

10 Greenhouse Gas Emissions

10.1 Introduction

This chapter describes the existing setting of the proposed project site as it relates to greenhouse gas emissions; identifies associated regulatory conditions and requirements; presents the criteria used to evaluate potential impacts on greenhouse gas emissions; and identifies mitigation measures to reduce or avoid each significant impact. The significance of each impact after the incorporation of identified mitigation measures is included at the end of this chapter.

Information used to prepare this chapter came from the following sources:

- Project application and related materials
- Air quality data provided by the California Air Resources Board (CARB)
- Michael Baker International, Brentwood Golf Course Redevelopment Project – Air Quality/Greenhouse Gas Emissions Technical Memorandum (see Appendix B)
- California Environmental Quality Act (CEQA) Air Quality Guidelines
- Bay Area Air Quality Management District (BAAQMD), Clean Air Plan 2017
- City of Brentwood General Plan Update (General Plan), 2014
- City of Brentwood General Plan EIR, Draft Program Environmental Impact Report for the 2014 Brentwood General Plan Update, 2014

10.2 Scoping Issues Addressed

During the public comment scoping period for the proposed project, no comments regarding greenhouse gas emissions were raised.

10.3 Environmental Setting

The 355-acre project area includes relatively flat portions as well as gently sloping hills. Site elevations range from approximately 200 feet above mean sea level (msl) in the south (Deer Ridge) to approximately 250 feet above msl to the north (Shadow Lakes). The approximately 32-acre project site is located in the southwest portion of Brentwood and includes small portions of both the Deer Ridge Golf Club and the Shadow Lakes Golf Club. The Shadow Lakes portion of the site is located directly north of Balfour Road, while the Deer Ridge portion of the site is located directly south of Balfour Road.

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then

emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Because the earth has a much lower temperature than the sun, it emits lower-frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead “trapped,” resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

The primary GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Fluorinated gases also make up a small fraction of the GHGs that contribute to climate change. Fluorinated gases include chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride; however, it is noted that these gases are not associated with typical land use development. According to some scientists, human-caused emissions of these GHGs in excess of natural ambient concentrations are believed to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth’s climate, known as global climate change.

GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, more CO₂ is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, or other forms of carbon sequestration. Of the total annual human-caused CO₂ emissions, approximately 55 percent is sequestered through ocean and land uptakes every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO₂ emissions remains stored in the atmosphere (IPCC 2013). Table 10-1 (Greenhouse Gases), describes the primary GHGs attributed to global climate change, including their physical properties.

Greenhouse Gas	Description
Carbon Dioxide (CO ₂)	Carbon dioxide is a colorless, odorless gas. CO ₂ is emitted naturally and through human activities. The largest source of CO ₂ emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, and industrial facilities. Specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can lead to CO ₂ emissions. The atmospheric lifetime of CO ₂ is variable because it is readily exchanged in the atmosphere.

Table 10-1: Greenhouse Gases

Greenhouse Gas	Description
Methane (CH ₄)	Methane, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. Methane is a colorless, odorless gas and is the major component of natural gas, about 87 percent by volume. Human-related sources include fossil fuel production, animal husbandry, rice cultivation, biomass burning, and waste management. Natural sources of CH ₄ include wetlands, gas hydrates, termites, oceans, freshwater bodies, non-wetland soils, and wildfires. The atmospheric lifetime of CH ₄ is about 12 years.
Nitrous Oxide (N ₂ O)	Nitrous oxide is a colorless gas with a slightly sweet odor. N ₂ O is largely attributable to agricultural practices and soil management. Primary human-related sources of N ₂ O include agricultural soil management, sewage treatment, combustion of fossil fuels, and adipic and nitric acid production. N ₂ O is produced from biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N ₂ O is approximately 120 years.

Source: Michael Baker International, 2017.

The California Climate Change Center (2012) identifies that global warming in California is anticipated to impact natural resources. The California Climate Change Center states that climate changes could affect the following resources described below.

10.3.1 Water Resources

By late-century, all projections show drying, and half of the projections suggest 30-year average precipitation will decline by more than 10 percent below the historical average. This drying trend is caused by an apparent decline in the frequency of rain and snowfall. Even in projections with relatively small or no declines in precipitation, central and southern parts of the state can be expected to be drier from the warming effects alone—the spring snowpack will melt sooner, and the moisture contained in soils will evaporate during long, dry summer months.

