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# GREENHOUSE GAS EMISSIONS

## INTRODUCTION

In addition to the air pollutants discussed in Chapter 6: Air Quality, other emissions may not be directly associated with adverse health effects, but are suspected of contributing to “global climate change”. Global climate change has occurred in the past as a result of natural processes, but the term is often used now to refer to the warming predicted by computer models to occur as a result of increased emissions of greenhouse gases (e.g., carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone and water vapor).

## ENVIRONMENTAL SETTING

Naturally occurring and anthropogenic-generated (generated by mankind) atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide can have an affect on global temperatures.<sup>1</sup> Gases that trap heat in the atmosphere are called greenhouse gases (GHG). Solar radiation enters the earth’s atmosphere from space, and a portion of the radiation is absorbed at the surface. The earth emits this radiation back toward space as infrared radiation. Greenhouse gases, which are mostly transparent to incoming solar radiation, are effective in absorbing infrared radiation and redirecting some of this back to the earth’s surface. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This is known as the greenhouse effect. The greenhouse effect is necessary for the planet to maintain a habitable climate. Natural processes and human activities emit GHGs. Emissions from human activities, such as electricity production, motor vehicle use and agriculture, however, are elevating the concentration of GHGs in the atmosphere, and are reported to have led to a trend of unnatural warming of the earth’s natural climate, known as global warming or global climate change. Other than water vapor, the GHGs contributing to global climate change include the following gases:

- Carbon dioxide, primarily a byproduct of fuel combustion.
- Nitrous oxide is a byproduct of fuel combustion and also associated with agricultural operations such as fertilization of crops.
- Methane is commonly created by off gassing from agricultural practices (e.g. keeping livestock) and landfill operation.
- Chlorofluorocarbons that were widely used as refrigerants, propellants and cleaning solvents, however their production has been mostly reduced by international treaty.

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<sup>1</sup> IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: <http://www.ipcc.ch/>.

- Hydrofluorocarbons are now used as a substitute for chlorofluorocarbons in refrigeration and cooling.
- Perfluorocarbons and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semiconductor manufacturing.

Gases in the atmosphere can contribute to the greenhouse effect both directly and indirectly. Direct effects occur when the gas itself absorbs outgoing radiation. Indirect effects occur when gases cause chemical reactions that produce other GHGs or prolong the existence of other GHGs. The Global Warming Potential (GWP) concept is used to compare the ability of each GHG to trap heat in the atmosphere relative to carbon dioxide (CO<sub>2</sub>), which is the most abundant GHG. CO<sub>2</sub> has a GWP of 1, expressed as CO<sub>2</sub>e. Other GHGs, such as methane and nitrous oxide are commonly found in the atmosphere but at much lower concentrations. However, the GWP for methane is 21, while nitrous oxide has a GWP of 310. Other trace gases, such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which are halocarbons that contain chlorine, have much greater GWPs. Fortunately these gases are found at much lower concentrations and many are being phased out as a result of global efforts to reduce destruction of stratospheric ozone. In the United States, CO<sub>2</sub> emissions account for about 85 percent of the CO<sub>2</sub>e emissions, followed by methane at about 8 percent and nitrous oxide at about 5 percent<sup>2</sup>.

Many of the world's leading climate scientists have reached consensus that global climate change is underway, is "very likely" caused by humans, and hotter temperatures and rises in sea level "would continue for centuries," no matter how much humans control future emissions. A report of the Intergovernmental Panel on Climate Change (IPCC) - an international group of scientists and representatives concludes that "The widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone."<sup>3</sup>

Human activities have exerted a growing influence on some of the key factors that govern climate by changing the composition of the atmosphere and by modifying vegetation. The concentration of carbon dioxide in the atmosphere has increased from the burning of coal, oil, and natural gas for energy production and transportation and the removal of forests and woodlands around the world to provide space for agriculture and other human activities. Emissions of other greenhouse gases, such as methane and nitrous oxide, have also increased due to human activities. Since the Industrial Revolution (i.e., about 1750), global atmospheric concentrations of CO<sub>2</sub> have risen about 36 percent, due primarily to the combustion of fossil fuels<sup>4</sup>.

