4.5 CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

4.5.1 INTRODUCTION

This Section describes the potential effects of climate change from the proposed Project's contribution to green house gas 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* as amended (2004)
- City of Roseville *Zoning Ordinance* as amended (August 2006)
- Tim Rimpo Associates, *Sierra Vista Specific Plan Air Quality/Greenhouse Gas Emissions Technical Report,* July 2, 2009
- (proposed) *Sierra Vista Specific Plan* (2009)
- *West Roseville Specific Plan FEIR*, February 2004
- *Placer Vineyards Specific Plan 2nd Partially Re-circulated Draft EIR*, March 2007

The documents listed above are available for review during normal business hours at:

City of Roseville Permit Center
311 Vernon Street
Roseville, CA 95678

No comments were received relative to greenhouse gas emissions or climate change.

4.5.2 ENVIRONMENTAL SETTING

The Greenhouse Effect

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. As defined in California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, GHGs include all of the following: carbon dioxide ($CO_{2)}$, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6).[1] (Health & Safety Code § 38505(g).) . The greenhouse effect is the process of

[1] These are also the six "Kyoto Protocol" greenhouse gases.

solar radiation entering 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. The absorbed radiation is then emitted from the earth, not as high-frequency solar radiation, but lower frequency infrared radiation. Most solar radiation passes through GHGs; however, infrared radiation is selectively absorbed by GHGs. As a result, infrared radiation released from the earth 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. Without the greenhouse effect, Earth would not able to support life as we know it.

Global warming potential (GWP) is a measure of how much a given mass of GHG is estimated to contribute to global warming. It is a relative scale, which compares the gas in question to that of the same mass of CO_2 (which has a GWP of 1). Thus, for example, CH_4 has a GWP of 21 and N_2O has a GWP of 310 (California Climate Action Registry, 2009). Refrigerants have GWP's that range from 76 up to 12,240 (U.S. Green Building Council, 2007). Consequently, using each pollutant's GWP, emissions of CO_2, CH_4, N_2O, Chlorofluorocarbons and Ozone Depletion Chlorofluorocarbons (CFCs), and Hydrochlorofluorocarbons (HCFCs), can be converted into CO_2 equivalents, expressed as CO_2e.

Fossil fuel combustion removes carbon stored underground (as, for example, coal, oil or natural gas) and releases it into the active carbon cycle, thus increasing concentrations of GHGs in the atmosphere. Emissions of GHGs in excess of natural ambient concentrations are theorized to be responsible for the enhancement of the greenhouse effect and contribute to what is termed "global warming", a trend of unnatural warming of the Earth's natural climate. Increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface. Climate change is a global problem, and GHGs are global pollutants, unlike criteria pollutants (such as ozone, carbon monoxide, and particulate matter) and toxic air contaminants (TACs), which are pollutants of regional and local concern.

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme. IPCC's mission is to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, including the potential impacts and options for adaptation and mitigation. IPCC

predicts substantial increases in global temperatures of between 1.1 to 6.4 degrees Celsius by the end of the century, depending on the scenario (Intergovernmental Panel on Climate Change 2007).

Climate change could impact California's natural environment in the following ways (California Energy Commission 2005):

- Rising sea levels along the California coastline, particularly in San Francisco and the Sacramento-San Joaquin River Delta due to ocean expansion;
- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths and infectious diseases and a higher risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Changes in distribution of plant and wildlife species due to changes in temperature, competition of colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California's climate and ecosystems could occur at a time when California's population is expected to increase from 34 million to 59 million, by the year 2040 (California Energy Commission 2005).

Consequently, for a "business as usual" scenario, increases are expected in the amount of anthropogenic GHG emissions and the number of people potentially affected by climate change. Changes similar to those noted above for California would also occur in other parts of the world.

Transportation generates 41 percent of California's GHG emissions, followed by the industrial sector (23%), electricity generation (20%), agriculture and forestry (8%), and other sources (8%). Emissions of CO_2 and N_2O are byproducts of fossil fuel combustion, among other sources.

Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Sinks of carbon dioxide include uptake by vegetation and dissolution into the ocean. In 2004, California generated 524 million metric tons of GHG measured as CO_2e emissions (California Air Resources Board, 2007).

4.5.3 REGULATORY SETTING

Federal

There are currently no federal laws that regulate global warming. However, the Waxman Markey bill (HR2454) is pending in Congress and is referred to as The American Clean Energy and Security Act (ACES). It is intended to create jobs, reduce energy costs, and reduce green house gas emissions. To address these goals, the legislation has four titles:

- A clean energy title that promotes renewable sources of energy, carbon capture and sequestration technologies, low-carbon fuels, clean electric vehicles, and the smart grid and electricity transmission;
- An energy efficiency title that increases energy efficiency across all sectors of the economy, including buildings, appliances, transportation, and industry;
- A global warming title that places limits on emissions of heat-trapping pollutants; and
- A transitioning title that protects U.S. consumers and industry and promotes green jobs during the transition to a clean energy economy.

State

Several recent state-level actions have been taken to limit greenhouse gas (GHG) emissions implicated in global warming. Those actions are described below.

Executive Order S-3-05

On June 1, 2005, California Governor Arnold Schwarzenegger issued Executive Order S-3-05. It included the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80% below 1990 levels. To meet the targets, the governor directed several state agencies to cooperate in the development of a Climate Action Plan. The Secretary of Cal-EPA leads the Climate Action

Team (CAT), whose goal is to implement global warming emission reduction programs identified in the Climate Action Plan and to report on the progress made toward meeting the emission reduction targets established in the executive order.

The first report to the Governor and the Legislature was released in March 2006 and will be issued bi-annually thereafter. The CAT report to the Governor contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met (California Environmental Protection Agency 2006). The most recent CAT Biennial Report was issued in draft form in March 2009.

California Global Warming Solutions Act of 2006 (Assembly Bill 32)

In 2006, the California state legislature adopted the California Global Warming Solutions Act of 2006 (AB 32). AB 32 establishes a cap on statewide GHG emissions and sets forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHGs are defined as carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

AB 32 requires that ARB:

- Adopt early action measures to reduce GHGs.;
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions;
- Adopt mandatory report rules for significant GHG sources;
- Adopt a scoping plan indicating how emission reductions will be achieved via regulations, market mechanisms, and other actions; and
- Adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

Early *Action Measures*

ARB has adopted several early action measures to reduce GHG. They include actions such as improvements to landfill methane capture, a vehicle tire pressure program, improvements to heavy duty truck efficiency, and a low carbon fuels standard (LCFS). On April 23, 2009, the California Air Resources Board adopted a LCFS. This standard requires that all fuels sold in California must have a reduced carbon content that will lower emissions by 10% by 2020.

Guidance and protocols for businesses and governments to facilitate GHG emission reductions were approved as early action items by the Board at its June 2007 hearing. A Local Government Toolkit was designed to provide guidance and resources to help cities and counties reduce greenhouse gas emissions and save money. No regulations have been adopted by the California Air Resources Board that applies specifically to cities and counties.

A variety of tools are available to assist with climate action planning, including information on:

- How to calculate and inventory current GHG emissions;
- A recommended target to reduce GHG emissions;
- Cost-saving strategies to take action now;
- Financial resources to get started;
- Case studies to learn what other cities have been able to accomplish.

Phase II of the Toolkit will include a decision support tool to help local governments develop customized climate action plans, a peer-networking online discussion forum, and a climate leadership recognition program to recognize achievements for measured GHG emission reductions.

California's *Scoping Plan and GHG Emissions Cap*

In the adopted Climate Change Scoping Plan (2008), ARB lays out the GHG reductions that need to be achieved, and the types of measures that will be used to reach them. The Plan shows that California's 1990 GHG emissions equaled 427 million metric tons CO_2e, 2002-2004 average emissions equaled 469 million metric tons CO_2e, and 2020 GHG emissions would equal 596 million metric tons CO_2e under a "business as usual" scenario. Consequently, compared to 1990, emissions would need to be reduced by 169 million metric tons CO_2e, and about 42 million metric tons from 2002-2004 levels (ARB, 2008b).

The measures that will be used to achieve these emission reductions include the early action measures described above, plus 18 additional categories of measures:

1) California Cap-and-Trade Program
2) California Light-Duty Vehicle GHG Gas Standards

3) Energy Efficiency
4) Renewables Portfolio Standard
5) Low Carbon Fuel Standard
6) Regional Transportation-Related GHG Targets
7) Vehicle Efficiency Measures
8) Goods Movement
9) Million Solar Roofs Program
10) Medium/Heavy-Duty Vehicles
11) Industrial Emissions
12) High Speed Rail
13) Green Building Strategy
14) High Global Warming Potential Gases
15) Recycling and Waste
16) Sustainable Forests
17) Water
18) Agriculture

The California Air Resources Board has initiated development of measures for each of these categories.