10.3.2 Wildfire Risks

Earlier snowmelt, higher temperatures and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. Human activities will continue to be the biggest factor in ignition risk. The number of large fires statewide are estimated to increase from 58 percent to 128 percent above historical levels by 2085. Under the same emissions scenario, estimated burned area will increase by 57 percent to 169 percent, depending on location.

10.3.3 Health Impacts

Many of the gravest threats to public health in California stem from the increase of extreme conditions, principally more frequent, more intense, and longer heat waves. Particular concern centers on the increasing tendency for multiple hot days in succession and heat waves occurring simultaneously in several regions throughout the state. Public health could also be affected by climate change impacts on air quality, food production, the amount and quality of water supplies, energy pricing and availability, and the spread of infectious diseases. Higher temperatures also increase ground-level ozone levels. Furthermore, wildfires can increase particulate air pollution in the major air basins of California.

10.3.4 Increased Energy Demand

Increases in average temperature and higher frequency of extreme heat events combined with new residential development across the state will drive up the demand for cooling in the increasingly hot and longer summer season and decrease demand for heating in the cooler season. Warmer, drier summers also increase system losses at natural gas plants (reduced efficiency in the electricity generation process at higher temperatures) and hydropower plants (lower reservoir levels). Transmission of electricity will also be affected by climate change. Transmission lines lose seven percent to eight percent of transmitting capacity in high temperatures while needing to transport greater loads. This means that more electricity needs to be produced to make up for the loss in capacity and the growing demand.

10.4 Applicable Regulations, Plans, and Standards

10.4.1 Federal

Federal Clean Air Act

The U.S. Environmental Protection Agency (USEPA) is charged with implementing national air quality programs. USEPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA). The FCAA was passed in 1963 by the U.S. Congress and has been amended several times. In 1977, Congress added several provisions, including nonattainment requirements for areas not meeting National Ambient Air Quality Standards as well as the Prevention of Significant Deterioration program. The 1990 FCAA amendments represent a series of Federal efforts to regulate the protection of air quality in the United States. The FCAA allows states to adopt more stringent standards or to include other pollution species.

The U.S. Supreme Court in *Massachusetts et al. v. Environmental Protection Agency*, 549 U.S. 497 (2007), held that the USEPA has the authority to regulate motor-vehicle GHG emissions under the FCAA. The Supreme Court held that the USEPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

The USEPA publishes an annual GHG inventory (Inventory of U.S. Greenhouse Gas Emissions and Sinks),¹ which tracks the national trend in GHG emissions and removals back to 1990. The report contains total national emissions by source, economic sector, and GHG. The USEPA uses national energy data, data on national agricultural activities, and other national statistics to provide a comprehensive accounting of total GHG emissions for all man-made sources in the country. It also collects GHG emissions data from individual facilities and suppliers of certain fossil fuels and industrial gases through the Greenhouse Gas Reporting Program.

In May 2010, the USEPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) published the final rule-making for a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States. The standards for the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide (CO₂) per mile, equivalent to 35.5 miles per gallon (mpg), if the automobile industry were to meet this CO₂ level solely through fuel economy improvements. Together, these standards are projected to cut GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

In October 2012, the USEPA and NHTSA published the final rule-making for the second phase of the national program, which covers model years 2017 through 2025. The final standards are projected to result in an average industry fleetwide level of 163 grams of CO₂ per mile, equivalent to 54.5 MPG, if the automobile industry were to meet this CO₂ level solely through fuel economy improvements. The USEPA does not regulate residential sources of GHG emissions.

Executive Order 13963

Executive Order (EO) 13963, Planning for Federal Sustainability in the Next Decade, signed in 2015, seeks to maintain Federal leadership in sustainability and greenhouse gas emission reductions. Its goal is to reduce agency Scope 1 and 2 GHG emissions² by at least 40 percent by 2025, foster innovation, reduce spending, and strengthen communities through increased efficiency and improved environmental performance. Sustainability goals are set for building efficiency and management, energy portfolio, water use efficiency, fleet efficiency, sustainable acquisition and supply chain greenhouse gas management, pollution prevention, and electronic stewardship.

¹ A greenhouse gas "sink" is a process, activity, or mechanism that absorbs more greenhouse gases than it releases.

² In GHG inventories, direct emissions are Scope 1; indirect emissions from consumption of purchased electricity, heat or steam are Scope 2; and other indirect emissions (such as extraction and production of purchased materials and fuels, transport in vehicles not controlled by the reporting entity, outsourced activities) are Scope 3.