The IPCC predicts a temperature increase of between two and 11.5 degrees Fahrenheit (F) (1.1 and 6.4 degrees Celsius) by the end of the 21<sup>st</sup> century under six different scenarios of emissions and carbon dioxide equivalent concentrations.<sup>5</sup> Sea levels are predicted to rise by 0.18 to 0.59 meters

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<sup>2</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006*. U.S. EPA. April 15, 2008.

<sup>3</sup> *Climate Change 2007 - The Physical Science Basis Contribution of Working Group I to the Fourth Assessment Report of the IPCC*. February 2, 2007. (<http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>]

<sup>4</sup> IPCC. 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (<http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf> ]

<sup>5</sup> IPCC. 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (<http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf> ]

(seven to 23 inches) during this time, with an additional 3.9 to 7.8 inches possible depending upon the rate of polar ice sheets melting from increased warming. The IPCC report states that the increase in hurricane and tropical cyclone strength since 1970 can likely be attributed to human-generated greenhouse gases.

## REGULATORY SETTING

Global climate change resulting from greenhouse gas emissions is an emerging environmental concern being raised and discussed at the international, national, and statewide level. At each level, agencies are considering strategies to control emissions of gases that contribute to global climate change.

### U.S. EPA

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). While the United States signed the Kyoto Protocol, which would have required reductions in GHGs, the Congress never ratified the protocol. The federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science. In 2002, the United States announced a strategy to reduce the greenhouse gas intensity of the American economy by 18 percent over a 10-year period from 2002 to 2012. In the past, the U.S. EPA has not regulated GHGs under the Clean Air Plan (note that a 2007 Supreme Court ruling held that the U.S. EPA can regulate GHG emissions)<sup>6</sup>. In response to this ruling, the EPA has recently made an endangerment finding that GHGs pose a threat to the public health and welfare. These findings were signed by the Administrator on December 7, 2009. On December 15, 2009, the final findings were published in the *Federal Register* ([www.regulations.gov](http://www.regulations.gov)) under Docket ID No. EPA-HQ-OAR-2009-0171. The final rule was effective January 14, 2010. This is the first step necessary for the establishment of federal GHG regulations under the Clean Air Act.

As part of the commitments to UNFCCC, the U.S. EPA has developed an inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases. This inventory is periodically updated with the latest update being 2008<sup>7</sup>. EPA reports that total U.S. emissions have risen by 14.7 percent from 1990 to 2006, while the U.S. gross domestic product has increased by 59 percent over the same period. A 1.1 percent decrease was noted from 2005 to 2006, which is reported to be attributable to: (1) climate conditions, (2) reduced use of petroleum products for transportation, and (3) increased use of natural gas over other fuel sources. The inventory notes that the transportation sector emits about 33 percent of CO<sub>2</sub> emissions, with 60 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 20 percent of CO<sub>2</sub> emissions.

As a part of U.S. EPA's responsibility to develop and update an inventory of U.S. GHG emissions and sinks, EPA compared trends of other various U.S. data. Over the period between 1990 and 2006, GHG emissions grew at a rate of about 0.9 percent per year. Population growth was slightly higher at

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<sup>6</sup> On April 2, 2007, the United States Supreme Court issued a 5-4 decision in *Massachusetts v. EPA*, which holds that the U.S. Environmental Protection Agency has authority, under the Clean Air Act, to regulate greenhouse gas emissions from new vehicles. The U.S. EPA had previously argued it lacked legal authority under the Clean Air Act to regulate greenhouse gases. The majority opinion of the Supreme Court decision noted that greenhouse gases meet the Clean Air Act's definition of an "air pollutant," and the EPA has the statutory authority to regulate the emission of such gases from new motor vehicles.

<sup>7</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006*. U.S. EPA. April 15, 2008.