SB *375*

This regulation, enacted in September 2008, is designed to control GHGs by limiting urban sprawl. It requires metropolitan planning organizations (MPOs) to include sustainable communities strategies (SCS), as defined, in their regional transportation plans (RTPs) for the purpose of reducing greenhouse gas emissions. SB 375 also aligns planning for transportation and housing, and creates specified incentives for the implementation of the strategies.

ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHS emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years, if advancements in emissions technologies affect the reduction strategies to achieve the targets.

ARB is also charged with reviewing each MPOs SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012. SACOG is the MPO for the project region.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under the California Environmental Quality Act (CEQA). The bill directs the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency (recently renamed the Natural Resources Agency) by July 1, 2009 CEQA guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The California Resources Agency is required to certify or adopt those guidelines by January 1, 2010.

On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the state CEQA Guidelines for greenhouse gas emissions, as required by Senate Bill 97 (Chapter 185, 2007). The proposed CEQA Guideline amendments would provide guidance to public agencies regarding the analysis and mitigation of the effects of greenhouse gas emissions in draft CEQA documents. The Natural Resources Agency commenced formal rulemaking on July 3, 2009, prior to certifying and adopting the amendments, as required by Senate Bill 97 (California Office of Planning and Research, 2009).

Metropolitan Transportation Plan and SACOG Blueprint

Placer County and the City of Roseville are members of the Sacramento Area Council of Governments (SACOG), which covers a six county area. SACOG adopted a metropolitan transportation plan (MTP) for 2035 to provide a regional vision for all modes of surface transportation. The MTP uses federal and state funds for programs designed to meet goals such as clean air; for designing communities to encourage local pedestrian, bicycle, and transit travel; and for improvements to main routes that serve longer distance travel around the region.

As part of the MTP, the Preferred Blueprint Scenario promotes compact, mixed-use development. The City of Roseville adopted Blueprint Implementation strategies that support the Preferred Blueprint Scenario (refer to section 4.1, *Land Use*, for a discussion of the City's strategies).

Actions Taken by the Governor's Office of Planning and Research

The California Attorney General (AG) has filed letters commenting on CEQA compliance for a number of proposed projects throughout the state. The AG has also filed at least one CEQA lawsuit and has entered into settlement agreements regarding proposed general plans and projects that the AG found either failed to analyze GHG emissions or failed to provide adequate GHG mitigation. The AG's office has prepared a report that lists measures that local agencies should consider under CEQA to offset or reduce global warming impacts. (Office of the Attorney General, "Global Warming Measures" (12-9-08). The AG's office also has prepared a chart of modeling tools to estimate GHG emissions impacts of projects and plans. The GHG analysis described in this chapter uses two of the tools listed by the AG: URBEMIS and EMFAC. URBEMIS was used to estimate area source emissions, such as space and water heating. Information on the AG's actions can be found on at the California Department of Justice Office of Attorney General web site (California Department of Justice 2008).

California Air Pollution Control Officers Association Guidance

The California Air Pollution Control Officers Association (CAPCOA) released a report in January 2008 that describes methods to estimate and mitigate GHG emissions from projects subject to CEQA. The CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The CAPCOA report, however, does not recommend any one threshold. Instead, the report is designed as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects subject to CEQA (California Air Pollution Control Officers Association 2008.

City of Roseville

The *City of Roseville General Plan* was updated in 2008 to specifically identify policies that reduce greenhouse gas emissions. These policies, which address global climate change by requiring greenhouse gas emissions reduction, conserving energy and resources, and by addressing the potential impact of climate change (e.g., the flood protection policies), are listed here:

> **Community Form Policy 5:** Promote land use patterns that result in the efficient use of urban lands and preservation of open space as specified in the Open Space and Conservation Element.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 1: Promote land use patterns that support a variety of transportation modes and accommodate pedestrian mobility.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 2: Allow for land use patterns and mixed use development that integrate residential and non-residential land uses, such that residents may easily walk or bike to shopping, services, employment, and leisure activities.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - 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.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 4: Promote and encourage the location of employee services such as childcare, restaurants, banking facilities, convenience markets, etc., within major employment centers for the purpose of reducing midday service-related vehicle trips.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - Policy 5: Where feasible, improve existing development areas to create better pedestrian and transit accessibility.

Community Form - Relationship to Transit, Pedestrian, and Air Quality - 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.

Community Form - 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.

Community Form – Jobs/Housing and Economic Development - Policy 1: Strive for a land use mix and pattern of development that provides linkages between jobs and employment uses, will provide a reasonable jobs/housing balance, and will maintain the fiscal viability of the City.

Community Form – Community Design - 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.

Community Form – Community Design - Policy 3: Encourage project designs that place a high priority and value on open space, and the preservation, enhancement and incorporation of natural resources and other features including consideration of topography, vegetation, wetlands, and water courses.

Community Form – Community Design - Policy 9: The location and preservation of native oak trees and oak woodlands shall be a primary factor in determining site design, building location, grading, construction and landscaping, and in establishing the character of projects through their use as a unifying element in both new an existing development.

Growth Management Policy 8: Manage growth in such a way to ensure that significant open space areas will be preserved.

Circulation – Level of Service - Policy 2: Strive to meet the level of service standards through a balanced transportation system that reduces the auto emissions that contribute to climate change by providing alternatives to the automobile and avoiding excessive vehicle congestion through roadway improvements, Intelligent Transportation Systems, and transit improvements.

Circulation – Level of Service – Policy 5: Enable the City to designate a Pedestrian District over a geographic area for the purpose of implementing measures that promote pedestrian walkability and reduce total vehicle miles traveled and resultant air pollution emissions that contribute to climate change. In these districts, the City recognizes that pedestrian travel takes a higher priority than automobile travel, which could reduce the vehicular level of service.

Circulation – Transit - Policy 1: Pursue and support transit services within the community and region and pursue land use, design and other mechanisms that promote the use of such services.

Circulation – Transportation System Management - Policy 1: Continue to enforce the City's TSM ordinance and monitor its effectiveness.

Circulation – Transportation System Management – Policy 2: Work with appropriate agencies to develop measures to reduce vehicular travel demand and total vehicle miles traveled and meet air quality goals.

Circulation – Bikeway/Trails – 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.

Circulation – Bikeway/Trails – Policy 2: Coordinate Roseville's bikeway and trail system with those of neighboring jurisdictions to provide both local and regional connections.

Air Quality and Climate Change Policy 1: Cooperate with other agencies to develop a consistent and effective approach to air pollution planning.

Air Quality and Climate Change Policy 4: As part of the development review process, develop mitigation measures to minimize stationary and area source emissions.

Air Quality and Climate Change – Transportation and Circulation - Policy 5: Develop transportation systems that minimize vehicle delay and air pollution.

Air Quality and Climate Change – Transportation and Circulation – Policy 6: Develop consistent and accurate procedures for mitigating transportation emissions from new and existing projects.

Air Quality and Climate Change – Transportation and Circulation – Policy 7: Encourage alternative modes of transportation including pedestrian, bicycle, and transit usage.

Air Quality and Climate Change – Land Use – Policy 9: Encourage land use policies that maintain and improve air quality.

Air Quality and Climate Change – Energy Conservation – Policy 10: Conserve energy and reduce air emissions by encouraging energy efficient building designs and transportation systems.

Open Space and Conservation – Open Space System – Policy 1: Provide an interconnecting system of open space corridors that, where feasible, incorporate bikeways and pedestrian paths.

Open Space and Conservation – Open Space System – Policy 2: Provide interconnected open space corridors between open space and habitat resources, recreation areas, schools, employment, commercial service and residential areas.

Open Space and Conservation – Open Space System – Policy 3: Work with adjacent jurisdictions to connect the City with regional open space and trail systems, providing a network of open space and habitat resources, pathways and, where reasonable, equestrian trails through the City to link nearby communities

Open Space and Conservation – Open Space System – 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.

Open Space and Conservation – Open Space System – Policy 6: Take into account consideration of natural habitat areas in developing linkages and in preserving open space areas. Identify alternate sites for linkages where sensitive habitat areas have the potential to be adversely impacted.

Open Space and Conservation – Open Space System – Policy 7: Maximize opportunities for preservation and maintenance of open space resources, including establishment of private open space areas. Consider coordination with non-profit organizations and investigate the potential for conservancy ownership and/or management of open space areas.

Open Space and Conservation – Vegetation and Wildlife – Policy 1: Incorporate existing trees into development projects, and where preservation is not feasible, continue to require mitigation for the loss of removed trees. Particular emphasis shall be placed on avoiding the removal of groupings or groves of trees.

Open Space and Conservation – Vegetation and Wildlife – Policy 2: Preserve and rehabilitate continuous riparian corridors and adjacent habitat along the City's creeks and waterways.

