

SECTION 4.4 CLIMATE CHANGE

4.4.1 Introduction

This section describes the potential effects of climate change associated with implementation of the Life Time Fitness Project's (proposed project) contribution to greenhouse gas (GHG) emissions, and the potential effects of climate change on the project. The information provided in this section was obtained from review of the following documents:

- *City of Roseville General Plan 2025*, as amended February 2013 (City of Roseville 2013)
- *Stoneridge Specific Plan and Design Guidelines* (City of Roseville 2007)
- *Stoneridge Specific Plan Environmental Impact Report* (City of Roseville 1998)
- *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan* (PCAPCD 2008)
- *Air Quality Impact and Greenhouse Gas Analysis, Life Time Fitness Project* (May 2013, included as Appendix C).

The documents listed above are available for review during normal business hours (Monday through Friday 8 a.m. to 5 p.m.) at the City of Roseville Permit Center, 311 Vernon Street, Roseville, California 95678.

No comments were received relative to GHG emissions or climate change in response to the Notice of Preparation (NOP). A copy of the NOP and comment letters received in response to the NOP is included in Appendix A.

4.4.2 Environmental Setting

The Earth's climate is determined by the balance between energy received from the sun and energy emitted back to space from the Earth and its atmosphere. Certain gases in the atmosphere, such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapor, and others, trap some of the outgoing energy, retaining heat in the Earth's atmosphere. Such gases are considered GHGs. The best understood GHGs emitted by human activities are CO₂, CH₄, N₂O, and certain fluorinated compounds. The increase in atmospheric concentrations of GHGs has resulted in more heat being held within the atmosphere, which is the accepted explanation for global climate change.

Changes in GHG emissions are influenced by many long-term factors, including population and economic growth, land use, energy prices, technological changes, and inter-annual temperatures. On an annual basis, combustion of fossil fuels, which accounts for most GHG emissions in the

United States, generally fluctuates in response to changes in general economic conditions, energy prices, weather, and the availability of non-fossil alternatives.

Global Warming Potential

Global Warming Potential (GWP) is one type of simplified index (based upon radiative properties) that can be used to estimate the potential future impacts of emissions of various gases. According to the U.S. Environmental Protection Act (EPA), the global warming potential of a gas, or aerosol, to trap heat in the atmosphere is the “cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas.” The reference gas for comparison is CO₂. GWP is based on a number of factors, including the heat-absorbing ability of each gas relative to that of CO₂, as well as the decay rate of each gas relative to that of CO₂. Each gas’s GWP is determined by comparing the radiative forcing associated with emissions of that gas versus the radiative forcing associated with emissions of the same mass of CO₂, for which the GWP is set at one. Methane gas, for example, is estimated by the EPA to have a comparative global warming potential 21 times greater than that of CO₂, as shown in Table 4.4-1.

Table 4.4-1
GWPs and Atmospheric Lifetimes of Select GHGs

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide (CO ₂)	50–200	1
Methane (CH ₄)	12±3	21
Nitrous Oxide (N ₂ O)	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF ₄)	50,000	6,500
PFC: Hexafluoroethane (C ₂ F ₆)	10,000	9,200
Sulfur Hexafluoride (SF ₆)	3,200	23,900

Source: EPA 2013.

At the extreme end of the scale, sulfur hexafluoride is estimated to have a comparative global warming potential 23,900 times that of CO₂. The “specified time horizon” is related to the atmospheric lifetimes of such GHGs, which are estimated by the EPA to vary from 50–200 years for CO₂, to 50,000 years for tetrafluoromethane. Longer atmospheric lifetimes allow GHG to build up in the atmosphere; therefore, longer lifetimes correlate with the global warming potential of a gas. The common indicator for GHGs is expressed in terms of CO₂ equivalents (CO₂e).

According to the EPA, the United States accounts for nearly one-fifth of the total global emissions of CO₂, CH₄, N₂O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and SF₆. The primary GHG emitted by human activities is CO₂ and accounted for 83% of U.S. GHG emissions in 2009. The next largest components, CH₄ and N₂O, represented 10% and 4% of the total U.S. GHG emissions in 2009, respectively. The primary sources of CH₄ emissions include domestic livestock sources, decomposition of wastes in landfills, and releases of natural gas systems, coal mine seepage, and manure management. The main human activities producing N₂O are agricultural soil management, fuel combustion in motor vehicles, nitric acid production, manure management, and stationary fuel combustion.

