28.7	2.87	0.00	—	100
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	28.7	0.00	28.7	2.87	0.00	—	100
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	28.7	0.00	28.7	2.87	0.00	—	100
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	28.7	0.00	28.7	2.87	0.00	—	100
Annual	—	—	—	—	—	—	—
Apartments Mid Rise	4.75	0.00	4.75	0.47	0.00	—	16.6
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	4.75	0.00	4.75	0.47	0.00	—	16.6

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	—	—	—	—	0.96	0.96
Total	—	—	—	—	—	0.96	0.96
Daily, Winter (Max)	—	—	—	—	—	—	—
Apartments Mid Rise	—	—	—	—	—	0.96	0.96
Total	—	—	—	—	—	0.96	0.96
Annual	—	—	—	—	—	—	—
Apartments Mid Rise	—	—	—	—	—	0.16	0.16
Total	—	—	—	—	—	0.16	0.16

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	6.01	6.01	—	—	—	6.01
Pinus canariensis	—	0.73	0.73	—	—	—	0.73
Afrocarpus	—	0.24	0.24	—	—	—	0.24
Washingtonia robusta)	—	0.20	0.20	—	—	—	0.20
Olea europaea ssp. europea	—	-0.18	-0.18	—	—	—	-0.18
Pistacia chinensis	—	-0.01	-0.01	—	—	—	-0.01
Platanus	—	0.03	0.03	—	—	—	0.03
Ulmus parvifolia	—	-0.03	-0.03	—	—	—	-0.03
Filicium decipiens	—	-0.17	-0.17	—	—	—	-0.17
Arbutus unedo	—	0.41	0.41	—	—	—	0.41

Magnolia	—	0.06	0.06	—	—	—	0.06
Rudgea nobilis	—	-0.07	-0.07	—	—	—	-0.07
Subtotal	—	7.22	7.22	—	—	—	7.22
Sequestered	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	8.47	8.47	—	—	—	8.47
Pinus canariensis	—	1.81	1.81	—	—	—	1.81
Afrocarpus	—	0.69	0.69	—	—	—	0.69
Washingtonia robusta)	—	0.51	0.51	—	—	—	0.51
Olea europaea ssp. europea	—	-0.28	-0.28	—	—	—	-0.28
Pistacia chinensis	—	-0.59	-0.59	—	—	—	-0.59
Platanus	—	-0.36	-0.36	—	—	—	-0.36
Ulmus parvifolia	—	-2.65	-2.65	—	—	—	-2.65
Filicium decipiens	—	-1.27	-1.27	—	—	—	-1.27
Arbutus unedo	—	-0.44	-0.44	—	—	—	-0.44
Magnolia	—	-0.60	-0.60	—	—	—	-0.60
Rudgea nobilis	—	-0.48	-0.48	—	—	—	-0.48
Subtotal	—	4.81	4.81	—	—	—	4.81
Removed	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	—	—	—	—	—	—
Pinus canariensis	—	—	—	—	—	—	—
Afrocarpus	—	—	—	—	—	—	—
Washingtonia robusta)	—	—	—	—	—	—	—
Olea europaea ssp. europea	—	—	—	—	—	—	—
Pistacia chinensis	—	—	—	—	—	—	—
Platanus	—	—	—	—	—	—	—
Ulmus parvifolia	—	—	—	—	—	—	—

Filicium decipiens	—	—	—	—	—	—	—
Arbutus unedo	—	—	—	—	—	—	—
Magnolia	—	—	—	—	—	—	—
Rudgea nobilis	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Total	—	12.0	12.0	—	—	—	12.0
Daily, Winter (Max)	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	6.01	6.01	—	—	—	6.01
Pinus canariensis	—	0.73	0.73	—	—	—	0.73
Afrocarpus	—	0.24	0.24	—	—	—	0.24
Washingtonia robusta)	—	0.20	0.20	—	—	—	0.20
Olea europaea ssp. europea	—	-0.18	-0.18	—	—	—	-0.18
Pistacia chinensis	—	-0.01	-0.01	—	—	—	-0.01
Platanus	—	0.03	0.03	—	—	—	0.03
Ulmus parvifolia	—	-0.03	-0.03	—	—	—	-0.03
Filicium decipiens	—	-0.17	-0.17	—	—	—	-0.17
Arbutus unedo	—	0.41	0.41	—	—	—	0.41
Magnolia	—	0.06	0.06	—	—	—	0.06
Rudgea nobilis	—	-0.07	-0.07	—	—	—	-0.07
Subtotal	—	7.22	7.22	—	—	—	7.22
Sequestered	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	8.47	8.47	—	—	—	8.47
Pinus canariensis	—	1.81	1.81	—	—	—	1.81
Afrocarpus	—	0.69	0.69	—	—	—	0.69

Washingtonia robusta)	—	0.51	0.51	—	—	—	0.51
Olea europaea ssp. europea	—	-0.28	-0.28	—	—	—	-0.28
Pistacia chinensis	—	-0.59	-0.59	—	—	—	-0.59
Platanus	—	-0.36	-0.36	—	—	—	-0.36
Ulmus parvifolia	—	-2.65	-2.65	—	—	—	-2.65
Filicium decipiens	—	-1.27	-1.27	—	—	—	-1.27
Arbutus unedo	—	-0.44	-0.44	—	—	—	-0.44
Magnolia	—	-0.60	-0.60	—	—	—	-0.60
Rudgea nobilis	—	-0.48	-0.48	—	—	—	-0.48
Subtotal	—	4.81	4.81	—	—	—	4.81
Removed	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	—	—	—	—	—	—
Pinus canariensis	—	—	—	—	—	—	—
Afrocarpus	—	—	—	—	—	—	—
Washingtonia robusta)	—	—	—	—	—	—	—
Olea europaea ssp. europea	—	—	—	—	—	—	—
Pistacia chinensis	—	—	—	—	—	—	—
Platanus	—	—	—	—	—	—	—
Ulmus parvifolia	—	—	—	—	—	—	—
Filicium decipiens	—	—	—	—	—	—	—
Arbutus unedo	—	—	—	—	—	—	—
Magnolia	—	—	—	—	—	—	—
Rudgea nobilis	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Total	—	12.0	12.0	—	—	—	12.0