Open Space and Conservation – Vegetation and Wildlife – Policy 3: Require dedication of the 100-year flood plain or comparable mechanism to protect habitat and wildlife values in perpetuity.

Open Space and Conservation – Vegetation and Wildlife – Policy 4: Require preservation of contiguous areas in excess of the 100-year flood plain as merited by special resources or circumstances. Special circumstances may include, but are not limited to, sensitive wildlife or vegetation, wetland habitat, oak woodland areas, grassland connections in association with other habitat areas, slope or topographical considerations, recreation opportunities, and maintenance access requirements.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 3: Ensure a buffer area between waterways and urban development to protect water quality and riparian areas.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 4: Consider the use of City property for habitat preservation and mitigation requirements resulting from development proposals when such efforts do not conflict with existing resources, recreational opportunities, or other City goals, policies, or programs.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 5: Continue to monitor groundwater resources and investigate strategies for enhanced sustainable use. Areas where recharge potential is determined to be high shall be considered for designation as open space.

Open Space and Conservation – Groundwater Recharge and Water Quality – Policy 6: Where feasible, locate storm water retention ponds in areas where subsoil is suitable for groundwater recharge.

Parks and Recreation Policy 1: The City shall ensure the provision of 9 acres of park land per 1,000 residents

Parks and Recreation Policy 6: Take into consideration energy efficiency and water conservation, including the use of treated wastewater, in park development, and design

Public Facilities – Electric Utilities – Policy 5: Explore the feasibility of the development of and participation in renewable energy resources.

Public Facilities – Electric Utilities – Policy 6: Adopt a load/resource management plan, incorporating energy efficiency, conservation, load management, and reliability strategies, identifying program objectives and implementation and monitoring mechanisms.

Public Facilities – Electric Utilities – Policy 8: Pursue reasonable and cost-effective energy efficiency, conservation, and load management programs pertinent to the electric utility system.

Public Facilities – Electric Utilities – Policy 10: Require new development to pay a fair share of the cost of new sub-transmission and distribution needed to serve the development and to dedicate sites and easements needed for substations, transmission, sub-transmission, and distribution.

Public Facilities – Water System – Policy 10: Develop and implement water conservation standards and measures as necessary elements of the water system.

Public Facilities – Water System – Policy 11: Develop and implement an aquifer storage and recovery program.

Public Facilities – Wastewater and Recycled Water System – Policy 5: Explore potential alternatives to treatment and discharge.

Public Facilities – Wastewater and Recycled Water System – Policy 6: Develop, plan, and provide incentives for use of recycled water by the public and private sectors.

Public Facilities – Solid Waste, Source Reduction and Recycling – Policy 1: Ensure existing and future recycling sites and operations remain viable through application of land use compatibility standards.

Public Facilities – Solid Waste, Source Reduction and Recycling – 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.

Public Facilities – Solid Waste, Source Reduction and Recycling – Policy 5: Develop public education and recycling programs

Public Facilities – Water and Energy Conservation – Policy 1: Develop and implement water conservation standards.

Public Facilities – Water and Energy Conservation – Policy 2: Implement various water conservation plans developed by the Environmental Utilities Department.

Public Facilities – Water and Energy Conservation – Policy 3: Explore potential uses of treated wastewater.

Public Facilities – Water and Energy Conservation – Policy 4: Protect the quality and quantity of the City's groundwater and consider designating areas as open space where recharge potential is high.

Public Facilities – Water and Energy Conservation – 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.

Public Facilities – Water and Energy Conservation – Policy 6: Develop and implement public education programs designed to increase public participation in energy, water conservation and recycled water use.

Public Facilities – Water and Energy Conservation – Policy 7: Require large electricity users to submit a use and conservation plan concurrent with development review specifying measures to be taken to minimize demand.

Public Facilities – Water and Energy Conservation – Policy 8: Enforce energy requirements and encourage development and construction standards that promote energy efficiency and conservation.

Public Facilities – Water and Energy Conservation – Policy 9: Preserve scarce resources by undertaking major projects in energy conservation and load management, including increasing efficiency in the City's electrical system.

Public Facilities – Water and Energy Conservation – Policy 10: Continue and expand energy efficiency and conservation programs to serve all utility users.

Safety – Flood Protection – Policy 1: Continue to regulate, through land use, zoning, and other restrictions, all uses and development in areas subject to potential flooding.

Safety – Flood Protection – Policy 2: Monitor and regularly update City flood studies, modeling and associated land use, zoning, and other development regulations.

Safety – Flood Protection – Policy 3: Continue to pursue a regional approach to flood issues.

Safety – Flood Protection – Policy 4: Provide flood warning and forecasting information to community residents to reduce impacts to personal property.

Safety – Flood Protection – Policy 5: Minimize the potential for flood damage to public and emergency facilities, utilities, roadways, and other infrastructure.

Safety – Flood Protection – Policy 6: Require new developments to provide mitigation to insure that the cumulative rate of peak run-off is maintained at pre-development levels.

Safety – Flood Protection – Policy 8: Establish flood control assessment districts or consider other funding mechanisms to mitigate flooding impacts.

Safety – Flood Protection – Policy 9: Where feasible, maintain natural stream courses and adjacent habitat and combine flood control, recreation, water quality, and open space functions.

City Operations

Measures that are included in the City of Roseville Utility Operations:

The Water Treatment, Water Distribution, Storm Water, Wastewater Treatment, Wastewater Collection and Recycled Water facilities are the primary divisions in the Environmental Utilities Department that are affected by the implementation of the energy efficiency standards listed below.

- Automatic Process Controls Systems: There are numerous benefits of automatic process control systems. Two of the chief benefits are chemical and energy savings. Savings of 20% in chemical and energy consumption with a payback period of 2 years are not uncommon. [*1]
- Reduced chemical usage is achieved automatically by varying the chemicals delivered to the process to precisely match the amount of chemical needed. The reduced chemical consumption also achieves the benefit of reducing shipments of chemicals to the facility, reducing pumping costs, and less wear and tear on chemical systems due to excessive operation. All of the chemical control systems in Environmental Utilities utilize automatic process control systems.
- Reduction in electricity consumption is achieved via automatic process controls since the automated system will only operate equipment that is needed for current process conditions. The system constantly evaluates the equipment that is required to control the processes and turns on or off equipment as necessary to maintain permit and regulatory compliance. In addition to turning on and off equipment, many of the motors on process equipment are equipped to vary their speed automatically with variable frequency drives. The variable frequency drives will automatically vary the speed of a pump or other device to match the exact speed required for the process. All capital improvement projects for Environmental Utilities since 1994 utilize automatic process control systems.

- Variable Frequency Drives: Variable frequency drives is a system used to vary the speed of rotating equipment rather than running it at full speed, thereby reducing energy consumption.

- The majority of variable frequency drive applications are for pumps and fans. The savings is largest for them since the theoretical power required varies with the cube of the speed of the equipment. The Energy and Water Management Report conducted by Xenergy in 2001 revealed no additional treatment processes would benefit by addition of variable frequency drives at our treatment facilities since Environmental Utilities had already properly assessed their treatment systems. Each treatment process continues to be evaluated during design to determine whether variable frequency drives will provide a benefit.

- Soft Starters: Soft Starters are utilized to reduce the initial inrush of current that occurs when a motor is started.

- Typical starting current for a motor ranges from ten to thirteen times the normal operating current. With the use of soft starters, the starting current is typically reduced to two to three times the normal operating current. Roseville Electric is required to have reserve power available at all times to allow for the extra current demands created by the motors and other loads in the City. Use of soft starters reduces the peak current demand on Roseville Electric and also has the benefit of reducing mechanical and electrical stresses on the affected equipment.

- Premium Efficiency Motors: Electric motors account for majority of the energy costs for Environmental Utilities facilities.

- In 1992 the National Electrical Manufacturers Association standardized the criteria for labeling motors as 'premium efficiency'. This label could only be applied to motors that meet stringent criteria for efficiency standards. These efficiencies translate into reduced energy consumption for each motor, and the increased cost of these motors typically has a payback from a few months to a couple of years. Environmental Utilities has required the use of premium efficiency motors for all new and replacement motors since 1998.

- Heating Ventilation and Air Conditioning (HVAC) and Lighting Systems: Less than three percent of electricity consumed in the water and wastewater treatment process is due to HVAC and lighting.

- Environmental Utilities meets or exceeds California Code of Regulations Title 24 energy efficiency standards. These efficiencies include use of occupancy sensors for indoor lighting, photocells for outdoor lighting, and programmable thermostats for HVAC systems.

In addition to all of the minimum requirements listed above, Environmental Utilities is partnering with Roseville Electric to investigate new and emerging technologies to reduce the overall electrical consumption by Environmental Utilities. Some of the programs currently being analyzed or implemented include installation of solar panel grids, wastewater treatment gas powered fuel cells and low pressure-high output ultraviolet disinfection systems for the wastewater treatment facilities.