Emissions of GHG by economic sector indicate that energy-related activities account for the majority of U.S. emissions. Electricity generation is the largest single-source, accounting for 32% of all U.S. GHG emissions in 2009. Transportation is the second largest source, followed by industrial activities. The agricultural, commercial, and residential sectors account for the remainder of emissions. Emissions of GHG are offset by uptake of carbon and sequestration in forests, trees in urban areas, agricultural soils, and landfilled yard trimmings and food scraps.

Uncertainty Regarding Global Climate Change

The scientific community has largely agreed that the Earth is warming and that humans are contributing to that change. However, the Earth's climate is composed of many complex mechanisms, including ocean currents, cloud cover, the jet-stream, and other pressure/temperature weather guiding systems. These systems are, in turn, influenced by changes in ocean salinity, changes in the evapotranspiration of vegetation, the reflectivity (albedo) of groundcover, as well as numerous other factors. Some changes have the potential to reduce climate change, while others could form a feedback mechanism that would speed the warming process beyond what is currently projected. The climate system is inherently dynamic; however, the overall trend is towards a gradually warming planet.

Global Climate Change Analysis

Analyzing global warming presents several unique challenges, largely because of its “global” nature. Global warming presents the considerable challenge of analyzing the relationship between local and global activities. Typically, air quality analyses examine the project-specific impacts that a particular project is likely to generate on a local or regional level. With regard to global warming, however, the magnitude of global warming effects is so substantial and the contribution of an individual project to global warming is so small that direct impacts would be highly unlikely. Accordingly, the issue of global climate change is different from any other areas of air quality impact analysis. A global climate change analysis must be conducted on a global level, rather than the typical local or regional setting, and requires consideration of not only

emissions from the project under consideration, but also the extent of the displacement, translocation, and redistribution of emissions. In the usual context, where air quality is linked to a particular location or area, it is appropriate to consider the creation of new emissions in that specific area to be an environmental impact whether or not the emissions are truly “new” emissions to the overall globe. In fact, the approval of a new developmental plan or project does not necessarily create new automobile drivers—the primary source of a land use project’s emissions. Rather, a new land use project may simply be redistributing existing mobile emissions; accordingly, the use of models that measure overall emissions increases without accounting for existing emissions will substantially overstate the impact of the development project on global warming. Thus, an accurate analysis of GHG emissions substantially differs from other air quality impacts, where the “addition” of redistributed emissions to a new locale can make a substantial difference to overall air quality in that area.

4.4.3 Regulatory Setting

Air quality and GHG is monitored through the efforts of various international, federal, state, regional, and local government agencies. The agencies work jointly and individually to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for regulating and improving the air quality within the City of Roseville (City) area are discussed below.

International Regulations

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations’ Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling GHG emissions. As a result, the *Climate Change Action Plan* (CCAP) was developed to address the reduction of GHGs in the United States. The CCAP currently consists of more than 50 voluntary programs.

Federal Regulations

U.S. Environmental Protection Agency

The EPA is responsible for enforcement of NAAQS for atmospheric pollutants. The EPA regulates emission sources that are under the exclusive authority of the federal government including emissions of GHGs. To track the national trend in emissions and removals of GHG since 1990, the EPA develops the official U.S. GHG inventory each year. The national GHG inventory is submitted to the United Nations in accordance with the Framework Convention on Climate Change. The EPA’s

air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was signed into law in 1970. Congress substantially amended the CAA in 1977 and again in 1990.

Federal Clean Air Act

On December 7, 2009, the EPA issued findings under Section 202(a) of the CAA concluding that GHGs are pollutants that could endanger public health. Under the so-called Endangerment Finding, the EPA found that the current and projected concentrations of the six key well-mixed GHGs – CO₂, CH₄, N₂O, PFCs, SF₆, and HFCs – in the atmosphere threaten the public health and welfare of current and future generations. These findings do not, by themselves, impose any requirements on industry or other entities.