10.4.2 State

California Air Resources Board (CARB)

The California Air Resources Board (CARB) is responsible for the coordination and oversight of State and local air pollution control programs in California. Various statewide and local initiatives to reduce California's contribution to GHG emissions have raised awareness about climate change and its potential for severe long-term adverse environmental, social, and economic effects. California is a significant emitter of carbon dioxide equivalents (CO₂e) in the world and produced 459 million gross metric tons of CO₂e in 2013. In the state, the transportation sector is the largest emitter of GHGs, followed by industrial operations such as manufacturing and oil and gas extraction.

California Global Warming Solutions Act (Assembly Bill 32)

The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) (Health and Safety Code Sections 38500, 38501, 38510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) instructs the CARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. AB 32 directed CARB to set a GHG emissions limit based on 1990 levels, to be achieved by 2020. It set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

CARB Scoping Plan

CARB adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that would be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business-as-usual")³. The Scoping Plan evaluates opportunities for sector-specific reductions; integrates early actions by CARB and the State's Climate Action Team and additional GHG reduction measures by both entities; identifies additional measures to be pursued as regulations; and outlines the adopted role of a cap-and-trade program.⁴ Additional development of these measures and adoption of the appropriate regulations occurred through the end of 2013. Key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs, as well as building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent by 2020.

³ CARB defines business-as-usual (BAU) in its Scoping Plan as emissions levels that would occur if California continued to grow and add new GHG emissions but did not adopt any measures to reduce emissions. Projections for each emission-generating sector were compiled and used to estimate emissions for 2020 based on 2002–2004 emissions intensities. Under CARB's definition of BAU, new growth is assumed to have the same carbon intensities as was typical from 2002 through 2004.

⁴ The Climate Action Team, led by the secretary of the California Environmental Protection Agency, is a group of State agency secretaries and heads of agencies, boards, and departments. Team members work to coordinate statewide efforts to implement global warming emissions reduction programs and the State's Climate Adaptation Strategy.

- Developing a California cap-and-trade program that links with other programs to create a regional market system and caps sources contributing 85 percent of California’s GHG emissions (adopted in 2011).
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets (several Sustainable Communities Strategies have been adopted).
- Adopting and implementing measures pursuant to existing State laws and policies, including California’s clean car standards, heavy-duty truck measures, the Low Carbon Fuel Standard (amendments to the Pavley Standard adopted 2009; Advanced Clean Car standard adopted 2012), goods movement measures, and the Low Carbon Fuel Standard (adopted 2009).
- Creating targeted fees, including a public goods charge on water use, fees on gasses with high global warming potential, and a fee to fund the administrative costs of the State of California’s long-term commitment to AB 32 implementation (CARB 2008).

In 2012, CARB released revised estimates of the expected 2020 emissions reductions. The revised analysis relied on emissions projections updated in light of current economic forecasts that accounted for the economic downturn since 2008, reduction measures already approved and put in place relating to future fuel and energy demand, and other factors. This update reduced the projected 2020 emissions from 596 million metric tons of CO_{2e} (MMTCO_{2e}) to 545 MMTCO_{2e}. The reduction in forecasted 2020 emissions means that the revised business-as-usual reduction necessary to achieve AB 32’s goal of reaching 1990 levels by 2020 is now 21.7 percent, down from 29 percent. CARB also provided a lower 2020 inventory forecast that incorporated State-led GHG emissions reduction measures already in place. When this lower forecast is considered, the necessary reduction from business-as-usual needed to achieve the goals of AB 32 is approximately 16 percent.

CARB adopted the first major update to the Scoping Plan on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG emissions reductions necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. The Scoping Plan update also looks beyond 2020 toward the 2050 goal established in Executive Order (EO) S-3-05, although not yet adopted as State law, and observes that “a mid-term statewide emission limit will ensure that the State stays on course to meet our long-term goal.”⁵ The Scoping Plan update does not establish or propose any specific post-2020 goals, but identifies such goals adopted by other governments or recommended by various

⁵ Executive Order S-3-05 set forth a series of GHG emissions reduction targets that consist of reducing GHG emissions to 2000 levels by 2010; reducing GHG emissions to 1990 levels by 2020; and reducing GHG emissions to 80 percent below 1990 levels by 2050.

scientific and policy organizations. EO B-30-15 (signed April 29, 2015) endorses the effort to set interim GHG reduction targets for 2030 (40 percent below 1990 levels).⁶

In 2016, the Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. With SB 32, the Legislature passed companion legislation, AB 197, which provides additional direction for developing the Scoping Plan. On December 14, 2017 CARB adopted a second update to the Scoping Plan⁷. The 2017 Scoping Plan details how the State will reduce GHG emissions to meet the 2030 target set by Executive Order B-30-15 and codified by SB 32. Other objectives listed in the 2017 Scoping plan are to provide direct GHG emissions reductions; support climate investment in disadvantaged communities; and, support the Clean Power Plan and other Federal actions.