Annual	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	0.99	0.99	—	—	—	0.99
Pinus canariensis	—	0.12	0.12	—	—	—	0.12
Afrocarpus	—	0.04	0.04	—	—	—	0.04
Washingtonia robusta)	—	0.03	0.03	—	—	—	0.03
Olea europaea ssp. europea	—	-0.03	-0.03	—	—	—	-0.03
Pistacia chinensis	—	> -0.005	> -0.005	—	—	—	> -0.005
Platanus	—	0.01	0.01	—	—	—	0.01
Ulmus parvifolia	—	> -0.005	> -0.005	—	—	—	> -0.005
Filicium decipiens	—	-0.03	-0.03	—	—	—	-0.03
Arbutus unedo	—	0.07	0.07	—	—	—	0.07
Magnolia	—	0.01	0.01	—	—	—	0.01
Rudgea nobilis	—	-0.01	-0.01	—	—	—	-0.01
Subtotal	—	1.20	1.20	—	—	—	1.20
Sequestered	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	1.40	1.40	—	—	—	1.40
Pinus canariensis	—	0.30	0.30	—	—	—	0.30
Afrocarpus	—	0.11	0.11	—	—	—	0.11
Washingtonia robusta)	—	0.08	0.08	—	—	—	0.08
Olea europaea ssp. europea	—	-0.05	-0.05	—	—	—	-0.05
Pistacia chinensis	—	-0.10	-0.10	—	—	—	-0.10
Platanus	—	-0.06	-0.06	—	—	—	-0.06
Ulmus parvifolia	—	-0.44	-0.44	—	—	—	-0.44
Filicium decipiens	—	-0.21	-0.21	—	—	—	-0.21
Arbutus unedo	—	-0.07	-0.07	—	—	—	-0.07

Magnolia	—	-0.10	-0.10	—	—	—	-0.10
Rudgea nobilis	—	-0.08	-0.08	—	—	—	-0.08
Subtotal	—	0.80	0.80	—	—	—	0.80
Removed	—	—	—	—	—	—	—
Cupaniopsis anacardioides	—	—	—	—	—	—	—
Pinus canariensis	—	—	—	—	—	—	—
Afrocarpus	—	—	—	—	—	—	—
Washingtonia robusta)	—	—	—	—	—	—	—
Olea europaea ssp. europea	—	—	—	—	—	—	—
Pistacia chinensis	—	—	—	—	—	—	—
Platanus	—	—	—	—	—	—	—
Ulmus parvifolia	—	—	—	—	—	—	—
Filicium decipiens	—	—	—	—	—	—	—
Arbutus unedo	—	—	—	—	—	—	—
Magnolia	—	—	—	—	—	—	—
Rudgea nobilis	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Total	—	1.99	1.99	—	—	—	1.99

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	8/1/2025	8/31/2025	5.00	21.0	—
Grading	Grading	9/1/2025	10/31/2025	5.00	45.0	—
Building Construction	Building Construction	11/1/2025	11/30/2026	5.00	281	—

Paving	Paving	12/1/2025	1/31/2026	5.00	45.0	—
Architectural Coating	Architectural Coating	4/1/2026	11/30/2026	5.00	174	—
Trenching	Trenching	11/1/2026	11/30/2026	5.00	21.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Average	1.00	8.00	423	0.48
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	8.00	367	0.29
Building Construction	Forklifts	Diesel	Average	2.00	7.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Average	3.00	8.00	46.0	0.45
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	8.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

Trenching	Trenchers	Diesel	Average	1.00	8.00	40.0	0.50

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	7.50	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	10.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	12.8	40.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	44.6	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	6.63	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	8.93	18.5	LDA,LDT1,LDT2

Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
Trenching	—	—	—	—
Trenching	Worker	2.50	18.5	LDA,LDT1,LDT2
Trenching	Vendor	—	10.2	HHDT,MHDT
Trenching	Hauling	0.00	20.0	HHDT
Trenching	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	271,747	90,582	0.00	0.00	659

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	0.00	31.5	0.00	—
Grading	4,590	—	45.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.25

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Apartments Mid Rise	—	0%
Parking Lot	0.25	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	349	0.03	< 0.005
2026	0.00	346	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Apartments Mid Rise	446	304	254	145,479	3,780	2,578	2,147	1,231,999
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)

Apartments Mid Rise	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	62
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
271746.89999999997	90,582	0.00	0.00	659

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Apartments Mid Rise	227,282	346	0.0330	0.0040	688,624
Parking Lot	9,616	346	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Apartments Mid Rise	2,310,976	494,574
Parking Lot	0.00	3,057

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Apartments Mid Rise	53.2	—
Parking Lot	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Apartments Mid Rise	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Apartments Mid Rise	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

Olea europaea ssp. europea	1.00	2,270	11.0
Pistacia chinensis	1.00	1,957	-9.00
Platanus	1.00	2,372	-16.0
Ulmus parvifolia	1.00	1,933	-14.0
Filicium decipiens	1.00	2,060	10.0
Ulmus parvifolia	1.00	2,876	-8.00
Arbutus unedo	1.00	360	-54.0
Magnolia	1.00	1,293	-14.0
Rudgea nobilis	1.00	940	3.00
Arbutus unedo	1.00	2,675	-13.0
Cupaniopsis anacardioides	-6.00	12,986	64.0
Pinus canariensis	-1.00	2,923	15.0
Afrocarpus	-1.00	2,923	15.0
Pinus canariensis	-1.00	2,923	15.0
Cupaniopsis anacardioides	-1.00	2,857	14.0
Cupaniopsis anacardioides	-1.00	2,923	15.0
Cupaniopsis anacardioides	-5.00	12,388	62.0
Cupaniopsis anacardioides	-1.00	2,668	13.0
Cupaniopsis anacardioides	-1.00	2,923	15.0
Washingtonia robusta)	-1.00	823	3.00
Pinus canariensis	-1.00	2,923	15.0
Cupaniopsis anacardioides	-3.00	8,197	42.0
Cupaniopsis anacardioides	-3.00	8,770	45.0
Washingtonia robusta)	-1.00	934	3.00
Washingtonia robusta)	-1.00	1,026	4.00
Cupaniopsis anacardioides	-1.00	2,923	15.0
Cupaniopsis anacardioides	-1.00	1,673	8.00
Cupaniopsis anacardioides	-1.00	2,792	14.0