1.1 percent, while energy and fossil fuel consumption were more closely related at 1.0 percent. GDP and energy generation grew at much higher rates.

## STATE OF CALIFORNIA

The State of California is concerned about GHG emissions and their effect on global climate change. The State recognizes that “there appears to be a close relationship between the concentration of greenhouse gases in the atmosphere and global temperatures” and that “the “evidence for climate change is overwhelming.” The effects of climate change on California, in terms of how it would affect the ecosystem and economy, remain uncertain. The State has many areas of concern regarding climate change with respect to global climate change. According to the 2006 Climate Action Team Report<sup>8</sup> the following climate change effects and conditions can be expected in California over the course of the next century:

- A diminishing Sierra snow pack declining by 70 percent to 90 percent, threatening the state’s water supply;
- Increasing temperatures from eight to 10.4 degrees Fahrenheit (F) under the higher emission scenarios, leading to a 25 to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
- Coastal erosion along the length of California and seawater intrusion into the Sacramento River Delta from a four-to 33-inch rise in sea level. This would exacerbate flooding in already vulnerable regions;
- Increased vulnerability of forests due to pest infestation and increased temperatures;
- Increased challenges for the state’s important agricultural industry from water shortages, increasing temperatures, and saltwater intrusion into the Delta; and
- Increased electricity demand, particularly in the hot summer months.

California emissions of GHG gases or CO<sub>2</sub> equivalent emissions was estimated at 484 million metric tons of equivalent CO<sub>2</sub> emissions (MMTCO<sub>2</sub>e), which is about seven percent of the emissions from the entire United States<sup>9</sup>. It is estimated that the United States contributes up to 35 percent of the world’s CO<sub>2</sub> equivalent emissions. Transportation is the largest source of GHG emissions in California, contributing about 40 percent of the emissions. Electricity generation is second at over 20 percent, but California does import electricity during the summer bringing energy sources up to about 25 percent. Industrial activities account for about 20 percent of the State’s emissions. Transportation is the largest source of greenhouse gas emissions in California, followed by industrial sources and electric power generation.<sup>10</sup> On a per-person basis, greenhouse gas emissions are lower in California than most other states; however, California is a populous state and the second largest emitter of greenhouse gases in the United States and one of the largest emitters in the world.<sup>11</sup>

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<sup>8</sup> California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. ([http://www.climatechange.ca.gov/climate\\_action\\_team/reports/2006-04-03\\_FINAL\\_CAT\\_REPORT.PDF](http://www.climatechange.ca.gov/climate_action_team/reports/2006-04-03_FINAL_CAT_REPORT.PDF))

<sup>9</sup> California Air Resources Board. 2008. *Climate Change Draft Scoping Plan*. June.

<sup>10</sup> California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. ([http://www.climatechange.ca.gov/climate\\_action\\_team/reports/2006-04-03\\_FINAL\\_CAT\\_REPORT.PDF](http://www.climatechange.ca.gov/climate_action_team/reports/2006-04-03_FINAL_CAT_REPORT.PDF))

<sup>11</sup> California Legislative Analyst’s Office. 2006. *Analysis of the 2006-07 Budget Bill (Governor’s Climate Change Initiative)*. ([http://www.lao.ca.gov/analysis\\_2006/resources/res\\_04\\_anl06.html](http://www.lao.ca.gov/analysis_2006/resources/res_04_anl06.html))

Under a “business as usual” scenario, emissions of GHG in California are estimated to increase to approximately 600 MMTCO<sub>2</sub>e by 2020. CARB staff has estimated the 1990 statewide emissions level to be 427 MMTCO<sub>2</sub>e, therefore, requiring a reduction of almost 30 percent in emissions by 2020 to meet the AB32 goal.