Amendments to California Global Warming Solutions Act of 2006: Emission Limit (Senate Bill 32)

Signed into law in September 2016, Senate Bill (SB) 32 codifies the 2030 target in EO B-30-15. SB 32 authorizes the State board to adopt an interim GHG emissions level target to be achieved by 2030. The bill states that the intent is for the legislature and appropriate agencies to adopt complementary policies which ensure that the long-term emissions reductions advance specified criteria. CARB is directed to update the Scoping Plan to provide guidance for compliance with SB 32. The next updated Scoping Plan is expected to be adopted in 2017.

Table 10-2 (California State Climate Change Legislation) provides a brief overview of other California legislation relating to climate change that may affect emissions associated with the proposed project.

Legislation	Description
Assembly Bill 1493 and Advanced Clean Cars Program	Assembly Bill 1493 (“the Pavley Standard”) (Health and Safety Code §§ 42823 and 43018.5) aims to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks with one set of emission standards for model years 2009–2016 and a second set of emissions standards for model years 2017 to 2025. By 2025, when all rules will be fully implemented, new automobiles will emit 34 percent fewer CO ₂ e emissions and 75 percent fewer smog-forming emissions.
Low Carbon Fuel Standard	Executive Order S-01-07 (2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California. The regulation took effect in 2010 and is codified at Title 17, California Code of Regulations, Sections 95480–95490. The Low Carbon

⁶ Executive Order B-30-15, which was issued in April 2015, requires statewide GHG emissions to be reduced 40 percent below 1990 levels by 2030. Senate Bill 32 (SB 32), signed into law in September 2016, codifies the 2030 GHG reduction target in Executive Order B-30-15. The bill authorizes CARB to adopt an interim GHG emissions level target to be achieved by 2030. CARB also must adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective GHG reductions.

⁷ California Air Resources Board, *California’s 2017 Climate Change Scoping Plan*, https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed January 12, 2018.

Legislation	Description
	Fuel Standard will reduce GHG emissions by reducing the carbon intensity of transportation fuels used in California by at least 10 percent by 2020.
Renewables Portfolio Standard (Senate Bill X1-2 and Senate Bill 350)	California’s Renewables Portfolio Standard (RPS) requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. The 33 percent standard is consistent with the RPS goal established in the Scoping Plan. The passage of SB 350 in 2015 updates the RPS to require the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. The bill will make other revisions to the RPS program and to certain other requirements on public utilities and publicly owned electric utilities.
Senate Bill 375 ^a	SB 375 took effect in 2008 and provides a new planning process to coordinate land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction goals established in AB 32. SB 375 requires metropolitan planning organizations (MPO) to incorporate a Sustainable Communities Strategy (SCS) in their regional transportation plans that will achieve GHG emissions reduction targets by reducing vehicle miles traveled (VMT) from light-duty vehicles through the development of more compact, complete, and efficient communities. CARB adopted per capita reduction targets for each MPO rather than a total magnitude reduction target. The Southern California Association of Government’s (SCAG) targets are an 8 percent per capita reduction from 2005 GHG emission levels by 2020 and a 13 percent per capita reduction from 2005 GHG emission levels by 2035. SB 375 requires CARB to periodically update the targets, no later than every 8 years. CARB is in the process of updating targets, with the intent to make them effective in 2018. SCSs adopted in 2018 would be subject to the updated targets.
California Building Energy Efficiency Standards	In general, the California Building Energy Efficiency Standards require the design of building shells and building components to conserve energy. The California Energy Commission adopted changes to the 2016 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1. The amended standards took effect on July 1, 2017. Under the 2016 Standards, residential buildings are 28 percent more energy efficient than the 2013 Standards, and nonresidential buildings are 5 percent more energy efficient than the 2013 Standards. The 2016 standards will not achieve zero net energy. However, they get very close to the State’s goal and make important steps toward changing residential building practices in California. The 2019 standards are intended to achieve zero net energy for newly constructed residential buildings throughout California.
California Green Building Standards	The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, is a statewide mandatory construction code developed and adopted by the California Building Standards Commission and the Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency/conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt that encourage or require additional measures in the five green building topics. The most recent update to the CALGreen Code went into effect January 1, 2017.