Cupaniopsis anacardioides	-1.00	2,792	14.0
Cupaniopsis anacardioides	-1.00	2,002	10.0
Cupaniopsis anacardioides	-1.00	2,368	12.0
Cupaniopsis anacardioides	-1.00	2,544	12.0
Cupaniopsis anacardioides	-1.00	2,537	12.0

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	5.08	annual days of extreme heat
Extreme Precipitation	4.20	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A

Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	22.2
AQ-PM	82.0
AQ-DPM	57.6
Drinking Water	29.4
Lead Risk Housing	47.8
Pesticides	0.00
Toxic Releases	98.7
Traffic	92.7
Effect Indicators	—
CleanUp Sites	96.4
Groundwater	95.4
Haz Waste Facilities/Generators	97.1
Impaired Water Bodies	93.4
Solid Waste	59.4
Sensitive Population	—
Asthma	57.0
Cardio-vascular	52.3
Low Birth Weights	61.0
Socioeconomic Factor Indicators	—
Education	57.5
Housing	16.9
Linguistic	47.7

Poverty	34.9
Unemployment	77.8

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	68.72834595
Employed	38.86821506
Median HI	73.48902862
Education	—
Bachelor's or higher	54.65161042
High school enrollment	100
Preschool enrollment	69.40844347
Transportation	—
Auto Access	53.75336841
Active commuting	16.07853202
Social	—
2-parent households	26.98575645
Voting	48.32542025
Neighborhood	—
Alcohol availability	24.57333504
Park access	47.69665084
Retail density	92.83972796
Supermarket access	19.2865392
Tree canopy	32.9013217
Housing	—
Homeownership	73.93814962

Housing habitability	67.17567047
Low-inc homeowner severe housing cost burden	55.89631721
Low-inc renter severe housing cost burden	50.51969716
Uncrowded housing	36.46862569
Health Outcomes	—
Insured adults	53.31707943
Arthritis	51.7
Asthma ER Admissions	31.1
High Blood Pressure	28.2
Cancer (excluding skin)	42.8
Asthma	83.3
Coronary Heart Disease	54.4
Chronic Obstructive Pulmonary Disease	74.0
Diagnosed Diabetes	25.3
Life Expectancy at Birth	25.7
Cognitively Disabled	20.1
Physically Disabled	28.8
Heart Attack ER Admissions	33.0
Mental Health Not Good	71.0
Chronic Kidney Disease	45.1
Obesity	64.2
Pedestrian Injuries	72.7
Physical Health Not Good	57.2
Stroke	39.4
Health Risk Behaviors	—
Binge Drinking	87.8
Current Smoker	70.9
No Leisure Time for Physical Activity	49.0

Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	73.7
Elderly	30.4
English Speaking	48.2
Foreign-born	66.2
Outdoor Workers	39.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	17.2
Traffic Density	90.8
Traffic Access	23.0
Other Indices	—
Hardship	56.1
Other Decision Support	—
2016 Voting	17.9

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	79.0
Healthy Places Index Score for Project Location (b)	57.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	Wilmington Long Beach Carson

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Population forecast based on 2045 forecast of 3.43 persons per dwelling unit, per Southern California Association of Governments, 2020-2045 Regional Transportation Plan, Demographics and Growth Forecast Technical Report; September 3, 2020.
Construction: Construction Phases	—
Construction: Off-Road Equipment	b
Construction: Trips and VMT	Assumes 14 cy haul truck capacity
Operations: Vehicle Data	Daily weekday rate per ITE Trip Generation manual 11th edition (ITE Land Use Code 215)
Operations: Hearths	—

DOUGLAS KIM + ASSOCIATES, LLC

TREE SEQUESTRATION CALCULATIONS

Project Report - i-Tree Planting Calculator

Location: Carson, California 90745
Total number of trees planted in this project: 36
Electricity Emissions Factor: 252.40 kilograms CO2 equivalent/MWh
Fuel Emissions Factor: 52.00 kilograms CO2 equivalent/MMBtu
Lifetime: 40 years
Annual Tree Mortality: 3%

All amounts in the tables are for the full lifetime of the project.

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
1	• 6 Carrotwood(Cupaniopsis anacardioides) trees of 3 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	6	18.5	65.3	1.8	3.4	1,017.0	3.8
2	• 1 Canary island pine(Pinus canariensis) tree of 18.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	39.9	83.0	0.30	2.6	525.8	1.8
3	• 1 Afrocarpus spp(Afrocarpus) tree of 11.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	41.1	77.3	0.30	2.8	452.9	1.7
4	• 1 Canary island pine(Pinus canariensis) tree of 16 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	37.4	83.0	0.30	2.3	493.8	1.6

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
5	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 10.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	65.7	0.30	0.58	257.3	0.6
6	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	65.7	0.30	0.58	271.6	0.7
7	• 5 Carrotwood(Cupaniopsis anacardioides) trees of 6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	5	18.6	65.5	1.5	2.9	1,043.1	3.2
8	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	65.6	0.30	0.58	237.0	0.6

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
9	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.8	65.8	0.30	0.59	294.5	0.7
10	• 1 Mexican fan palm(Washingtonia robusta) tree of 13.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	48.0	47.6	0.30	3.8	910.3	0.4
11	• 1 Canary island pine(Pinus canariensis) tree of 14.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	36.3	83.0	0.30	2.2	480.7	1.5
12	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 9.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	18.7	65.6	0.91	1.7	743.4	1.9