State Regulations

Assembly Bill 32

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Climate Solutions Act of 2006. AB 32 delegated the authority for its implementation to the California Air Resources Board (CARB) and directs CARB to enforce the statewide cap that would begin phasing in by 2012. Among other requirements, AB 32 required CARB to (1) identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020, and (2) develop and implement a Scoping Plan to be implemented by January 1, 2012. Accordingly, CARB has prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, which was approved in 2008. The Scoping Plan provides the outline for actions to reduce California's GHG emissions. Based on the reduction goals called for in the 2008 Scoping Plan, a 29% reduction in GHG levels relative to a Business As Usual (BAU) scenario would be required to meet 1990 levels by 2020. A BAU scenario is a baseline condition based on what could or would occur on a particular site in the year 2020 without implementation of a proposed project or any required or voluntary GHG reduction measures. A project's BAU scenario is project- and site-specific, and varies from project to project. For example, if a project is proposed on a site that has existing operations that are currently emitting GHGs, the current GHG emissions would be the baseline or BAU condition and would be compared to the proposed project's GHG emissions (i.e., the BAU levels would be subtracted from the proposed project levels in order to determine the project's net increase in GHG emissions).

In 2011, the baseline or "projected 2020 BAU" level for the Scoping Plan was revised to account for the economic downturn and state regulation emission reductions (i.e., Pavley, Low Carbon Fuel Standard [LCFS], and Renewable Portfolio Standard [RPS]). Again, the projected 2020 BAU condition is project- and site-specific and varies. The projected 2020 BAU scenario is based on what could or would occur on a particular site in the year 2020 without implementation of a proposed project or consideration of any state regulation emission

reductions or voluntary GHG reduction measures. Accordingly, the Scoping Plan emission reduction target from projected 2020 BAU levels required to meet 1990 levels by 2020 was modified from 29% to 21% (where projected 2020 BAU levels are based on 2010 levels) or 16% (where the projected 2020 BAU levels are based on 2010 levels including accounting for percentages of emission reductions captured for implementation of Pavley and RPS). The amended Scoping Plan was reapproved August 24, 2011.

Assembly Bill 1493

California AB 1493, known as Pavley, was enacted on July 22, 2002. AB 1493 requires that CARB develop and adopt regulations that achieve “the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state.” On June 30, 2009, the EPA granted a waiver of CAA preemption to California for the state’s GHG emission standards for motor vehicles, beginning with the 2009 model year. Pursuant to the CAA, the waiver allows for the state to have special authority to enact stricter air pollution standards for motor vehicles than the federal government’s. CARB estimates that the regulation would reduce GHG emissions from the light-duty passenger vehicle fleet by an estimated 18% in 2020 and by 27% in 2030.

Executive Order S-3-05

In 2005, Governor Schwarzenegger signed Executive Order S-3-05, which established total GHG emission targets. Specifically, emissions are to be reduced to year 2000 levels by 2010, 1990 levels by 2020, and to 80% below 1990 levels by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multiagency effort to reduce GHG emissions to the target levels. The Secretary is also directed to submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets; (2) impacts of global warming on California’s resources; and (3) mitigation and adaptation plans to combat these impacts.

To comply with the Executive Order, the Secretary of CalEPA created a Climate Act Team (CAT) made up of members from various state agencies and commissions. In March 2006, CAT released their first report. In addition, CAT has released several “white papers” addressing issues pertaining to the potential impacts of climate change on California.

Executive Order S-01-07

On January 18, 2007, Governor Schwarzenegger signed Executive Order S-01-07, which mandates that a statewide goal be established to reduce the carbon intensity of California’s

transportation fuels by at least 10% by 2020. The Executive Order also requires that a Low Carbon Fuel Standard for transportation fuels be established for California.

Senate Bill 375

In September 2008, Governor Arnold Schwarzenegger signed SB 375, which is intended to build on AB 32 by attempting to control GHG emissions by curbing sprawl. SB 375 enhances CARB's ability to reach goals set by AB 32 by directing CARB to develop regional GHG emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. In addition, CARB will work with the state's 18 metropolitan planning organizations, including the Sacramento Area Council of Governments (SACOG), to align their regional transportation, housing, and land-use plans and prepare a "Sustainable Communities Strategy" (SCS) to reduce the amount of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets. SB 375 provides incentives for creating walkable and sustainable communities and revitalizing existing communities, and allows home builders to get relief from certain environmental reviews under the California Environmental Quality Act (CEQA) if they build projects consistent with the new sustainable community strategies. Furthermore, SB 375 encourages the development of alternative transportation options, which will reduce traffic congestion. SACOG adopted its Sustainable Communities Strategy in April 2012.