Diesel Emissions Control Systems (DECS): Twenty-Three (23) solid waste collection trucks and nine (9) diesel transit buses have been retrofitted with DECS reducing the diesel particulate material (PM) by 85% and Nitrogen Oxides (Nox) by 25% for each vehicle.

Ultra Low Sulfur Diesel (ULSD): The City of Roseville has been using ULSD for over two years on its transit fleet and it is now used exclusively by all fleet diesel engines.

Compressed Natural Gas (CNG) Fuel: Nine (9) transit buses and one (2) passenger van operate on CNG fuel.

Hybrid Vehicles: Currently there are four (4) hybrid vehicles in the City's fleet and the City is looking to add more this year.

Biodiesel: Vehicle Maintenance has entered into discussions with area users and distributors to look at the cost/benefit of using biodiesel within the city's diesel fleet.

Traffic Signal-Head Retrofits

Over the past 6 years, Roseville has installed or converted 2,539 traffic signal heads, 914 pedestrian signal heads, and 16 internally illuminated street name signs from traditional incandescent light

bulbs to energy efficient LED's (Light Emitting Diodes). This change resulted in a 300,900 kwh (kilowatt hour) monthly reduction in energy consumption (3,610,548 kwh annually). Thanks to the LED changeover, the City saves over $24,900 a month in energy costs—almost $300,000 a year!

Traffic Signal Coordination

Roseville has 16 roadway segments that are coordinated at various times throughout the day. Out of the 150 existing traffic signals within the city, 87 signals are coordinated -- about 58% of all traffic signals in Roseville. Coordinated traffic signals help deter emissions normally created by vehicles through reduced vehicle idling, acceleration and deceleration. It also contributes to increased vehicle fuel economy for the motoring public. Studies have documented a 20% overall reduction in total delay on the coordinated corridors.

Asphalt Recycling

The City's Street Maintenance Division reduces emissions by recycling asphalt materials replaced during maintenance on roadways. Recycled asphalt is reused as base material for overflow parking lots and roadway repairs. This practice saves money and avoids emissions created by asphalt processing.

Climate Action Initiatives

In September 2006, City Council took a major step toward charting a course for a greener and more sustainable Roseville by adopting the National Action Plan for Energy Efficiency and the guiding principles for Greenhouse Gas Reduction Goals. Roseville joined the California Climate Action Registry in 2006 as well.

- **National Action Plan for Energy Efficiency**

  In 2006, the United States Environmental Protection Agency (EPA) and Department of Energy (DOE) co-sponsored the National Action Plan for Energy Efficiency (the Action Plan).The Action Plan presents policy recommendations for creating a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities and partner organizations. Such a commitment could save Americans many billions of dollars on energy bills over the next 10 to 15 years, contribute to energy security, and improve our environment. Roseville has adopted the principles of the Action Plan.

- **Climate Action Registry**

Roseville Electric joined the California Climate Action Registry (CCAR) in late 2006. As a member, Roseville Electric compiled and reported its Green House Gas (GHG) emissions. Roseville Electric's first filing only reported CO_2. All filings subsequent to 2008 report the six Kyoto gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) to the extent Roseville Electric is a producer of the respective gas.

- **Greenhouse Gas Goals**

  Roseville Electric is actively monitoring and participating in the efforts of the California Air Resources Board as it implements the "The California Global Warming Solutions Act of 2006," or AB 32. This effort was only recently undertaken by the California regulatory bodies and has not yet rendered draft regulations or detailed compliance timelines. Roseville Electric fully intends to participate in this public process and adopt its own policies, procedures, and timelines, to be in full compliance of these regulations. Generally, entities are expected to begin reducing GHG emissions January 1, 2010.

Renewable Portfolio (RPS)

The Roseville Electric Renewable Portfolio Standard requires 20% renewable power resources in Roseville Electric's power portfolio. For over 20 years, the City of Roseville has used renewable energy resources to meet a portion of its customers' needs with its ownership participation in the Northern California Power Agency projects: Collierville hydroelectric facility (1990); geothermal facilities (1983 & 1985 or Plants 1 & 2, respectively); and its purchased power from the Federal entity Western Area Power Administration – Sierra Nevada Region Central Valley Project hydro-electric system. In addition, power is purchased from the landfill gas facility in Lincoln Landfill. The project uses landfill gas, which is mostly methane, to produce electricity instead of allowing the gas to vent into the atmosphere or burned through flaring. Each ton of methane has the equivalent effect of 21 tons of carbon dioxide in its global warming potential.

In 2005, these projects, as well as other power purchases served approximately 45% of Roseville's electrical needs. When compared to conventional fossil fuel generation, the output from these renewable sources avoids the production of 266 million pounds of CO_2 which has the environmental impact of removing 26,176 cars from the road or planting more than 50 million trees each year.

The Roseville Energy Park (REP)

The Roseville Energy Park is a 166 megawatt natural gas fired power plant that utilizes the state-of-the-art and most efficient current combined cycle gas turbine ("CCGT") technology available—a technology recognized and selected by the California state legislature to serve as the benchmark for the Emission Performance Standard ("EPS"). The benchmark will be applied to baseload resources located within the state of California and resources that ultimately produce the power that is imported into California.

City Owned Solar Electric Systems

Roseville Electric and the City of Roseville have been active supporters of solar electric generation (photovoltaic, or "PV") since 1997; Electric and Central Services Departments have installed PV on the Ray Sharp Memorial Fire Station #6, at the Roseville Aquatics Center, the Civic Center, and the historic locomotive on Vernon Street. In addition, RE installed a PV system on a rooftop at Silverado Middle School in the Dry Creek School District. These systems provide enough locally generated clean renewable energy to offset approximately 102,000 lbs of CO2 greenhouse gas emissions from traditional fossil fuel fired generation each year.

City Facilities Powered by Clean Renewable Energy

Currently, Roseville Electric provides both the City's Civic Center and Roseville Electric buildings with clean, renewable power by purchasing 100% of their energy use from Green Roseville, described below. These City buildings alone avoid the production of more than 1.2 million pounds of $C0_2$ per year. Roseville Electric hopes to have all City owned facilities powered by clean energy.

Green Roseville – Clean Green Energy Program

Roseville Electric offers its customers the choice to purchase clean, renewable energy for their homes or businesses. Choosing clean energy is one of the most significant efforts an individual or an organization can take to reduce their impact on the environment. Renewable energy ties directly to a reduction in C02 emissions and is recognized by the Environmental Protection Agency to have a substantial positive effect on the environment. Green Roseville provides renewable energy from the cleanest, local sources available - wind and solar. The wind energy comes from High Winds wind farm, the largest modern wind farm in California located in nearby Solano County. The solar energy is produced within the City of Roseville by facilities such as Fire Station #6, the Roseville Aquatics Center and the Civic Center. In order to expand the benefits of

the program to the community, all proceeds from the solar energy customers are matched by the City of Roseville to support the production of new City-owned PV systems that provide the solar energy used in the program. The average Roseville home enrolled in the program can prevent about 7,700 pounds of carbon dioxide and other harmful air pollutants such as particulates from entering the atmosphere each year. Small businesses and Large Green Roseville Business Partner Champions have a much greater impact.

Shade Tree Program

Roseville Electric, in cooperation with Roseville Urban Forest Foundation, provides free shade trees to residential and commercial customers as an energy efficiency measure. Properly placed shade trees can reduce summer cooling costs by 20 – 40 percent while also providing environmental benefits through oxygen exchange and noise reduction.

Strategic Planning and Initiatives

Roseville Electric has a strong commitment to energy reductions and renewable energy resources, two effective ways to reduce green house gases and assist in creating a sustainable community. As a strategic goal, Roseville will reduce energy requirements by 5% by 2012 through demand side programs such as energy efficiency and renewable energy resources like solar energy facilities. State law requires roughly 3% of total electric revenues be targeted toward demand side efforts. Roseville exceeds this requirement with an allocation of 5% of total revenues toward the demand side programs and resources.

Solar Electric (PV) Incentive Programs

Solar electric generation incentives are provided to Roseville residential and commercial electric customers – both for new buildings and to retrofit to existing buildings. PV systems reach peak production during times of the day when the Roseville Electric system experiences maximum electric demand from City customers. PV incentives are designed to minimize the customer's project "first cost" (initial investment) with respect to installing new PV equipment. Roseville Electric presently has 460 AC watts installed, with generation of approximately 741,328 kWh per year. This level of clean energy generation creates an environmental benefit equal to the reduction of 922,000 pounds of CO2 per year.