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
13	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 14 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	18.8	65.8	0.91	1.8	880.4	2.0
14	• 1 Mexican fan palm(Washingtonia robusta) tree of 18.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	49.7	49.1	0.30	4.1	962.2	0.4
15	• 1 Mexican fan palm(Washingtonia robusta) tree of 20.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	50.4	49.7	0.30	4.2	983.7	0.4
16	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.8	65.8	0.30	0.59	294.5	0.7

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
17	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	16.8	61.8	0.30	0.47	221.1	0.5
18	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	65.6	0.30	0.58	248.9	0.6
19	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	65.6	0.30	0.58	248.9	0.6
20	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 12.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	17.6	63.4	0.30	0.51	263.8	0.6

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
21	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in poor condition and planted in full sun.	1	18.4	65.0	0.30	0.56	268.9	0.6
22	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 7.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.6	65.5	0.30	0.58	221.4	0.6
23	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 6.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.6	65.5	0.30	0.58	214.5	0.6
Total		36			**11**	**38.7**	**11,535.7**	**26.2**

Location			CO_2 (Carbon Dioxide) Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	CO_2 (Carbon Dioxide) Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
1	• 6 Carrotwood(Cupaniopsis anacardioides) trees of 3 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	6	15,283.4	$355.44	28,605.9	$665.29
2	• 1 Canary island pine(Pinus canariensis) tree of 18.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	9,657.1	$224.59
3	• 1 Afrocarpus spp(Afrocarpus) tree of 11.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,533.4	$82.18	10,135.2	$235.71
4	• 1 Canary island pine(Pinus canariensis) tree of 16 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	8,621.0	$200.50
5	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 10.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,449.9	$80.23	4,438.6	$103.23
6	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	4,016.5	$93.41
7	• 5 Carrotwood(Cupaniopsis anacardioides) trees of 6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	5	14,674.4	$341.28	24,780.8	$576.32
8	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,201.7	$74.46	4,797.8	$111.58
9	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	3,036.2	$70.61
10	• 1 Mexican fan palm(Washingtonia robusta) tree of 13.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	881.9	$20.51	2,336.4	$54.34
11	• 1 Canary island pine(Pinus canariensis) tree of 14.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	8,189.6	$190.46
12	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 9.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	9,868.5	$229.51	13,911.2	$323.53

Location			CO_2 (Carbon Dioxide) Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	CO_2 (Carbon Dioxide) Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
13	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 14 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	10,603.4	$246.60	9,255.2	$215.25
14	• 1 Mexican fan palm(Washingtonia robusta) tree of 18.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	997.6	$23.20	2,501.0	$58.17
15	• 1 Mexican fan palm(Washingtonia robusta) tree of 20.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	1,107.0	$25.74	2,553.0	$59.38
16	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,534.5	$82.20	3,036.2	$70.61
17	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	1,993.6	$46.36	2,811.6	$65.39
18	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,365.1	$78.26	4,618.2	$107.41
19	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,365.1	$78.26	4,618.2	$107.41
20	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 12.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	2,421.1	$56.31	2,515.4	$58.50
21	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in poor condition and planted in full sun.	1	2,862.9	$66.58	3,371.8	$78.42
22	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 7.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,032.7	$70.53	4,927.0	$114.59
23	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 6.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	3,016.0	$70.14	4,951.4	$115.16
Total		36	**104,864.5**	**$2,438.83**	**167,685.4**	**$3,899.85**

Location			Energy Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh) (Kilowatt-Hours)	Electricity Saved ($)	Fuel Saved (MMBtu) (Millions of British Thermal Units)	Fuel Saved ($)
1	• 6 Carrotwood(Cupaniopsis anacardioides) trees of 3 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	6	12,986.1	$2,658.25	64.1	$830.07
2	• 1 Canary island pine(Pinus canariensis) tree of 18.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45
3	• 1 Afrocarpus spp(Afrocarpus) tree of 11.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.1	$598.35	15.3	$197.37
4	• 1 Canary island pine(Pinus canariensis) tree of 16 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45
5	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 10.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,857.7	$584.97	14.9	$192.44
6	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45
7	• 5 Carrotwood(Cupaniopsis anacardioides) trees of 6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	5	12,388.1	$2,535.85	62.0	$802.54
8	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,668.0	$546.15	13.7	$177.50

Location			Energy Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh) (Kilowatt-Hours)	Electricity Saved ($)	Fuel Saved (MMBtu) (Millions of British Thermal Units)	Fuel Saved ($)
9	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45
10	• 1 Mexican fan palm(Washingtonia robusta) tree of 13.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	823.9	$168.64	3.3	$42.77
11	• 1 Canary island pine(Pinus canariensis) tree of 14.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45
12	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 9.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	8,197.4	$1,678.01	42.4	$548.92
13	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 14 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	8,770.5	$1,795.33	45.8	$592.36
14	• 1 Mexican fan palm(Washingtonia robusta) tree of 18.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	934.0	$191.20	3.7	$48.23
15	• 1 Mexican fan palm(Washingtonia robusta) tree of 20.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	1,026.2	$210.07	4.2	$54.22
16	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,923.5	$598.44	15.3	$197.45

Location			Energy Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh) (Kilowatt-Hours)	Electricity Saved ($)	Fuel Saved (MMBtu) (Millions of British Thermal Units)	Fuel Saved ($)
17	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	1,673.6	$342.59	8.5	$109.68
18	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,792.8	$571.68	14.5	$187.35
19	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,792.8	$571.68	14.5	$187.35
20	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 12.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	2,002.6	$409.93	10.5	$135.26
21	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in poor condition and planted in full sun.	1	2,368.0	$484.74	12.4	$159.94
22	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 7.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,544.1	$520.79	12.9	$166.96
23	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 6.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,537.1	$519.34	12.8	$165.57
Total		36	**87,827.1**	**$17,978.21**	**446.9**	**$5,783.26**