California Code of Regulations Title 17, Sections 95100–95133

On December 6, 2007, CARB approved a regulation mandating the reporting of GHG emissions from major sources, pursuant to the California Global Warming Solutions Act of 2006. Sections 95100–95133 of Title 17 of the California Code of Regulations include mandatory reporting that applies to major sources including but not limited to cement plants, refineries, and electricity generating facilities.

California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The CBC is adopted every 3 years by the Building Standards Commission (BSC). In the interim, the BSC adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if the jurisdiction makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both are contained in the CBC and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance (BSC 2011).

AB 32, which mandates the reduction in GHG emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In the scoping plan for the implementation of AB 32, CARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25% of all such emissions. In recommending a green building strategy as one element of the scoping plan, the CARB estimated that green building standards would reduce GHG emissions by approximately 26 MMTCO_{2e} by 2020 (BSC 2011).

2010 Green Building Code

On January 12, 2010, the BSC adopted the 2010 California Green Building Standards Code, otherwise known as the CALGreen Code. In addition to the new statewide mandates, CALGreen encourages local governments to adopt more stringent voluntary provisions, known as Tier 1 and Tier 2 provisions, to further reduce emissions, improve energy efficiency, and conserve natural resources. If a local government adopts one of the tiers, the provisions become mandates for all new construction within that jurisdiction. The most significant features of the 2010 CALGreen Code include the following (BSC 2011):

- 20% mandatory reduction in indoor water use, with voluntary goal standards for 30%, 35%, and 40% reductions
- Separate indoor and outdoor water meters to measure nonresidential buildings' indoor and outdoor water use with a requirement for moisture-sensing irrigation systems for larger landscape projects
- Diversion of 50% of construction waste from landfills, increasing voluntarily to 65% and 75% for new homes and 80% for commercial projects
- Mandatory periodic inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies
- Mandatory use of low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particle board.

CEQA Guidelines Amendments of 2010

The California Natural Resources Agency, with input from the Governor’s Office of Planning and Research (OPR), amended the CEQA Guidelines, effective March 18, 2010, to provide guidance to public agencies regarding the analysis and mitigation of GHG emissions and the effects of GHG emissions in draft CEQA documents. Legal principles for determining the significance of impacts from GHG emissions are provided in the amendments in addition to additional directives on determining thresholds of significance. The new Guidelines sections suggest a careful judgment be made by the lead agency that should make a good-faith effort, based on available information, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. A lead agency can use a model or methodology to quantify GHG emissions from a project or rely on a qualitative analysis or performance-based standards. When assessing the significance of impacts from GHG emissions on the environment, lead agencies can consider the extent to which the project may increase or reduce GHG as compared to the existing environmental setting, whether the project emissions exceed a threshold of significance determined applicable to the project, and/or the extent to which the project complies with adopted regulations or requirements to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. When adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

If GHG emissions of a project are determined to be significant, feasible means of mitigating GHG emissions, such as the following, may include:

- Measurement of the reduction of emissions required as part of the lead agency’s decision
- Reductions in emissions resulting from project through project features, design, or other measures
- Off-site measures, including offsets, to mitigate a project’s emissions
- Measures that sequester GHG gases
- If a GHG reduction plan, ordinance, regulation, or other similar plan is adopted, mitigation may include project-by-project measures, or specific measures or policies found in the plan that reduces the cumulative effect of emissions.

Local Regulations

Placer County Air Pollution Control District

The Placer County Air Pollution Control District's (PCAPCD's) *CEQA Air Quality Handbook* recommends that the threshold of significance for GHG emissions selected by lead agencies be related to compliance with AB 32 reduction goals. Thus, in accordance with the revised 2020 reduction goals set forth in the amended 2011 Scoping Plan, the PCAPCD recommends a quantitative GHG analysis for development projects in order to demonstrate that a project would promote sustainability and implement operational GHG emission reduction strategies that would reduce GHG emissions to meet the statewide emission reduction target for GHG of 21% (where projected 2020 BAU levels is based on 2010 levels) or 16% (where the projected 2020 BAU levels is based on 2010 levels including accounting for percentages of emission reductions captured for implementation of Pavley and RPS) (see Appendix C). Emission reduction measures for GHG could include, but are not limited to, compliance with local, state, or federal plans or strategies for GHG reductions, on-site and off-site mitigation recommendations from the Office of the Attorney General, and project design features.