Energy Audits

Roseville Electric (RE) provides "on-line" and on-site energy audits to residential and commercial electric customers. Based upon the premise that "you can't change what don't understand", these audits provide the customers with a report on their present energy use patterns and habits. They also identify opportunities for the customer to change electric usage patterns or purchase more energy efficient appliances and equipment that will reduce their monthly energy bills. Commercial customers can link into the Customer Connection advice available on the Roseville Electric website for more in-depth information. Residential customers can click on the RE-View Energy and Water audit on RosevilleElectric.org.

Residential Energy Efficiency Programs

RE's Residential Energy Efficiency Programs for new and existing homes offer rebates, educational materials and technical assistance designed to help costumers use electricity more efficiently. Customers benefit from reduced electric bills and by reducing emissions due to reduced power consumption. Programs focus on rebates for new window upgrades, energy efficient appliances, better insulation, and high efficiency air conditioners and heat pumps.

For the new home market, Roseville Electric offers award winning programs. Via development agreements, all new construction requires air conditioners that exceed state energy efficiency requirements. Preferred Homes provides rebates to builders who construct energy efficient homes. The annual goal is 1000 new homes per year. The BEST Homes program takes an additional step by adding electricity producing solar electric panels, Energy Star appliances and shade trees to the Preferred Homes requirements. Goals are to include 20% of all new homes in Roseville in one of these programs. Over the next 25 years, the result will be a reduction in future emissions of CO2 by 62,000 ton lbs. Additionally, this is equivalent to planting 22,000,000 trees over the next 25 years.

Energy Efficiency Programs for Low Income Residents

Loans, grants and the Handyperson Program provide financial assistance to low income residents and can be used to improve the energy efficiency of a home. These programs are funded through Federal and State programs for low income residents and administered by the Roseville's Housing Division.

Commercial Energy Efficiency Programs

Roseville Electric's Commercial Retrofit Energy Efficiency Rebate program helps new and existing businesses save energy and money and reduce summer peak electric consumption. Reductions in summer peak demand reduce greenhouse gases and save ratepayers money. RE offers rebates to assist with reduction of first cost expenditures for energy efficiency upgrades in equipment. Rebates are available for HVAC, lighting, chillers, and are part of a customized approach that allows the customer to create their own energy efficiency measure. In the new construction market, cash rebates are available to architects, engineers, and owners who build at a minimum of 10 percent beyond Title 24 requirements.

Alternatively Fueled Vehicles

Highway vehicles are a major contributor to air pollution in the U.S., producing 29-63% of key chemicals that cause smog and health problems. www.fueleconomy.gov. U.S. Dept. of Energy.

- Carbon monoxide (CO) - 63%
- Nitrogen oxides (NOx) - 36%
- Hydrocarbons - 29%

Hybrid-electric vehicles combine the benefits of gasoline engines and electric motors to reduce reliance on fossil fuels and provide up to a 50% reduction in emissions. The Roseville Electric fleet of vehicles includes 4 Hybrid fuel vehicles. All new staff cars will be hybrid. The use of hybrid vehicles in the city's fleet will substantially reduce green house gas emissions. According to the City's Draft Municipal Climate Action Plan, it is estimated that the City's Fleet Program will save approximately 55,000 gallons of fuel a year which would equate to approximately 500 tons of CO2 emissions avoided.[2]

Electric Vehicle Charging Stations

Electric vehicles are energy efficient, environmentally friendly and are not dependent on gasoline. Electric vehicles are limited in driving range and can take from 4 to 8 hours to recharge. www.fueleconomy.gov. Roseville Electric supports Electric Vehicle (EV) owners in the Roseville community and others by maintaining 3 electric vehicle charging stations in Roseville, one in the Galleria (temporarily out of service during the mall remodel), one on Oak St. and one in the Amtrak

[2] Terri Shirhall, personal communication, September 2009.

parking lot on Church St. These charging stations are promoted through the Electric Vehicle Enthusiast online newsite, EV Charger News.

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The proposed SVSP incorporates guidelines, strategies, and mitigation measures that minimize the human and spatial environmental footprint with respect to transportation fuels consumption and electricity production. Implementation of these strategies and measures would help reduce potential GHG emissions resulting from the development in the SVSP area. As indicated, the transportation sector is the state's largest fossil energy consumer (CEC 2006). To address this reality, the SVSP land use plan, and Design Guidelines include policies and implementation measures with the following elements that would reduce GHG emissions from an unmitigated baseline:

- Mix of Land Uses to provide opportunities for residential uses adjacent to commercial services.
- Implement bicycle facilities consistent with the City's Bicycle Master Plan including Class I bicycle facilities and an integrated paseo system that provide connectivity of neighborhoods, designed to provide opportunities to reduce automobile demand.
- Promote the use of transit in new developments by requiring the installation of transit facilities where appropriate along transit routes. Right of way is being set aside to support potential bus rapid transit on Watt Avenue.

Although neither the ARB nor any air district in California, including the PCAPCD, has identified a significance threshold for analyzing GHG emissions generated by a proposed project or a methodology for analyzing air quality impacts related to global warming, California has identified goals to reduce GHG emissions to 1990 levels by the year 2020 with adoption of AB 32. To meet AB 32 goals, California would need to generate lower levels of GHG emissions than current levels, while accommodating 30 years of population and economic growth in the state. In addition, by adoption of SB 97 California has committed to developing and adopting CEQA Guidelines to assist local jurisdictions in their assessment. Because no standards have yet been adopted, it is recognized that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels (e.g., help or hinder meeting the AB 32 emission goals). In addition, at this time it remains possible that the regulations

promulgated by ARB pursuant to AB 32 will only apply to stationary source emissions. For purposes of this analysis and absent guidance from State and local agencies, the City has chosen the following approach to analyzing GHG emissions in the context of CEQA: 1) quantify the mass of GHG emissions associated with the proposed SVSP using recommended and widely accepted calculation tools available at this time of writing, 2) apply a significance threshold by that, if exceeded, would indicate that the proposed SVSP would result in a substantial increase in GHG emissions, and the impact would be deemed cumulatively considerable and thus significant, and 3) formulate the best available, feasible mitigation measures known to reduce GHG emissions, although the efficacy of such measures may be currently unknown.

4.5.4 IMPACTS

Methodology

Transportation and area source GHG emissions were estimated using the approaches described in Section 4.4, above, for criteria air pollutant emissions. GHGs produced by electricity generation and from solid waste disposal were also estimated. For residential land uses in the 2035 cumulative buildout, direct electricity use was estimated using the California Energy Commission's (CEC's) Residential Appliance Saturation Survey (KEMA-XENERGY, Itron, and RoperASW, 2004). The CEC database contains information on kilowatts consumed per square foot for various types of commercial land uses (Itron, Inc., 2006). For residential land uses, direct electricity use was estimated using the utilities study performed by Capitol Utility Specialists for the proposed project (Capitol Utility Specialists 2009).

The analysis also estimated indirect electricity use associated with water consumption and wastewater treatment. Estimates of water-related energy use were based on a report prepared for the California Energy Commission (Pacific Institute 2005).

Once total electricity use was estimated, the GHGs associated with that electricity use were estimated using emission factors developed by the California Climate Action Registry (2009).

Emissions from the solid waste generated by the proposed project were estimated based on predicted population for 2025 and 2035 and California Air Resources Board methane emissions estimates per standard cubic foot of landfill gas emitted in California (California Air Resources Board 2008b).

Thresholds of Significance

As explained earlier, there are no established, widely accepted, or officially adopted quantitative thresholds of significance against which to compare quantitative assessments of projects' GHG. This current lack of consensus with respect to a quantitative threshold exists because there are inherent challenges associated with determining a project specific project's contribution to a global issue.

- For this analysis, the project's incremental contribution to global climate change would be "cumulatively considerable" and thus significant if due to the size or nature of the project, it would generate a substantial increase in green house gas emissions relative to existing conditions.

- Significant impacts of climate change on the project, such as loss or substantial reduction of water supply reliability, due to rising temperature, change in precipitation patterns, change in snowpack, rise in sea level, or change in storm frequency or severity.

IMPACT 4.5-1	**INCREASED SHORT-TERM CONSTRUCTION-RELATED AND LONG-TERM OPERATIONAL GREENHOUSE GAS EMISSIONS**	
Applicable Policies and Regulations	AB 32 City of Roseville General Plan Greenhouse Gas Policies	
	SVSP	**Urban Reserve**
Significance with Policies and Regulations	Potentially Significant	Potentially Significant
Mitigation Measures:	MM 4.5-1 Air Quality Measures and 4.5-2 Additional Measures to Reduce Greenhouse Gas Emissions	WMM 4.4-4 Reduction of Construction Emissions and WMM 4.4-6 Operational Emission Policies
Significance after Mitigation:	Significant and Unavoidable	Significant and Unavoidable

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The Placer County General Plan currently designates most of the SVSP area as agriculture/timberland. The majority of the SVSP area is undeveloped and has historically been used for agricultural or grazing activities. There are three large-lot single-family residences in the central and southwestern portion of the site, as well as other smaller structures along Baseline Road associated with ongoing dry farming agricultural production activities. Because the SVSP area is largely undeveloped, the existing GHG emissions on the project site are negligible.