Location			Hydrological Benefits				
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Runoff Avoided (gallons)	Runoff Avoided ($)
1	• 6 Carrotwood(Cupaniopsis anacardioides) trees of 3 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	6	48,454.8	48,454.7	262,321.6	18,216.3	$162.78
2	• 1 Canary island pine(Pinus canariensis) tree of 18.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	26,507.1	26,507.0	143,502.5	9,965.2	$89.05
3	• 1 Afrocarpus spp(Afrocarpus) tree of 11.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	20,187.6	20,187.5	109,290.1	7,589.4	$67.82
4	• 1 Canary island pine(Pinus canariensis) tree of 16 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	24,388.0	24,388.0	132,030.4	9,168.6	$81.93
5	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 10.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	16,156.0	16,155.9	87,464.2	6,073.8	$54.28
6	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	17,458.7	17,458.7	94,517.0	6,563.5	$58.65
7	• 5 Carrotwood(Cupaniopsis anacardioides) trees of 6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	5	57,968.3	57,968.1	313,824.9	21,792.9	$194.74
8	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	14,269.1	14,269.0	77,249.0	5,364.4	$47.94
9	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	19,480.7	19,480.6	105,463.2	7,323.7	$65.44
10	• 1 Mexican fan palm(Washingtonia robusta) tree of 13.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30,337.2	30,337.1	164,237.6	11,405.1	$101.92
11	• 1 Canary island pine(Pinus canariensis) tree of 14.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	23,603.3	23,603.2	127,782.0	8,873.5	$79.29
12	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 9.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	45,835.0	45,834.8	248,138.3	17,231.4	$153.98

Location			Hydrological Benefits				
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Runoff Avoided (gallons)	Runoff Avoided ($)
13	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 14 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	58,181.8	58,181.6	314,980.9	21,873.2	$195.46
14	• 1 Mexican fan palm(Washingtonia robusta) tree of 18.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	36,594.5	36,594.4	198,112.7	13,757.5	$122.94
15	• 1 Mexican fan palm(Washingtonia robusta) tree of 20.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	39,713.4	39,713.3	214,998.0	14,930.1	$133.42
16	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	19,480.7	19,480.6	105,463.2	7,323.7	$65.44
17	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	4,711.8	4,711.8	25,508.3	1,771.4	$15.83
18	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	15,378.0	15,377.9	83,252.4	5,781.3	$51.66
19	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	15,378.0	15,377.9	83,252.4	5,781.3	$51.66
20	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 12.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	6,153.7	6,153.6	33,314.3	2,313.4	$20.67
21	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in poor condition and planted in full sun.	1	10,525.6	10,525.6	56,983.1	3,957.1	$35.36
22	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 7.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	12,798.3	12,798.3	69,286.8	4,811.5	$43.00
23	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 6.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	12,147.9	12,147.9	65,765.4	4,566.9	$40.81
Total		36	**575,709.3**	**575,707.9**	**3,116,738.2**	**216,435.0**	**$1,934.06**

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
1	• 6 Carrotwood(Cupaniopsis anacardioides) trees of 3 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	6	64.36	1.10	15.99	3.87	1.13	6.85	4.28	0.69	$28.86	$414.10
2	• 1 Canary island pine(Pinus canariensis) tree of 18.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	32.90	0.25	8.03	0.89	0.58	1.55	0.96	0.31	$6.53	$203.62
3	• 1 Afrocarpus spp(Afrocarpus) tree of 11.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	25.20	0.25	6.16	0.89	0.45	1.55	0.96	0.24	$6.53	$156.24
4	• 1 Canary island pine(Pinus canariensis) tree of 16 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30.82	0.25	7.55	0.89	0.55	1.55	0.96	0.30	$6.53	$192.38

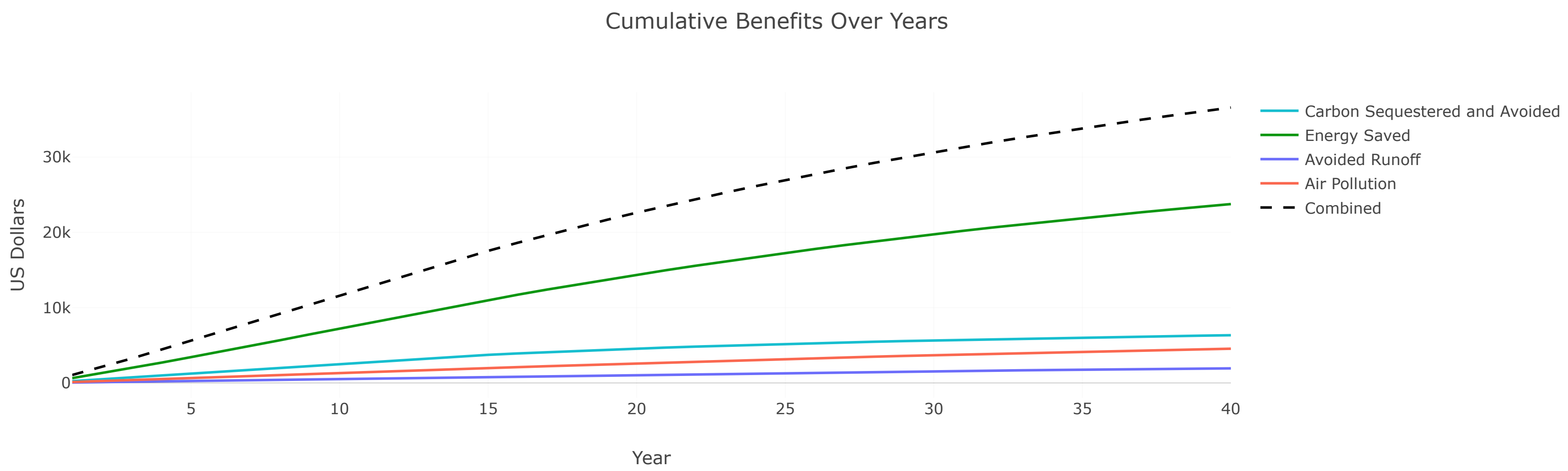
Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
5	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 10.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	20.33	0.25	4.97	0.87	0.36	1.51	0.94	0.19	$6.38	$126.44
6	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	21.67	0.25	5.28	0.89	0.38	1.55	0.96	0.20	$6.53	$133.86
7	• 5 Carrotwood(Cupaniopsis anacardioides) trees of 6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	5	75.47	1.06	18.64	3.71	1.33	6.54	4.09	0.77	$27.56	$478.54
8	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.25	0.23	4.49	0.81	0.32	1.41	0.88	0.18	$5.95	$114.51