City of Roseville General Plan

The *City of Roseville General Plan 2025* (last updated in February 2013) provides goals and policies adopted by the City Council to help guide the direction of City development. The City has been advocating steps to reduce GHG emissions. The following are applicable goals from the updated Air Quality and Climate Change Element of the *City of Roseville General Plan 2025* that are relevant to the proposed project.

GHG-related policies that are actively being implemented by the City include the following:

Land Use Element – Community Form Policies – Relationship to Transit, Pedestrian, Air Quality

- Policy 1:** Promote land use patterns that support a variety of transportation modes and accommodate pedestrian mobility.
- Policy 2:** Allow for land use patterns and mixed use development that integrate residential and nonresidential land uses, such that residents may easily walk or bike to shopping, services, employment and leisure activities.
- Policy 3:** Concentrate higher intensity uses and appropriate support uses within close proximity of transit and bikeway corridors as identified in the Bicycle Master Plan. In addition, some component of public use such as parks, plazas, public buildings, community centers and/or libraries should be located within the corridors.

Policy 5: Where feasible, improve existing development areas to create better pedestrian and transit accessibility.

Policy 6: Through City land use planning and development approvals, require that neighborhood serving uses (e.g., neighborhood commercial uses, day care, parks, schools, and other community facilities) be physically linked with adjacent residential neighborhoods.

Land Use Element – Community Form Policies - Downtown, Neighborhoods

Policy 5: Encourage infill development and rehabilitation that:

- Upgrades the quality and enhances the character of existing areas;
- Enhances public transit use and pedestrian access;
- Efficiently utilizes and does not overburden existing services and infrastructure; and
- Results in land use patterns and densities that provide the opportunity for the construction of household types affordable to all income groups.

Land Use Element – Community Form Policies – Relationship of New Development

Policy 1: Require that new development areas and associated community-wide facilities (open space resources, parks, libraries, etc.) be linked and oriented to existing developed areas of the community through road networks, public transit systems, open space systems, bike way and pedestrian systems, and other physical connections.

Land Use Element – Community Design Policies

Policy 2: Continue to develop and apply design standards that result in efficient site and building designs, pedestrian friendly projects that stimulate the use of alternative modes of transportation, and the establishment of a functional relationship between adjacent developments.

Policy 3: Encourage designs that strike a balance between the incorporation of aesthetic and development requirements, and the economic considerations associated with development.

Circulation Element – Level of Service Policies

Policy 2: Strive to meet the level of service standards through a balanced transportation system that provides alternatives to the automobile.

Circulation Element –Transportation Systems Management Policies

Policy 1: Continue to enforce the City's TSM ordinance and monitor its effectiveness.

Circulation Element –Bikeway/Trails Policies

Policy 1: Develop a comprehensive and safe system of recreational and commuter bicycle routes and trails that provides connections between the City's major employment and housing areas and between its existing and planned bikeways.

Open Space and Conservation Element – Open Space System Policies

Policy 4: Require all new development to provide linkages to existing and planned open space systems. Where such access cannot be provided through the creation of open space connections, identify alternative linkages.

Public Facilities Element – Solid Waste, Source Reduction and Recycling Policies

Policy 2: Comply with the source reduction and recycling standards mandated by the State by reducing the projected quantity of solid waste disposed at the regional landfill by 50%, as well as any mandated future reductions.

Policy 5: Develop public education and recycling programs.

Public Facilities Element – Water and Energy Conservation Policies

Policy 1: Develop and implement water conservation standards.

Policy 2: Implement various water conservation plans developed by the Environmental Utilities Department.

Policy 5: Develop and adopt a landscape ordinance that provides standards for the use of drought tolerant, xeriscape, and water-conserving landscape practices for both public and private projects.

Policy 8: Enforce energy requirements and encourage development and construction standards that promote energy efficiency and conservation.

Policy 10: Continue and expand energy efficiency and conservation programs to serve all utility users.

4.4.4 Impacts

Methods of Analysis

The issue of global climate change is inherently a cumulative issue as the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the proposed project's impact to climate change is addressed only as a cumulative impact.