Short-term construction and long-term operation of the project would generate emissions of GHGs. Construction emissions would be associated with vehicle engine exhaust from construction equipment, vendor trips, and employee compute trips as shown below in Table 4.5-1. Operational emissions would be associated with area, mobile, and stationary sources. Area-source emissions would be associated with activities such as natural gas use for space and water heating, maintenance of landscaping and grounds, waste disposal, and other sources. Mobile-source emissions of GHGs would include project-generated vehicle trips for residents and employees of, and visitors to the SVSP area. In addition, increases in stationary-source emissions could occur at off-site utility providers associated with electricity generation that would supply the proposed uses within the Plan area.

GHG emissions generated by the proposed project would predominantly be in the form of CO_2. In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a much longer period of time. While emissions of other GHGs, such as methane (CH_4) and nitrous oxide (N_2O), are important with respect to global climate change, the emission levels of these other GHGs for the sources considered for this project would be relatively small compared with CO_2 emissions.

The estimated net increase in CO_2 emissions was calculated for the proposed SVSP and used as an indicator of total GHG emissions. Emission factors and calculation methods for GHG from development projects have not been formally adopted for use by the State or PCAPCD. The most recent URBEMIS model, URBEMIS2007, includes an output parameter for CO_2 emissions. The California Climate Action Registry (CCAR) *General Reporting Protocol* is the most comprehensive guidance, but the protocol is designed to be used by existing large entities and facilities where there are records of energy use, vehicle fleet activities, and manufacturing processes (CCAR 2007).

Both construction and operational emissions were calculated with URBEMIS. Operational emissions from electric utilities were estimated using the CCAR Protocol. For area sources, URBEMIS calculates CO_2 from natural gas use. The CCAR Protocol has calculation methodology for electricity use. The emissions from electricity use may occur a long distance from the point of electrical use, but on a global scale, the location of emissions is of less importance. An additional feature of the CCAR method is that there are factors for calculating CH_4 and N_2O, which are weighted by global warming potential of the respective GHG and summed with CO_2 to yield CO_2e.

Table 4.5-1 shows the estimated emissions per year at buildout from the SVSP project. Table 4.5-2 shows construction related emissions.

TABLE 4.5-1
OPERATIONAL GREENHOUSE GAS EMISSIONS
(UNMITIGATED, METRIC TONS PER YEAR)

Buildout (2025)[3]	CO_2	CH_4	N_2O	Total CO_2e
Water	1,747.8	0.01	0.01	1,751.0
Wastewater	694.7	0.01	0.00	696.0
Solid Waste	-	136.8	-	2,873.3
Area Sources	41,283.4	-	-	41,283.4
Electricity	65,845.0	0.6	0.31	65,965.3
Transportation	469,973.7	-	-	494,709.2
Total	579,544.6	137.4	0.32	607,278.1

Source: Tim Rimpo Associates, 2009

[3] Transportation emissions are based on VMT estimates provided for the traffic analysis and CT-EMFAC emission rates. Area source emissions were estimated using the URBEMIS2007 model and the land uses proposed for the SVSP. Direct electricity and indirect (water-related) electricity estimates are based on land uses proposed for buildout. Electricity estimates are based on emission factors developed by the California Climate Action Registry (2009). Detailed emission estimates are shown in Appendix-F.

TABLE 4.5-2
2025 BUILDOUT CONSTRUCTION EMISSIONS
(UNMITIGATED, POUNDS PER DAY)

	ROG	NO_X	CO	SO_2	PM10	PM2.5	CO_2
Phase A (2013-2016)							
2013	963.8	84.0	109.9	0.2	487.8	105.1	19,566.5
2014	1,177.2	77.9	103.8	0.2	486.0	104.4	18,141.4
2015	1,140.1	84.0	112.1	0.2	486.4	100.6	18,092.3
2016	688.2	64.9	65.8	0.1	425.3	91.2	13,289.9
Phase B (2017-2019)							
2017	1,784.7	56.4	133.8	0.3	736.7	155.6	29,310.9
2018	1,464.3	42.1	105.3	0.2	676.7	142.6	24,668.7
2019	1,707.1	38.4	99.6	0.2	676.4	142.4	24,960.7
Phase C (2020-2023)							
2020	1,486.1	56.8	101.3	0.2	690.3	146.1	27,432.6
2021	1,131.9	46.9	67.9	0.2	557.6	118.1	22,683.8
2022	1,131.9	46.9	67.9	0.2	557.6	118.1	22,683.8
2023	1,131.9	46.9	67.9	0.2	557.6	118.1	22,683.8
Phase D (2024)							
2024	1,134.1	46.8	69.8	0.2	600.0	127.0	24,324.2

Note: Emissions estimated with URBEMIS2007, version 9.2.4. Detailed description of modeling assumptions included in the Appendix.

As shown in Tables 4.5-1 and 4.5-2, SVSP operations would contribute to GHG emissions to a far greater extent than would construction.

Evaluating the proposed SVSP using traditional emissions calculation methodology, where new development is treated as a new potential to emit, the proposed net change in land uses would result in a substantial increase in GHG emissions compared to existing conditions. This would result in a considerable contribution to the cumulative impact of global climate change and result in a **significant impact**.

By acknowledging that the regulatory environment will continue to progress and that new GHG reduction technologies will continue to be developed in the future, MM 4.5-1 and MM 4.5-2 require the implementation of project-specific mitigation measures that are, MM 4.5-1 and MM 4.5-2 require the implementation of project-specific mitigation measures that are appropriate and feasible during each phase or increment of project development. Although MM 4.5-2 would require the implementation of all feasible GHG reduction known at the time of each Project approval, it is unknown at the time of writing, whether or not the project-specific measures selected during each project phase, in combination with the GHG reductions realized from the regulatory environment that exist at that time, would result in a 30% reduction from business-as-usual emission levels projected for 2025. As regulations and policies gradually become effective, the task of achieving a 30% emissions reduction compared with "business as usual" should become comparatively easier. Conservative emissions reduction estimates are shown, below, for individual mitigation options where documentation was available (California Air Pollution Control Officers Association 2008). The exact quantity of GHG emissions reduction associated with several of the measures identified in MM 4.5-1 and MM 4.5-2 cannot be calculated at this time. However, due to the current disparity between the amount of existing global GHG emissions and the goals of AB 32, even with mitigation measures incorporated, the proposed SVSP would contribute a cumulatively considerable, incremental contribution to global GHG emissions and, therefore, would result in a **significant and unavoidable impact**.

URBAN RESERVE

Future development of the Urban Reserve area would have similar impacts as the SVSP. Short-term construction and long-term operation of development of the Urban Reserve area would generate emissions of GHGs. Construction emissions would be associated with vehicle engine exhaust from construction equipment, vendor trips, and employee compute trips. Operational emissions would be associated with area, mobile, and stationary sources. Area-source emissions would result from activities such as natural gas use for space and water heating, maintenance of landscaping and grounds, waste disposal, and other sources. Mobile-source emissions of GHGs would include project-generated vehicle trips by residents and employees of, and visitors to, the Urban Reserve area. In addition, increases in stationary-source emissions could occur at off-site utility providers associated with electricity generation that would supply the proposed uses within the Urban Reserve area.

GHG emissions generated by development of the Urban Reserve area would predominantly be in the form of CO_2. In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a much longer period of time. While emissions of other GHGs, such as methane (CH_4) and nitrous oxide (N_2O), are important with respect to global climate change, the emissions levels of these other GHGs for the sources considered for this project would be relatively small compared with CO_2 emissions. GHG emissions associated with future development of the Urban Reserve area would result in a **significant** impact.

Implementation of WMM 4.4-4 Construction Emission Reductions and WMM 4.4-6 Operational Emission Policies, and compliance with the City's General Plan Greenhouse Gas policies, would reduce emissions of green house gases from development of the project, but not to a less than significant level. The impact would remain **significant and unavoidable**.

IMPACT 4.5-2	IMPACTS ON THE PROPOSED PROJECT RELATED TO GLOBAL CLIMATE CHANGE	
Applicable Policies and Regulations	AB 32	
	SVSP	**Urban Reserve**
Significance with Policies and Regulations	Less Than Significant	Less Than Significant
Mitigation Measures:	None Required	None Required
Significance after Mitigation:	Less Than Significant	Less Than Significant

SIERRA VISTA SPECIFIC PLAN

Although there is consensus that global warming is occurring and is greatly influenced by human activity, there is less certainty as to the timing, severity and potential consequences of global climate change. Nonetheless, the following provides information on the potential effects of climate change on the future SVSP project.