Location			Air Benefits										
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
9	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	23.60	0.25	5.72	0.89	0.42	1.55	0.96	0.21	$6.53	$144.02
10	• 1 Mexican fan palm(Washingtonia robusta) tree of 13.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	29.03	0.06	6.61	0.22	0.53	0.43	0.27	0.17	$1.80	$160.74
11	• 1 Canary island pine(Pinus canariensis) tree of 14.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	29.98	0.25	7.36	0.89	0.53	1.55	0.96	0.29	$6.53	$187.58
12	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 9.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	58.14	0.71	14.26	2.50	1.03	4.34	2.71	0.56	$18.30	$363.16

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
13	• 3 Carrotwood(Cupaniopsis anacardioides) trees of 14 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	3	70.56	0.76	17.10	2.68	1.25	4.64	2.89	0.63	$19.60	$430.84
14	• 1 Mexican fan palm(Washingtonia robusta) tree of 18.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	35.10	0.07	8.00	0.25	0.64	0.49	0.31	0.20	$2.04	$194.46
15	• 1 Mexican fan palm(Washingtonia robusta) tree of 20.4 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	38.11	0.08	8.69	0.28	0.69	0.54	0.34	0.22	$2.24	$211.19
16	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 14.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	23.60	0.25	5.72	0.89	0.42	1.55	0.96	0.21	$6.53	$144.02

Location			Air Benefits										
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
17	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 8.8 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	11.62	0.14	2.62	0.50	0.21	0.88	0.55	0.06	$3.73	$63.36
18	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	19.49	0.24	4.78	0.85	0.34	1.48	0.92	0.19	$6.24	$121.68
19	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 9.6 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	19.49	0.24	4.78	0.85	0.34	1.48	0.92	0.19	$6.24	$121.68
20	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 12.2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in critical condition and planted in full sun.	1	14.91	0.17	3.34	0.61	0.27	1.06	0.66	0.08	$4.47	$80.76

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
21	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 11.9 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in poor condition and planted in full sun.	1	18.04	0.21	4.22	0.72	0.32	1.25	0.78	0.13	$5.29	$103.85
22	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 7.1 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	16.54	0.22	4.08	0.77	0.29	1.34	0.84	0.17	$5.67	$104.41
23	• 1 Carrotwood(Cupaniopsis anacardioides) tree of 6.5 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	15.76	0.22	3.89	0.76	0.28	1.34	0.84	0.16	$5.65	$99.75
Total		36	**712.98**	**7.54**	**172.27**	**26.54**	**12.69**	**46.40**	**28.97**	**6.34**	**$195.74**	**$4,351.20**



Mortality is modeled as a fractional (not whole) tree estimate and may not align year-over-year.
Sequestration does not account for net differences like decay.
Tree canopy cover estimate assumes no overlap between crowns.

Application v2.7.1, powered by engine v0.16.2 (APIv3) and database v12.0.77.

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Version 2.7.1

Project Report - i-Tree Planting Calculator

Location: Carson, California 90745
Total number of trees planted in this project: 15
Electricity Emissions Factor: 252.40 kilograms CO2 equivalent/MWh
Fuel Emissions Factor: 52.00 kilograms CO2 equivalent/MMBtu
Lifetime: 40 years
Annual Tree Mortality: 3%

All amounts in the tables are for the full lifetime of the project.

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
1	• 1 European Olive(Olea europaea ssp. europea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	68.5	0.30	0.58	118.4	0.5
2	• 1 Chinese pistache(Pistacia chinensis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30.6	60.5	0.30	1.6	429.5	1.5
3	• 1 Sycamore spp(Platanus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	32.7	81.8	0.30	1.8	577.0	0.9

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
4	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	41.3	95.1	0.30	2.8	707.3	3.4
5	• 1 Fern tree(Filicium decipiens) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	32.7	89.4	0.30	1.8	331.1	3.3
6	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	41.3	95.1	0.30	2.8	707.3	3.4

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
8	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	17.6	86.5	0.30	0.51	202.8	0.5
9	• 1 Magnolia spp(Magnolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30.6	54.4	0.30	1.6	587.5	1.5
10	• 1 Rudgea nobilis(Rudgea nobilis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.5	43.5	0.30	0.57	203.6	0.9

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
11	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	17.6	86.5	0.30	0.51	202.8	0.5
12	• 1 Wilga; australian willow(Geijera parviflora) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.7	23.8	0.30	0.58	140.1	0.7
13	• 1 Guava crape myrtle(Lagerstroemia calyculata) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	32.7	31.8	0.30	1.8	215.7	1.7

Location			Tree Growth					
Group Identifier	Tree Group Characteristics	Initial Number of Trees	DBH (The estimated DBH at the end of the projection) ()	Height (The estimated tree height at the end of the projection) ()	Surviving Trees (The number of trees that survive at the end of the projection based on the mortality rate. The models do estimate fractions of individual trees remaining after mortality for the most precise estimates of the benefits.)	Basal Area (The estimated combined basal area of surviving trees at the end of the projection.) ()	Canopy Cover (The estimated combined crown area of surviving trees at the end of the projection. This combined crown area estimate assumes no overlap between tree crowns and represents the maximum area that these trees could possibly cover.) ()	Biomass (The estimated combined biomass of surviving trees at the end of the projection.) (pounds)
14	• 1 African sumac(Searsia lancea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.5	43.1	0.30	0.57	201.7	0.5
15	• 1 Ttristania spp(Tristania) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30.6	69.8	0.30	1.6	264.6	2.9
16	• 1 Elaeocarpus spp(Elaeocarpus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	30.6	56.4	0.30	1.6	254.4	2.1
Total		15			**4.6**	**20.6**	**5,143.9**	**24.4**