The proposed project's short-term construction-related and long-term operational GHG emissions were estimated using the CalEEMod software. The model quantifies direct GHG emissions from construction and operation (including vehicle use), as well as indirect GHG emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. Emissions are expressed in annual metric tons of CO₂ equivalent units of measure (i.e., MTCO₂e), based on the global warming potential of the individual pollutants. It should be noted that construction-related GHG emissions have been amortized over the lifetime of the project, which is assumed to be 25 years for this analysis, and included in the annual operational GHG emissions in order to present a conservative estimate.¹ This approach is considered conservative, as construction GHG emissions are a one-time release that would occur only during construction of the project (i.e., approximately 1 year for the proposed project), and would not actually occur each year over the lifetime of the project.

Thresholds of Significance

There are no established, widely accepted, or officially adopted quantitative thresholds of significance adopted by the City against which to compare quantitative assessments of a proposed project's GHG emissions. Therefore, consistent with Appendix G of the CEQA Guidelines, direction from the City, and professional judgment, a GHG impact is considered significant if implementation of the proposed project would result in, or potentially result in, any of the following conditions:

- Generate greenhouse gas emissions, either directly or indirectly, that will have a significant impact on the environment (i.e., the proposed project would not achieve a minimum 21% emission reduction from 'Business as Usual'); or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

¹ The PCAPCD does not recommend any specific operational lifetimes for use in amortizing construction-related GHG emissions; however, the Sacramento Metropolitan Air Quality Management District (SMAQMD), per its *Guide to Air Quality Assessment in Sacramento County*, suggests an operational lifetime for a new conventional commercial building of 25 years (SMAQMD 2013). The estimates are derived from the State of California Executive Order D-16-00 and U.S. Green Building Council's October 2003 report on *The Costs and Financial Benefits of Green Buildings*.

Impact 4.4-1	Generate a Substantial Contribution to GHG Emissions That Conflict With an Applicable Plan or Policy
Applicable Policies and Regulations	AB 32 City of Roseville General Plan Greenhouse Gas Policies
Significance with Policies and Regulations	Potentially significant
Mitigation Measures	4.4-1 Implement Mitigation Measures 4.2-5(a), 4.2-5(b), and 4.2-5(c).
Significance after Mitigation	Less than significant

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on Earth. A project's GHG emissions are at a micro-scale relative to global emissions, but could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact.

The PCAPCD recommends that the threshold of significance for GHG emissions selected by lead agencies be related to compliance with AB 32; thus, whether a project's emissions would substantially hinder the state's ability to reach the GHG reduction target or conflict with an applicable plan, policy, or regulation related to GHG reduction. Per AB 32, CARB prepared its Scoping Plan, which includes emission reduction targets in order to meet 1990 GHG levels by 2020. In accordance with the Scoping Plan and PCAPCD recommendations, the City of Roseville, as lead agency, requires a quantitative GHG analysis for development projects in order to demonstrate how a project would promote sustainability and implement operational GHG emission reduction strategies that would reduce GHG emissions according to the emission reduction targets of the Scoping Plan. To evaluate quantitatively whether a project's GHG emissions would result in a cumulatively considerable contribution to global climate change, the City uses the Scoping Plan emission reduction target of 21% from projected 2020 BAU levels, where projected 2020 BAU levels are based on 2010 levels, compared to a project's estimated 2020 levels as the threshold of significance for GHG emissions. Therefore, if the proposed project does not show a 21% reduction in GHG emissions it would have generated under the projected 2020 BAU scenario, the project would be considered to result in a cumulatively considerable contribution to global climate change.

Potential GHG emission reduction measures could include, but are not limited to, compliance with local, state, or federal plans or strategies for GHG reductions, on-site and off-site mitigation recommendations from the Office of the Attorney General, and project design features. It should be noted that the proposed project would be required to comply with and is implementing the minimum mandated measures of the CALGreen Code, which includes such measures as a 20% mandatory reduction in indoor water use and diversion of 50% of construction waste from

landfills. A variety of voluntary CALGreen Code measures also exist that would further reduce GHG emissions, but are not mandatory.

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of CO₂ and other GHG pollutants, including CH₄ and N₂O, from mobile sources and utility usage.

Short-Term GHG Emissions

Estimated increases in GHG emissions associated with construction of the proposed project are summarized in Table .

**Table 4.4-2
Unmitigated Construction GHG Emissions**

	CO ₂ emissions (MTCO _{2e})
Total Construction GHG Emissions	1,116.31

Source: See Appendix C.