Table 10-2: California State Climate Change Legislation

Legislation	Description
a.	Senate Bill 375 is codified at Government Code Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, and 65080.01, as well as at Public Resources Code Sections 21061.3 and 21159.28 and Chapter 4.2.
Source: Michael Baker International, 2017b.	

10.4.3 Regional & Local

City of Brentwood General Plan

Relevant General Plan policies for GHG are addressed in this section. Where inconsistencies exist, if any, they are addressed in the respective impact analysis below.

Conservation and Open Space Goal 8: Reduce air pollutants and greenhouse gas (GHG) emissions.

- **Policy COS 8-5:** Continue to require all construction projects and ground disturbing activities to implement BAAQMD dust control and abatement measures.
- **Policy COS 8-6:** Support the development and implementation of a GHG reduction plan, or Climate Action Plan, that addresses and reduces GHG emissions associated with community operations, including but not limited to, mobile sources (vehicle traffic), energy consumption, and solid waste.
- **Policy COS 8-8:** Encourage local businesses and industries to engage in voluntary efforts to reduce GHG emissions and energy consumption.
- **Policy COS 8-9:** Preserve, protect, and enhance, as appropriate, the City’s carbon sequestration resources, also referred to as “carbon sinks,” to improve air quality and reduce net carbon emissions.
- **Policy COS 8-11:** Encourage new construction to incorporate passive solar features.

Conservation and Open Space Goal 9: Promote conservation of energy and other natural resources.

- **Policy COS 9-1:** Require all new public and privately constructed buildings to meet and comply with the most current “green” development standards in the California Code of Regulations (CCR), Title 24.
- **Policy COS 9-2:** Support innovative and green building best management practices including, but not limited to, LEED certification for all new development, and encourage project applicants to exceed the most current “green” development standards in the California Code of Regulations (CCR), Title 24, if feasible.
- **Policy COS 9-3:** Promote the use of alternative energy sources in new development.

- Policy COS 9-6: Continue to require new development to incorporate water efficient fixtures into design and construction.
- Policy COS 9-8: Encourage large-scale developments and golf course developments to incorporate dual water systems.
- Policy COS 9-9: Encourage and support the use of drought-tolerant and regionally native plants in landscaping.
- Policy COS 9-10: Ensure that the layout and design of new development and significant remodels encourages the use of transportation modes other than automobiles and trucks.

City of Brentwood Climate Action Plan (CAP)

As part of the recent General Plan Update (2014), the City of Brentwood implemented goals and actions for the future development of a Climate Action Plan. The Climate Action Plan, if adopted, would be a stand-alone document that includes a range of strategies, measures, and programs that the City and the community may implement to reduce the generation of greenhouse gas emissions (GHGs) within the city. Major elements of the CAP would include the following:

- **Existing Emissions Inventory.** This inventory provides a detailed quantification of greenhouse gases being generated in Brentwood during the base year.
- **Emissions Reduction Target.** The City Council determines the appropriate target for the level of greenhouse gas emissions the Climate Action Plan seeks to reduce by 2020 and beyond.
- **Climate Action Plan GHG Reduction Measures.** The Plan will include a wide range of measures to reduce greenhouse gas emissions from a variety of sources, including energy use, building design and materials, transportation, and solid waste disposal.

10.5 Environmental Impacts and Mitigation Measures

10.5.1 Significance Criteria

CEQA Thresholds

Based upon the criteria derived from Appendix G of the State CEQA Guidelines, the project would result in a significant impact related to climate change if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance; or
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

The Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400 to 450 ppm carbon dioxide equivalent (CO₂eq)² concentration is required to keep global mean warming below 2 degrees Celsius (°C), which in turn is assumed to be necessary to avoid dangerous climate change.

Executive Order (EO) S-3-05 was issued in June 2005, which established the following GHG emission reduction targets:

- 2010: Reduce GHG emissions to 2000 levels;
- 2020: Reduce GHG emissions to 1990 levels; and
- 2050: Reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32) requires that CARB determine what the statewide GHG emissions level was in 1990, and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020. CARB has approved a 2020 emissions limit of 427 million metric tons (MMT) of CO₂eq.

Executive Order B-30-15, which was issued in April 2015, requires statewide GHG emissions to be reduced 40 percent below 1990 levels by 2030. Senate Bill 32 (SB 32), signed into law in September 2016, codifies the 2030 GHG reduction target in Executive Order B-30-15. The bill authorizes CARB to adopt an interim GHG emissions level target to be achieved by 2030. CARB also must adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective GHG reductions.