Temperature

An increase in average annual temperatures would, by itself, have little effect on the proposed project, other than increasing the demand for irrigation from increased evapo-transpiration rates, and potentially greater overall energy demand to meet air conditioning needs.

Precipitation Climate

Change can affect rainfall by changing the amount and timing and intensity of events. Although warmer rainfall would not affect local rainfall events, it could change the type of precipitation that falls in the Sierra Nevada mountain range (rain versus snow), which has functioned in California's water system as a vast reservoir of fresh water in the form of the snow pack.

Although global climate change models generally predict an increase in overall precipitation on a worldwide scale, regional models applied to California predict both increases and decreases in

annual precipitation. Therefore, the data have been inconclusive in formulating agreed-on predictions of future conditions.

According to DWR (2006), when trends are analyzed for northern, central and southern California, they show that precipitation in the northern portion of the state appears to have increased slightly from 1890 to 2002, while precipitation in the central and southern areas has decreased slightly. All changes were in the range of one to three inches annually.

Snow Pack/Water Supply

California's annual snow pack is deposited primarily between the months of November and March. The snow pack typically melts from April through July, which in turn feeds the American and Sacramento Rivers. Snowmelt provides significant quantities of water to streams and reservoirs for several months after the annual storm season has ended.

The snow pack is important to the state's annual water supply because of its volume and the time of year that it typically melts. Average runoff from melting snow pack provides about 20% of the state's total annual natural runoff and roughly 35% of the state's total usable annual surface water supply. The state's snow pack is estimated to contribute an average of about 15 million acre-feet of runoff each year, about 14 million acre feet of which is estimated to flow into the Central Valley. In comparison, total reservoir capacity serving the Central Valley is about 24.5 million acre feet in watersheds with snowmelt contributions.

According to DWR, total water runoff from snow pack into Sacramento Valley Rivers remained the same between the months April through July, 1906 through 2002; however, more runoff occurred in the form of rain during the winter months, and less as a result of melting snow during the spring and early summer. This shift towards a greater relative proportion of rain rather than snow could have ramifications on water supply, since snow pack is the primary storage mechanism of potable surface water supplies. As warming trends continue, it is reasonable to surmise that snow pack will be reduced and could melt earlier. This phenomenon could affect the proposed project indirectly by altering the timing and volume of runoff that feeds Folsom Lake, which provides water to the SVSP area. The management of reservoirs generally, including the management of Folsom Reservoir by the Bureau of Reclamation, may need to be altered to account for seasonal variations in precipitation type and intensity. Upstream water management is complex, because it serves multiple purposes such as flood control and habitat management.

The City of Roseville is taking a proactive approach in the face of future uncertainties, and requested the SVSP applicants to prepare a water conservation strategy, which has been incorporated into the project, to reduce SVSP water demands by roughly 20 percent in order to meet potential future reductions in surface water supply. At a state or regional level, it is expected that new technologies for water supply, treatment and water use efficiency, implementation of water transfers and conjunctive use, coordinated operation of reservoirs, improved flow forecasting, and the cooperation of local, regional, state, and federal agencies will be needed to help California respond to the effects of global climate change on water supply.

Climate change is expected to have a greater effect on Southern California and agricultural users, than urban users in the Sacramento Valley. For example, for 2020 conditions, where optimization is allowed (i.e., using the CAVIN model), scarcity is essentially zero in the Sacramento Valley for both urban (especially Coachella urban users) and agricultural uses[4]. By the year 2050, urban water scarcity will remain almost entirely absent north of the Tehachapi Mountains, although agricultural water scarcity could increase in the Sacramento Valley by approximately 2%.[5]

Based on increasing knowledge of climate change, it is reasonable to expect that California will adapt the State's water system to meet demands created by climate change, including changes to a warmer winter season. Measures that are likely include augmenting traditional water supply reservoir operations with other actions such as conservation, conjunctive use, desalination, and changes to water portfolios.

Although California could experience an increased number of single-dry and multiple dry years as a result of global climate change, based on current knowledge it is reasonably expected that such increase would not significantly affect the ability of the City of Roseville to reliably meet the build-out water demands for the SVSP. As described in Appendix W, *Sierra Vista Specific Plan Water Supply Assessment*, adequate water supply to reliably meet all of the projected existing City demands and SVSP demands, even under single-year and multiple year drought conditions, is available.

Importantly, the City of Roseville's surface water supply entitlements have historically demonstrated a high reliability during even multiple-dry years (see Section 4.12.1 *Water Supply* for

[4] Placer Vineyards 2nd Partially Recirculated Draft EIR, March 2007
[5] Placer Vineyards 2nd ADEIR; Medeliin et al 2006; see also Tanaka et al. 2006 and Lund et al. 2003.

a detailed analysis of the city's water supply). Even during the time between 1987 and 1992, when California experienced a five-year drought, Roseville had sufficient water to serve its customers based on securing water from PCWA through single-year wheeling agreements. Since that time, the City of Roseville has secured a wheeling agreement with USBR to bring PCWA water through its facilities, and PCWA has committed to providing the City water via agreements when needed. In addition, on an as-needed basis, Roseville would supplement its USBR contract supplies with groundwater in dry years to improve reliability to the point where all city water needs would be met.

The PCWA integrated water resources strategy anticipates that groundwater pumping would not exceed safe yields as long as the long-term multiple years average does not exceed 95,000 ac-ft per year. Although, as discussed below, there is still a great deal of uncertainty in respect to impacts of climate change on future groundwater availability in California, in view of the high reliability of Roseville surface water, the wide variety of water management techniques available to the City, and predictions about the effects of climate change on water supply in the geographic area of the proposed SVSP, the long term water supply is considered sufficient. Long-term average groundwater pumping is not expected to exceed the 95,000 acre-foot a year average. Further, the planned replacement of agricultural lands in western Placer County with urban or other uses (such as Reason Farms Stormwater Retention facility) is expected to result in in-lieu groundwater recharge, thereby further reducing the likelihood of a groundwater overdraft.

Storms and Extreme Events

Weather events are a natural part of any climate system. Although the climate in the project area is very stable and relatively predictable (warm, hot summers and cool wet winters), there can be variations over periods of time including droughts or severe storms. There is a potential that climate change could lead to more intense local storms and changes in runoff patterns and periods of drought. There is a potential California could experience an increased number of single dry, multiple dry, and critically dry years as a result of global climate change. However, it is not possible to predict with any accuracy these types of events.

The proposed SVSP is designed to provide adequate stormwater facilities in the event of storms, and includes provisions for water supply in dry and driest years (see Section 4.12, Utilities/Water Supply).

Rise in Sea Level

A consistent rise in sea level has been recorded worldwide over the last 100-years. Based on climate change modeling, a rise in sea level is expected to continue, including along the California Coast. Given the location and altitude of SVSP, it would not be affected by a rise in sea level, even if the Sacramento Delta were to be impacted.

Ground Water Supply

Little work has been performed on the effects of climate change on specific groundwater basins or groundwater recharge characteristics. Changes in rainfall and changes in the timing of the groundwater recharge season could result in changes in recharge rates. Warmer temperatures could increase the rate of evaporation, which would reduce percolation. However, as noted in Section 4.13, Hydrology and Groundwater of this EIR, the SVSP area is underlain with clay and low permeable soils. Except for the Curry Creek stream channel, there is little area within the project site that would be expected to provide opportunities for natural groundwater recharge. The City of Roseville is separately pursuing an Aquifer Storage and Recovery program, which would enable the city to inject surplus water into the groundwater table.

For these reasons, the impacts of global climate change on water supply for the proposed SVSP project are considered **less than significant.**

URBAN RESERVE

For the same reasons discussed above for the SVSP area, water supplies for future development of the Urban Reserve area are not expected to be significantly adversely affected due to climate change. Therefore, impacts on future development of the Urban Reserve area due to climate change are **less than significant**.

4.5.5 MITIGATION MEASURES

The Project area was included in the program-level analysis of the West Roseville Specific Plan Final EIR. Mitigation adopted by the City Council at time of approval in 2004 is still applicable unless superseded by SVSP project-specific mitigation, and will continue to apply to the Urban Reserve areas unless noted. This document will denote the WRSP mitigation measures as "WMM",

and will show ~~strikeout~~ for language that is proposed to be eliminated and <u>underline</u> for proposed new language in the previously adopted WMMs.

WMM 4.4-4 **Reduction of Construction Emissions (Impact 4.5-1 Urban Reserve)**

Specific plans and/or development proposals for the ~~Remainder Area~~ <u>Urban Reserve</u> shall require emission control measures during construction. Such measures, which shall be developed in consultation with the PCAPCD, may include use of heavy-duty off-road equipment included in the inventory powered by CARB certified off-road engines, or other measures to reduce particulate matter and nitrogen oxide emissions through the use of emulsified diesel fuel and/or particulate matter traps.