Location			CO_2 (Carbon Dioxide) Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	CO_2 (Carbon Dioxide) Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
1	• 1 European Olive(Olea europaea ssp. europea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,691.6	$62.60	4,076.8	$94.81
2	• 1 Chinese pistache(Pistacia chinensis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	149.6	$3.48	8,623.2	$200.55
3	• 1 Sycamore spp(Platanus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-476.6	$-11.08	5,246.3	$122.01
4	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-428.0	$-9.95	19,314.0	$449.18
5	• 1 Fern tree(Filicium decipiens) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,433.8	$56.60	18,567.0	$431.81
6	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	829.8	$19.30	19,314.0	$449.18
8	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-5,999.1	$-139.52	3,245.2	$75.47
9	• 1 Magnolia spp(Magnolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-847.7	$-19.72	8,817.6	$205.07
10	• 1 Rudgea nobilis(Rudgea nobilis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	979.1	$22.77	7,004.5	$162.90
11	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	71.0	$1.65	3,245.2	$75.47
12	• 1 Wilga; australian willow(Geijera parviflora) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-3,607.3	$-83.90	5,433.1	$126.36
13	• 1 Guava crape myrtle(Lagerstroemia calyculata) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-695.3	$-16.17	9,635.9	$224.10

Location			CO_2 (Carbon Dioxide) Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	CO_2 (Carbon Dioxide) Avoided (pounds)	CO_2 Avoided ($)	CO_2 Sequestered (pounds)	CO_2 Sequestered ($)
14	• 1 African sumac(Searsia lancea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	967.9	$22.51	3,487.6	$81.11
15	• 1 Ttristania spp(Tristania) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-187.4	$-4.36	16,915.1	$393.39
16	• 1 Elaeocarpus spp(Elaeocarpus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-6,481.5	$-150.74	11,985.7	$278.75
Total		15	**-10,600.1**	**$-246.53**	**144,911.4**	**$3,370.20**

Location			Energy Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh) (Kilowatt-Hours)	Electricity Saved ($)	Fuel Saved (MMBtu) (Millions of British Thermal Units)	Fuel Saved ($)
1	• 1 European Olive(Olea europaea ssp. europea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,270.4	$464.76	11.4	$147.33
2	• 1 Chinese pistache(Pistacia chinensis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	1,957.5	$400.70	-9.1	$-118.03
3	• 1 Sycamore spp(Platanus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,372.2	$485.59	-16.8	$-217.28
4	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	1,933.9	$395.87	-14.0	$-181.59
5	• 1 Fern tree(Filicium decipiens) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,060.2	$421.73	10.3	$132.72
6	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,876.7	$588.87	-8.1	$-104.60
8	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	360.0	$73.70	-54.2	$-701.94
9	• 1 Magnolia spp(Magnolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	1,293.6	$264.81	-14.3	$-184.84
10	• 1 Rudgea nobilis(Rudgea nobilis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	940.1	$192.43	3.5	$45.73
11	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,675.6	$547.69	-13.6	$-176.39

Location			Energy Benefits			
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh) (Kilowatt-Hours)	Electricity Saved ($)	Fuel Saved (MMBtu) (Millions of British Thermal Units)	Fuel Saved ($)
12	• 1 Wilga; australian willow(Geijera parviflora) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-526.9	$-107.86	-28.7	$-370.85
13	• 1 Guava crape myrtle(Lagerstroemia calyculata) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	572.4	$117.16	-9.1	$-117.93
14	• 1 African sumac(Searsia lancea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	935.2	$191.44	3.5	$44.80
15	• 1 Ttristania spp(Tristania) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	2,534.2	$518.75	-15.1	$-195.81
16	• 1 Elaeocarpus spp(Elaeocarpus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	-301.2	$-61.66	-54.9	$-710.82
Total		15	**21,954.1**	**$4,494.00**	**-209.4**	**$-2,709.51**

Location			Hydrological Benefits				
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Runoff Avoided (gallons)	Runoff Avoided ($)
1	• 1 European Olive(Olea europaea ssp. europea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	5,962.7	5,962.7	32,280.6	2,241.7	$20.03
2	• 1 Chinese pistache(Pistacia chinensis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	11,207.8	11,207.7	60,675.9	4,213.5	$37.65
3	• 1 Sycamore spp(Platanus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	13,327.0	13,327.0	72,148.8	5,010.2	$44.77
4	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	16,464.2	16,464.2	89,132.8	6,189.6	$55.31
5	• 1 Fern tree(Filicium decipiens) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	8,777.6	8,777.5	47,519.4	3,299.9	$29.49
6	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	16,464.2	16,464.2	89,132.8	6,189.6	$55.31
8	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7,663.7	7,663.7	41,489.5	2,881.1	$25.75
9	• 1 Magnolia spp(Magnolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	14,201.3	14,201.3	76,882.1	5,338.9	$47.71
10	• 1 Rudgea nobilis(Rudgea nobilis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	8,462.3	8,462.3	45,812.6	3,181.4	$28.43
11	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7,663.7	7,663.7	41,489.5	2,881.1	$25.75
12	• 1 Wilga; australian willow(Geijera parviflora) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	6,665.3	6,665.3	36,084.1	2,505.8	$22.39
13	• 1 Guava crape myrtle(Lagerstroemia calyculata) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	5,806.2	5,806.2	31,433.1	2,182.8	$19.51