As presented in the table, short-term emissions of GHG associated with construction of the proposed project are estimated to be 1,116.31 MTCO_{2e}. Construction GHG emissions are a one-time release and are typically considered separate from operational emissions, as global climate change is inherently a cumulative effect that occurs over a long period of time and is quantified on a yearly basis. However, the proposed project's construction GHG emissions have been amortized over the lifetime of the project, which is assumed for this analysis to be 25 years, and included in the annual operational GHG emissions in order to present a conservative analysis. Construction would only occur for a short period of time—in this case for approximately 1 year. For each year after construction is completed, during operation of the project, only operational GHG emissions would occur each year over the lifetime of the project. Therefore, assuming that construction-related GHG emissions (a one-time release that would occur only during construction of the project) would instead occur incrementally each year after construction is completed for every year over the lifetime of the project, which would not realistically occur, would represent a conservative estimate for the annual operational GHG emissions.

It is also important to note that the long-term operational GHG emissions from the project (presented below) are higher than those anticipated during construction. Therefore, by adding amortized construction to the operational emissions, the highest anticipated annual GHG emissions are presented.

Long-Term GHG Emissions

The long-term operational GHG emissions estimate for the proposed project incorporates the project's potential area source and vehicle emissions, emissions associated with utility and water usage, and the generation of wastewater and solid waste. In addition, as stated above, the one-time release of construction GHG emissions has been included in the annual operational GHG emissions estimate in order to provide a conservative operational estimate. Project modeling also included the sustainability features of the proposed project's design. Estimated GHG emissions associated with the proposed project at operational year 2020 are summarized in Table . As shown in the table, the annual unmitigated GHG emissions associated with the proposed project by year 2020, including construction GHG emissions, would be 4,793.51 MTCO_{2e}.

**Table 4.4-3
Unmitigated Proposed Project 2020 GHG Emissions**

	CO ₂ emissions (MTCO _{2e})
Annual Operational GHG Emissions	4,748.86
Construction GHG Emissions ¹	44.65
Annual GHG Emissions	4,793.51

Source: See Appendix C.

Note:

¹ See Table ; amortized over the estimated 25-year project lifetime.

The threshold of significance utilized by the City requires a minimum GHG emission reduction of 21% from what the project would have emitted under a 2020 BAU scenario, where projected 2020 BAU levels are based on 2010 emissions. Thus, the project's projected 2020 BAU emission levels were evaluated in order to determine the net decrease in the proposed project's GHG emissions over time. For the projected 2020 BAU modeling, the same land use, trip generation rates, and designed sustainability features of the project were applied for the operational year 2010. The required mitigation measures were not included in the projected 2020 BAU modeling, as they would not be considered BAU. As presented in Table 4.4-4, the projected 2020 BAU GHG emissions were estimated to be approximately 5,740.42 MTCO_{2e}.

**Table 4.4-4
Projected 2020 BAU GHG Emissions**

	CO ₂ emissions (MTCO _{2e})
Annual Operational GHG Emissions	5,695.79
Construction GHG Emissions ¹	44.63
Annual GHG Emissions	5,740.42

Source: See Appendix C.

Note:

¹ See Table ; amortized over the estimated 25-year project lifetime.

Consequently, the proposed project would result in approximately a 16.50% reduction in annual GHG emissions from the projected 2020 BAU level by 2020 ($[5,740.42 \text{ MTCO}_2e - 4,793.51 \text{ MTCO}_2e] / 5,740.42 \text{ MTCO}_2e \times 100\% = 16.50\%$). The reduction in GHG emissions over the years would be attributable to the advancement of vehicle and equipment efficiency and more stringent standards and regulations as time progresses, such as state regulation emission reductions (e.g., Pavley, LCSF, and RPS). It should be noted that although a reduction related to such attributes would occur for every development project, CalEEMod takes into consideration how much of each attribute is applied for each specific project based on the size of the project and associated land uses. Accordingly, some projects (e.g., large-scale projects, large commercial or distribution centers, etc.) may require additional reduction measures, such as project design features to reduce energy use, water use, or other sources of GHG, in order to further reduce operational GHG emissions to meet the GHG emission reduction threshold.

As stated previously, the proposed project would be required to comply with and is implementing the minimum mandatory measures of the CALGreen Code (i.e., a 20% mandatory reduction in indoor water use, diversion of 50% of construction waste from landfills, etc.), which would result in an estimated 1.8% reduction in GHG emissions. The total reduction in GHG emissions is presented below in Table 4.4-5.