Due to the nature of global climate change, it is not anticipated that any single development project would have a substantial effect on it. In actuality, GHG emissions from the proposed project would combine with emissions emitted across California, the United States, and the world to cumulatively contribute to global climate change.

Bay Area Air Quality Management District Thresholds

The Bay Area Air Quality Management District's (BAAQMD's) approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move towards climate stabilization. If a project would generate GHG emissions above the threshold level, it would be considered to contribute considerably to a significant cumulative impact. Stationary-source projects include land uses that would accommodate processes and equipment that emit GHG emissions and would require an Air District permit to operate. If annual emissions of operational-related GHGs exceed these levels, the proposed project would result in a cumulatively considerable contribution to a cumulatively significant impact to global climate change. BAAQMD's recommended thresholds are as follows:

- Compliance with a Qualified Climate Action Plan; or
- Meet one of the following thresholds:
 - 1,100 MT CO₂eq/year (yr); or
 - 4.6 MTCO₂eq/service population (sp)/yr (residents and employees).

It should be noted that the BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions. However, the BAAQMD recommends quantification and disclosure of construction GHG emissions. The BAAQMD also recommends that the Lead Agency should make a determination on the significance of these construction generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals, as required by the Public Resources Code, Section 21082.2. The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable.

Exercising its own discretion as lead agency, the City of Brentwood relies on the thresholds within the Options and Justification Report (dated October 2009) prepared by the BAAQMD. The BAAQMD Options and Justification Report establishes thresholds based on substantial evidence and are consistent with the thresholds outlined in the 2010 CEQA Air Quality Guidelines. Although the BAAQMD failed to comply with CEQA before completing its 2010 guidelines, these recommendations still represent the best available science on the subject of what constitutes significant air quality and/or GHG effects for this project.

Therefore, the BAAQMD's thresholds are used to analyze the project's GHG impacts on climate change. For purposes of this analysis, project consistency with the 4.6 MTCO₂eq/sp/yr. threshold is used as the basis to determine significance.

10.5.2 Impacts of the Proposed Project

Impact GHG-1: Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

Project-Related Sources of Greenhouse Gases

Project-related GHG emissions would include emissions from direct and indirect sources. The proposed project would result in direct and indirect emissions of CO₂, N₂O, and CH₄, and would not result in other GHGs that would facilitate a meaningful analysis. Therefore, this analysis focuses on these three forms of GHG emissions. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from electricity consumption, water demand, and solid waste generation.

Operational GHG estimations are based on energy emissions from natural gas usage and automobile emissions. CalEEMod relies upon trip data within the Brentwood Golf Redevelopment Traffic Impact Study and project specific land use data to calculate emissions. The proposed project involves the construction of two age-restricted housing facilities that could

accommodate up to 560 dwelling units combined, construction of a golf cart bridge and reconfiguration of certain areas of the existing golf courses to open space and other uses.

Table 10-3 (Estimated Greenhouse Gas Emissions) presents the estimated CO₂, CH₄, and N₂O emissions of the proposed project, which includes development of up to 560 senior housing units, reconfiguration of the golf course and addition of a golf cart bridge. The CalEEMod outputs are contained within the Appendix B (Air Quality/Greenhouse Gas Emissions Data).

Table 10-3: Estimated Greenhouse Gas Emissions						
Emissions Source	CO ₂ e	CH ₄		N ₂ O		Total
	MT/yr ¹	MT/yr ¹	MTCO ₂ eq ²	MT/yr ¹	MTCO ₂ eq ²	MTCO ₂ eq ³
Existing Greenhouse Gas Emissions						
Area Source	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00
Water Demand	152.44	0.01	0.17	0.00	0.00	153.04
Waste	0.49	0.03	0.72	0.00	0.00	1.21
<i>Total Existing Emissions³</i>	<i>154.25 MTCO₂eq</i>					
Proposed Project-Related Greenhouse Gas Emissions						
Construction (amortized over 30 yrs.)	44.73	0.01	0.25	0.00	0.00	44.98
Area Source ³	31.25	0.01	0.19	0.00	0.13	31.57
Energy	1,605.47	0.07	1.64	0.00	0.00	1,607.11
Mobile	986.79	0.04	0.91	0.00	3.60	991.29
Water Demand	82.71	1.02	25.56	0.02	7.36	115.65
Waste	28.01	1.66	41.39	0.00	0.00	69.40
<i>Total Proposed Project-Related Emissions³</i>	<i>2,860.00 MTCO₂eq</i>					
Total Net Greenhouse Gas Emissions³	2,705.75 MTCO₂eq					
Total Service Population Emissions⁴	3.1MTCO₂eq⁵/sp					
Threshold of Significance	4.6 MTCO₂eq/sp					
Project Exceed Thresholds?	No					
Notes:						
1. Emissions calculated using the California Emissions Estimator Model.						
2. Carbon dioxide equivalent values calculated using the United States Environmental Protection Agency Website, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator , accessed March 29, 2017.						
3. Totals may be slightly off due to rounding.						
4. Projected service population emissions are based on a service population of 920 assuming one trip is made to and from the project site by the anticipated total daily trips associated with number of residents and employees (1,841). The service population also conservatively assumes only a single occupant for each trip						
5. The project's total service population emissions were calculated by dividing the total proposed project-related emissions (2,860.00 MTCO ₂ eq/yr) by the service population (920); therefore, 2,860.00/920 = 3.1.						
Source: Michael Baker International, 2017.						