WMM 4.4-6 **Operational Emissions Policies (Impact 4.5-1 Urban Reserve)**

Specific plans and/or development proposals for the ~~Remainder Area~~ <u>Urban Reserve</u> shall include measures to reduce operational emissions. Such measures may include, but would not be limited to transit and pedestrian-oriented facilities (e.g., park and ride lots, bust stops), bike trails and facilities, energy-saving measures in buildings, as well as the measures identified in ~~WMM4.4-5, above.~~ <u>MM 4.5-2 below.</u> Appropriate measures shall be selected in consultation with the City and PCAPCD

MM 4.5-1 ***Air Quality Measures* (*Impact 4.5-1 SVSP*)**

Implement Mitigation Measure 4.4-1. Implementation of the Air Quality Mitigation Measure 4.4-1, listed in Section 4.4 *Air Quality*, would reduce operational and construction-related emissions of criteria air pollutants and precursors, and would also act to reduce GHG emissions associated with project construction and operation. Mitigation Measure 4.4-1 is relevant to Impact 4.5-1 because both criteria air pollutant and GHG emissions are frequently associated with combustion byproducts. In addition, the City shall implement the following measures to reduce direct and indirect GHG emissions associated with the SVSP. Certain measures

are already components of the project (i.e., Specific Plan policies, design guidelines and standards) and/or would be applied consistent with the City's General Plan Policies, addressing GHG emissions and climate change, but are provided here for purposes of completeness

MM 4.5-2 ***Additional Measures to Reduce GHG Emissions (Impact 4.5-1- SVSP)***

Each increment of new development within the project site requiring a discretionary approval (e.g., proposed tentative subdivision map, conditional use permit), shall demonstrate that GHG emissions from project construction and operation will be reduced by 30% from business-as-usual emissions levels projected for 2025.

For each increment of new development, the City shall submit to the developer, a list of potentially feasible GHG reduction measures to be considered in the construction and design of that portion of the project. The City's list of potentially feasible GHG reduction measures shall reflect the then-current state of the regulation of GHG emissions and climate change, which is expected to continue to evolve under the mandate of AB 32. The developer shall then submit to the City a mitigation plan that lists the measures selected to be implemented as part of the project and contains an analysis demonstrating the associated reduction in GHG emissions. The report shall also demonstrate why measures not selected are considered infeasible. The City shall review the mitigation report for the applicable increment of development and approve the report (with modifications, if considered necessary and feasible) prior to granting any requested discretionary approval for that increment of development. In determining what sort of measures should appropriately be imposed by a local government under the circumstances, the City shall consider the following factors:

- The extent to which rates of GHG emissions generated by motor vehicles traveling to, from, and within the project site are projected to decrease over time as a result of regulations, policies, and/or plans that have already been adopted or may be adopted

in the future by ARB or other public agency pursuant to AB 32, or by EPA;

- The extent to which mobile-source GHG emissions, which at the time of writing this EIR comprise a substantial portion of the state's GHG inventory, can also be reduced through design measures that result in trip reductions and reductions in trip length;
- The extent to which GHG emissions emitted by the mix of power generation operated by Roseville Electric, that will serve the project site, are projected to decrease pursuant to the Renewable Portfolio Standard required by SB 1078 and SB 107, as well as any future regulations, policies, and/or plans adopted by the federal and state governments that reduce GHG emissions from power generation;
- The extent to which replacement of CCR Title 24 with the California Green Building Standards Code or other similar requirements will result in new buildings being more energy efficient and consequently more GHG efficient;
- The extent to which any stationary sources of GHG emissions that would be operated on a proposed land use (e.g., industrial) are already subject to regulations, policies, and/or plans that reduce GHG emissions, particularly any future regulations that will be developed as part of ARB's implementation of AB 32, or other pertinent regulations on stationary sources that have the indirect effect of reducing GHG emissions;
- The extent to which the feasibility of existing GHG reduction technologies may change in the future, and to which innovation in GHG reduction technologies will continue, affecting cost-benefit analyses that determine economic feasibility; and
- Whether the total costs of proposed mitigation for GHG emissions, together with other mitigation measures, required for the proposed development, are so great that a reasonably prudent

property owner would not proceed with the project in the face of such costs.

- In considering how much, and what kind of, mitigation is necessary in light of these factors, the City shall consider the following list of options, though the list is not intended to be exhaustive, as GHG reduction strategies and their respective feasibility are likely to evolve over time. These measures are derived from multiple sources including the Mitigation Measure Summary in Appendix B of the California Air Pollution Control Officer's Association (CAPCOA) white paper, CEQA & Climate Change (CAPCOA 2008), and the California Attorney General's Office (2008).

Energy Efficiency

- Include clean alternative energy features to promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems, small wind turbines).
- Design buildings to meet CEC Tier II requirements (e.g., exceeding the requirements of the Title 24 (as of 2007) by 35%).
- Site buildings to take advantage of shade and prevailing winds and design landscaping and sun screens to reduce energy use.
- Install efficient lighting in all buildings (including residential). Also install lighting control systems, where practical. Use daylight as an integral part of lighting systems in all buildings.
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes.

SVSP developers shall be encouraged incorporate "green building" points into the construction and design of all (additions of 25,000 square feet of office/retail commercial or 100,000 square feet of industrial floor area) projects that incorporate "green building"

points in construction. Such points may be achieved through checklists identified by New Home Construction Green Building Guidelines available at www.builditgreen.org, or through a similar list that distinguishes specific measures targeting efficiencies in energy, resource use, or other measures that would also directly or indirectly result in GHG emission reductions. Specific efficiencies that would reduce GHG emissions shall be implemented where feasible, for all project areas including site design, landscaping, foundation, structural frame and building envelope, exterior finishing, plumbing, appliance use, insulation, heating, venting and air conditioning, building performance, use of renewable energy, finishes, and flooring.

SVSP developers shall be encouraged to incorporate any combination of the following strategies to reduce heat gain for 50 percent of the non-roof impervious site landscape (including roads, sidewalks, courtyards, parking lots, and driveways) into the construction and design of all new (additions of 25,000 square feet of office/retail commercial) projects:

Shaded (Within 5 years of occupancy)

Paving materials with a Solar Reflective Index (SRI) of at least 29

Open grid pavement system (pavement that is less than 50% impervious and contains vegetation in the open cells)

- Parking spaces under cover (defined as underground, under deck, under roof, or under building.) Any roof used to shade or cover parking should have an SRI of at least 29.
- Optional level of LEED certification, such as silver or gold which can allow for further reductions in energy consumption and GHG emissions.

Water Conservation and Efficiency

The SVSP project includes water conservation as part of the project. In addition, the following should be considered:

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought-resistant species in all public area and commercial landscaping. Use water-efficient turf in parks and other turf dependant spaces.

- Install the infrastructure to use recycled water for landscape irrigation. (part of the project)

- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls. (Water Efficient Landscaping Ordinance)

- Design buildings and lots to be water-efficient. Only install water-efficient fixtures and appliances. (e.g., Ultra low-flow toilets, no flow urinals etc.)

- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces unless required to mitigate health and safety concerns. These restrictions should be included in the Covenants, Conditions, and Restrictions of the community.

Solid Waste Measures

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

- Provide interior and exterior storage areas for recyclables and green waste at all buildings.

- Provide adequate recycling containers in public areas, including parks, school grounds, paseos, and pedestrian zones in areas of mixed-use development.

- Provide education and publicity about reducing waste and available recycling services.

Transportation and Motor Vehicles

- Promote ride sharing programs and employment centers (e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading zones and waiting areas for ride share vehicles, and providing a web site or message board for coordinating ride sharing).

- Provide the necessary facilities and infrastructure in all land use types to encourage the use of low or zero emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).

- At commercial land uses, all forklifts, "yard trucks," or vehicles that are predominately used on-site at non-residential land uses shall be electric-powered or powered by biofuels (such as biodiesel [B100]) that are produced from waste products, or shall use other technologies that do not rely on direct fossil fuel consumption.

- Implement roundabouts. (30% intersection emissions reduction)

- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations) (0.5-1.5% emissions reduction).

- Prioritized parking within new commercial and retail areas shall be given to electric vehicles, hybrid vehicles, and alternative fuel vehicles.

- Incorporate bicycle lanes, routes, and intersection improvements into street systems within the Specific Plan (1% emissions reduction).

- For commercial land uses, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience (1% emissions reduction).

- Create Class II bicycle lanes and walking paths directed to the location of schools, parks and other destination points (1% emissions reduction).

- Encourage the public school districts to serve the project site with a student busing system, and/or enable students residing in the project to safely walk to or bicycle to school without encountering barriers such as large arterial roadways or sound walls.

- Construction of transit facility/amenity (bus shelters, bicycle lockers/racks, etc.) for existing public and private transit (0.5% emissions reduction).

- Provide secure bicycle storage at public parking facilities.

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