**Table 4.4-5
Unmitigated GHG Reductions**

Reductions	Percent Reduction (%)
Reduction from Projected 2020 BAU by 2020 ¹	16.50
Compliance with CalGreen Code ²	1.80
Total Percent Reduction	18.30

Source: See Appendix C.

Notes:

¹ Percent reduction of project GHG emissions from projected 2020 BAU levels by 2020 (see calculation in text above).

² CARB estimates a three MMTCO₂e reduction by 2020 due to the CALGreen Code which is approximately 1.8% of the state's reduction goal at the time; thus, compliance with the Code would result in an approximate 1.8% reduction.

As shown in the table, the proposed project would reduce operational GHG emissions from BAU levels by approximately 18.30% by the year 2020, which does not meet the minimum reduction requirement employed by the City of a 21% minimum GHG emission reduction compared to BAU levels.

As stated previously, short-term construction GHG emissions are incorporated into the estimated annual operational GHG emissions, and the overall annual GHG emissions associated with the project would be reduced by 18.30%, which does not meet the minimum 21% by the year 2020 reduction threshold utilized by the City. It should be noted that the actual annual emissions over the lifetime of the project would be less than presented above, due to the one-time release of construction-related GHG emissions. However, because the project would not meet the City's

21% minimum reduction threshold, the project may hinder the state’s ability to reach the GHG reduction target or conflict with an applicable plan, policy, or regulation related to GHG reduction. Therefore, without mitigation, the proposed project could generate GHG emissions that would have a significant impact on the environment and conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and impacts related to GHG emissions and global climate change would be considered **potentially significant**.

4.4.5 Mitigation Measures

Implementation of Mitigation Measures 4.2-5(a) and 4.2-5(b), identified in Section 4.2, Air Quality, would result in a reduction of GHG emissions by year 2020, including construction-related GHG emissions, from 4,793.51 MTCO_{2e} to 4,690.12 MTCO_{2e}, which would result in an overall reduction from projected 2020 BAU levels of 18.30% by 2020. In addition, the reduction of operational reactive organic gases (ROG) and NO_x emissions due to payment of off-site mitigation fees, per Mitigation Measure 4.2-5(c) (see Section 4.2, Air Quality), would subsequently result in an associated reduction in GHG emissions. The cumulative mitigation fee amount stated below is the fee required to reduce the project’s contribution to cumulative emissions to less than significant. With implementation of Mitigation Measures 4.2-5 (a) through (c), the total GHG reduction from projected 2020 BAU levels by 2020 would be 21.58%, as presented in Table 4.4-6, which exceeds the threshold employed by the City of a 21% minimum GHG emission reduction compared to BAU levels. Accordingly, after mitigation, the impact would be **less than significant**.

**Table 4.4-6
Mitigated GHG Reductions**

Reductions	% Reduction (%)
Reduction from Projected 2020 BAU by 2020 ¹	16.50
Compliance with CalGreen Code ²	1.80
Additional reduction from implementation of Mitigation Measures AQ-4(a) and AQ-4(b) ³	1.80
Additional reduction from implementation of Mitigation Measure AQ-4(c) ⁴	1.48
Total% Reduction	21.58

Source: See Appendix C.

Notes:

¹ See Table 4.4-5.

² See 4.4-5.

³ $(5,740.42 \text{ MTCO}_2e - 4,690.12 \text{ MTCO}_2e) / 5,740.42 \text{ MTCO}_2e \times 100\% = 18.30\%$; $18.30\% - 16.50\% = 1.8\%$ (the additional 1.8% reduction is due to implementation of Mitigation Measures 4.2-5(a) and 4.2-5(b)).

⁴ Implementation of Mitigation Measure 4.2-5(c) would result in a reduction of 5.79 tons ROG and NO_x from payment of off-site mitigation fees. 13.18 tons of CO₂ are reduced per ton of ROG and NO_x reduced (13.18 tons CO₂/ton ROG and NO_x x 5.79 tons ROG and NO_x from payment of off-site mitigation fees = 76.31 tons or 69.23 metric tons CO₂ reduced = 1.48% reduction from payment of off-site mitigation fees) (from (Christofk, pers. comm. 2011)).

4.4.6 Sources

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