Direct Proposed Project-Related Sources of Greenhouse Gases

- **Construction Emissions.** Construction GHG emissions are typically summed and amortized over the lifetime of a project (assumed to be 30 years), then added to the operational emissions.⁸ As seen in Table 10-3, the proposed project would result in 44.98 MTCO₂eq/yr. (amortized over 30 years).
- **Area Source.** Area source emissions were calculated using CalEEMod and project specific land use data. As noted in Table 10-3, the proposed project would result in 31.57 MTCO₂eq/yr. of area sources GHG emissions.
- **Mobile Source.** CalEEMod relies upon trip data within the Traffic Impact Study and project specific land use data to calculate mobile source emissions. The proposed project would directly result in 1,607.11 MTCO₂eq/yr. of mobile source-generated GHG emissions; refer to Table 10-3.

Indirect Proposed Project-Related Sources of Greenhouse Gases

- **Energy Consumption.** Energy consumption emissions were calculated using CalEEMod and project-specific land use data. Electricity would be provided to the project site via Pacific Gas and Electric (PG&E). The proposed project would indirectly result in 1,607.11 MTCO₂eq/yr. due to energy consumption; refer to Table 10-3.
- **Water Demand.** The proposed project's water supply would be provided by local groundwater and imported surface water. Emissions from indirect energy impacts due to water supply would result in 115.65 MTCO₂eq/yr. (net decrease of 37.39 MTCO₂eq/yr.); refer to Table 10-3.
- **Solid Waste.** Solid waste associated with operations of the proposed project would result in 69.40 MTCO₂eq/yr. (net increase of 68.19 MTCO₂eq/yr.); refer to Table 10-3.

Total Proposed Project-Related Sources of Greenhouse Gases

As shown in Table 10-3, GHG emissions resulting from both construction and operation of the proposed project would result in approximately 2,860 MTCO₂eq/yr. The proposed project's service population would be made up of both the residents and employees associated with the age-restricted housing communities. In order to conservatively estimate the projected service population, the number of potential project related daily vehicle trips is divided by two to account for each service population member making one trip to and one trip from the project site (i.e., each project resident and employee would count for two trips). This is a conservative assumption since many seniors may not drive (especially those within assisted living facilities). According to project daily traffic data (refer to Chapter 17, Transportation and Circulation), the proposed project would generate approximately 1,976 daily trips during the weekday and 1,520 daily trips on the weekend, which results in an annual average of 1,841 daily trips. The total number of

⁸ The project lifetime is based on the standard 30-year assumption of the South Coast Air Quality Management District (South Coast Air Quality Management District, Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008).

projected daily trips is divided by two (920 trips per day) to derive the projected service population.

Therefore, the proposed project's service population estimate used for this GHG analysis is 920. As shown in Table 10-3, dividing the GHG emissions by the project's service population would result in approximately 3.1 MTCO₂eq per service population per year, which is below the BAAQMD significance thresholds (4.6 MTCO₂eq per service population per year). Therefore, the project's contribution of GHG emissions would be less than significant.

Impact GHG-2: Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

General Plan policies COS 8-5, COS 8-6, and COS 8-11 require all proposed construction projects in the city to reduce air pollutants and GHG emissions through the implementation of dust control and abatement measures, development of a GHG reduction plan (Climate Action Plan), and for new construction to incorporate passive solar features.

The BAAQMD recommends Basic Construction Mitigation Measures for all projects whether or not construction-related emissions exceed the thresholds of significance. These mitigation measures include (also refer to Mitigation Measure AQ-1 in Chapter 6, Air Quality):

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

In addition, the BAAQMD encourages lead agencies to incorporate best management practices to reduce GHG emissions during construction, as applicable. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment of at least 15 percent of the fleet; using local building materials of at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials. Compliance with BAAQMD construction-related mitigation requirements are considered to reduce GHG impacts at both the local and basin-wide levels.