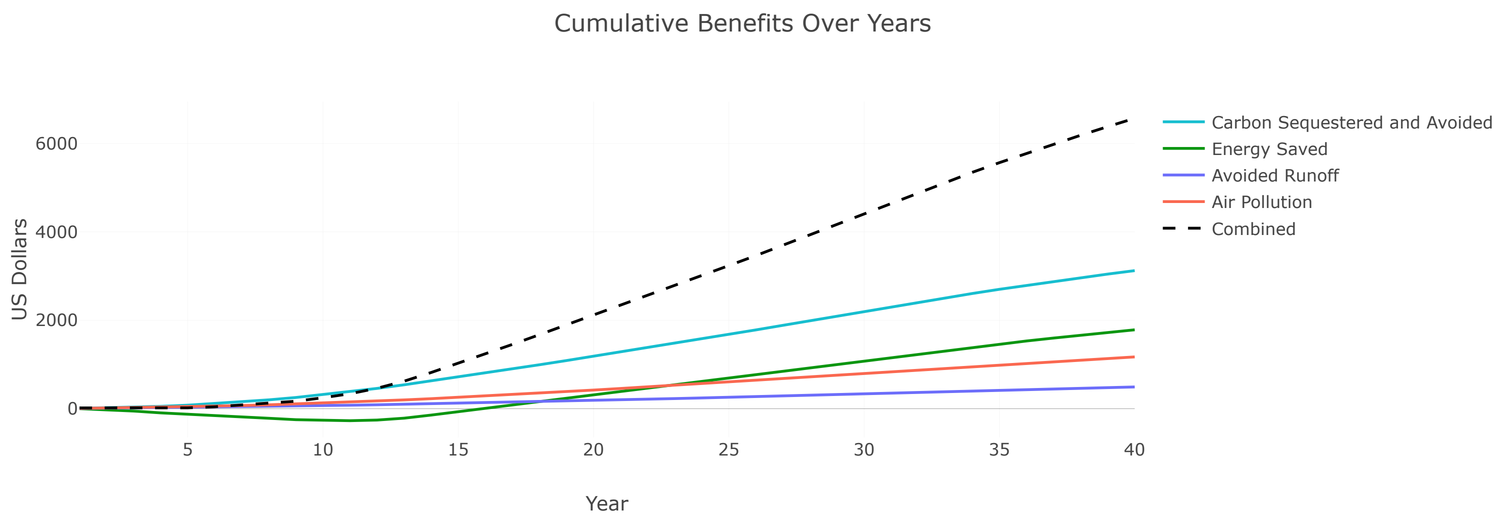
Location			Hydrological Benefits				
Group Identifier	Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Runoff Avoided (gallons)	Runoff Avoided ($)
14	• 1 African sumac(Searsia lancea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	8,350.2	8,350.1	45,205.5	3,139.2	$28.05
15	• 1 Ttristania spp(Tristania) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7,919.8	7,919.7	42,875.5	2,977.4	$26.61
16	• 1 Elaeocarpus spp(Elaeocarpus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7,373.9	7,373.9	39,920.4	2,772.2	$24.77
Total		15	**146,309.8**	**146,309.4**	**792,082.6**	**55,004.4**	**$491.52**

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
1	• 1 European Olive(Olea europaea ssp. europea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	9.19	0.19	2.38	0.68	0.16	1.20	0.75	0.13	$5.05	$65.38
2	• 1 Chinese pistache(Pistacia chinensis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	12.31	0.01	2.74	0.04	0.20	0.93	0.62	0.09	$3.52	$69.55
3	• 1 Sycamore spp(Platanus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.80	-0.03	4.46	-0.12	0.30	1.10	0.75	0.22	$4.01	$119.00
4	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.88	-0.03	4.25	-0.11	0.31	0.89	0.61	0.15	$3.25	$109.18

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
5	• 1 Fern tree(Filicium decipiens) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	13.31	0.18	3.42	0.62	0.23	1.09	0.68	0.18	$4.58	$92.89
6	• 1 Chinese elm(Ulmus parvifolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	18.88	0.06	4.25	0.21	0.31	1.40	0.92	0.15	$5.41	$109.18
8	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	8.87	-0.43	2.13	-1.52	0.16	-0.11	0.05	0.07	$-1.68	$53.20
9	• 1 Magnolia spp(Magnolia) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	16.71	-0.06	3.78	-0.21	0.27	0.57	0.40	0.14	$1.96	$97.04

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
10	• 1 Rudgea nobilis(Rudgea nobilis) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	10.75	0.07	2.64	0.25	0.19	0.49	0.31	0.11	$2.04	$67.54
11	• 1 Strawberry tree(Arbutus unedo) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	8.87	0.01	2.13	0.02	0.16	1.27	0.85	0.07	$4.76	$53.20
12	• 1 Wilga; australian willow(Geijera parviflora) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7.98	-0.26	1.93	-0.91	0.14	-0.42	-0.21	0.07	$-2.32	$48.61
13	• 1 Guava crape myrtle(Lagerstroemia calyculata) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and east (90°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	6.57	-0.05	1.47	-0.18	0.11	0.24	0.17	0.05	$0.74	$37.54

Location			Air Benefits									
Group Identifier	Tree Group Characteristics	Initial Number of Trees	O_3 (Ozone) Removed (pounds)	NO_2 (Nitrogen Dioxide) Avoided (pounds)	NO_2 (Nitrogen Dioxide) Removed (pounds)	SO_2 (Sulfur Dioxide) Avoided (pounds)	SO_2 (Sulfur Dioxide) Removed (pounds)	VOC (Volatile Organic Compound) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Avoided (pounds)	$PM_{2.5}$ (Particulate matter smaller than 2.5 micrometers in diameter) Removed (pounds)	Avoided Value (Values for avoided pollutants) ($)	Removal Value (Values for removed pollutants) ($)
14	• 1 African sumac(Searsia lancea) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	7.99	0.07	1.82	0.25	0.15	0.49	0.31	0.05	$2.03	$44.40
15	• 1 Ttristania spp(Tristania) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and west (270°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	12.42	-0.01	3.24	-0.05	0.21	1.19	0.80	0.19	$4.41	$90.72
16	• 1 Elaeocarpus spp(Elaeocarpus) tree of 2 inches initial DBH (Diameter at Breast Height). • Planted 0-19 feet and south (180°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	1	11.22	-0.47	2.89	-1.64	0.19	-0.45	-0.16	0.16	$-3.03	$79.14
Total		15	**182.76**	**-0.76**	**43.54**	**-2.68**	**3.08**	**9.87**	**6.85**	**1.83**	**$34.72**	**$1,136.56**



Mortality is modeled as a fractional (not whole) tree estimate and may not align year-over-year.
Sequestration does not account for net differences like decay.
Tree canopy cover estimate assumes no overlap between crowns.

Application v2.7.1, powered by engine v0.16.2 (APIv3) and database v12.0.77.

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