The City of Brentwood's General Plan (Action COS 8b) requires that development, infrastructure, and planning projects be reviewed for consistency with BAAQMD requirements during the CEQA review process and that project applicants prepare air quality analyses to address BAAQMD and General Plan requirements, including analysis of air pollutant emissions; exposure of sensitive receptors to toxic air contaminants; significant air quality impacts associated with construction project operation and cumulative conditions; and mitigation measures to reduce significant impacts to less than significant.

The City's General Plan Action COS 8c provides guidance on the contents of a future Climate Action Plan (CAP). Required components of the CAP include: (1) a baseline greenhouse gas (GHG) emissions inventory; (2) an adopted GHG emissions reduction target of at least 15 percent below the business-as-usual projections by 2020; (3) GHG reduction measures that apply to community wide operations, City operations, and future development projects; and (4) an implementation and monitoring program (City of Brentwood General Plan EIR, 2014).

According to the General Plan EIR (2014), the City has implemented a range of regulatory vehicles in order to reduce GHG emissions in the city from existing and future sources. Additionally, the City requires all new construction to implement CALGreen Mandatory Tier 1 standards, which include a detailed list of green building features that address energy efficiency, water efficiency, waste reduction, material conservation, and indoor air quality. These requirements apply to both newly constructed residential and non-residential facilities (City of Brentwood General Plan EIR, 2014). The policies and actions listed in the General Plan EIR were determined to be consistent with the policy guidance provided by CAPCOA through the 2009 Model Policies for Greenhouse Gases in General Plans, which is consistent with the AB 32 Scoping Plan, as well as GHG reduction measures recommended by the BAAQMD.

As proposed, the project does not currently specify the use of passive solar features in the project's design (General Plan Policy COS 8-11 encourages the use of passive solar features). Passive solar features are not mandated by General Plan Policy COS 8-11 due to individual site constraints and other feasibility issues. However, as described in above, and in Impact GHG-1, the project is generally consistent with other General Plan policies, would incorporate building energy and water efficiency measures, and project-related GHG emissions would be below the BAAQMD significance thresholds. It should be noted that quantitative emissions reductions/credits for passive solar design were conservatively not incorporated into the emissions depicted in Table 10-3.

In summary, the proposed project would be generally consistent with the General Plan policies as detailed above and would be subject to applicable Federal, State, and local regulatory requirements aimed at reducing project-related GHG emissions, also discussed above. As a result, the project would not conflict with or impede implementation of GHG reduction goals identified in AB 32 and other strategies to help reduce GHG emissions. Impacts associated with GHG plans, policies, and regulations would be less than significant.

10.5.3 Cumulative Impact Analysis

Impact GHG-3: Contribute to cumulatively considerable effects on construction-related greenhouse gas emissions.

Global climate change is, by definition, a cumulative impact of GHG emissions. The baseline against which to compare potential impacts of the proposed project includes the natural and anthropogenic drivers of global climate change, including world-wide GHG emissions from human activities that grew more than 70 percent between 1970 and 2004 (IPCC, 2007). As such, the geographic extent of the climate change and greenhouse gas emissions cumulative impact discussion is worldwide.

Because of the global nature of climate change, most projects will not result in GHG emissions that are individually significant. Therefore, it is accepted as very unlikely that any individual development project or General Plan would have GHG emissions of a magnitude to directly impact global climate change and the impact of the proposed project is considered on a cumulative basis. The project's cumulative contribution of GHG emissions would be less than significant and the project's cumulative GHG impacts would also be less than cumulatively considerable and potential impacts are considered less than significant.

10.5.4 Level of Significance After Mitigation

Table 10-4 (Summary of Impacts and Mitigation Measures – Greenhouse Gas Emissions) summarizes the environmental impacts, significance determinations, and mitigation measures for the proposed project with regard to greenhouse gas emissions.

Table 10-4: Summary of Impacts and Mitigation Measures – Greenhouse Gas Emissions

Impact	Impact Significance	Mitigation
Impact GHG-1: Contribute to cumulatively considerable effects on construction-related greenhouse gas emissions.	Less than Significant	None required.
Impact GHG-2: Contribute to cumulatively considerable effects on long-term operations-related greenhouse gas emissions.	Less than Significant	None required.
Impact GHG-3: Contribute to cumulatively considerable effects on construction-related greenhouse gas emissions.	Less than Significant	None required.

10.6 References

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