#### State of California Executive Order S-3-05

In June 2005, the Governor of California signed Executive Order S-3-05, which identified Cal/EPA as the lead coordinating State agency for establishing climate change emission reduction targets in California. A “Climate Action Team”, a multi-agency group of state agencies, was set up to implement Executive Order S-3-05. Under this order, the state plans to reduce greenhouse gas emissions to 80 percent below 1990 levels by 2050. In 2006 the California Climate Action Team identified greenhouse gas emission reduction strategies and measures to reduce global climate change.<sup>12</sup>

#### Assembly Bill (AB) 32—The California Global Warming Solutions Act of 2006

In 2006, the governor of California signed AB 32, the Global Warming Solutions Act, into legislation. The Act requires that California cap its greenhouse gas emissions at 1990 levels by 2020. This legislation requires CARB to establish a program for statewide greenhouse gas emissions reporting and monitoring/enforcement of that program. CARB recently published a list of discrete greenhouse gas emissions reduction measures that can be implemented immediately. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions. CARB’s Early Action Plan identified regulations and measures that could be implemented in the near future to reduce GHG emissions.

Much of the measures to reduce GHG emissions from transportation will come from CARB. AB 1493, the Pavley Bill, directed CARB to adopt regulations to reduce emissions from new passenger vehicles. CARB’s AB32 Early Action Plan released in 2007 included a strengthening of the Pavley regulation for 2017 and included a commitment to develop a low carbon fuel standard (LCFS). In April 2009, CARB adopted the new LCFS aimed at diversifying the variety of fuels used for transportation. This regulation is designed to increase the use of alternative fuels, replacing 20 percent of the fuel used by cars in California with clean alternative fuels by 2020. These fuels include electricity, biofuels, and hydrogen.

CARB is relying on increased fuel efficiency to reduce GHG emissions substantially. In May 2009, President Obama announced a new national policy aimed at both increasing fuel economy to reduce GHG emissions from new cars and trucks sold in the United States. The new standards would apply to new vehicles sold beginning in 2012, and ultimately require an average fuel economy standard of 35.5 miles per gallon (mpg) in 2016. This surpasses the previous 2007 standard of 35 mpg for 2020 model vehicles established in 2007. California had proposed a State standard similar to the new announced federal standard, but the U.S. EPA hindered implementation.

CARB is targeting other sources of emissions. The main measures to reduce GHG emissions are contained in the AB32 Scoping Plan. A draft of the plan was released in June 2008 and was approved in December 2008. This plan includes a range of GHG reduction actions. Central to the plan is a cap

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<sup>12</sup> California Environmental Protection Agency. 2006. *Climate Action Team Executive Summary Climate Action Team Report to Governor Schwarzenegger and the California Legislature*. ([http://www.climatechange.ca.gov/climate\\_action\\_team/reports/2006-04-03\\_FINAL\\_CAT\\_REPORT\\_EXECSUMMARY.PDF](http://www.climatechange.ca.gov/climate_action_team/reports/2006-04-03_FINAL_CAT_REPORT_EXECSUMMARY.PDF))

and trade program covering 85 percent of the state's emissions. This program will be developed in conjunction with the Western Climate Initiative, comprised of seven states and three Canadian provinces, to create a regional carbon market. The plan also proposes that utilities produce a third of their energy from renewable sources such as wind, solar and geothermal, and proposes to expand and strengthen existing energy efficiency programs and building and appliance standards. The plan also includes full implementation of the Pavley standards to provide a wide range of less polluting and more efficient cars and trucks to consumers who will save on operating costs through reduced fuel use. It also calls for development and implementation of the Low Carbon Fuel Standard, which will require oil companies to make cleaner domestic-produced fuels. The regulatory process began in 2009 to implement the plan. The details in regulating emissions and developing targeted fees to administer the program will be developed through this process. This will last two years and measures must be enacted by 2012.

#### Senate Bill 97—Modification to the Public Resources Code

Pursuant to Senate Bill 97, the Natural Resources Agency reviewed and adopted the amendments to the CEQA Guidelines on December 30, 2010 prepared and forwarded by the Governor's Office of Planning and Research (OPR), including guidelines addressing GHGs. The Amendments became effective on March 18, 2010. OPR recommends that each agency develop an approach to addressing GHG emissions that is based on best available information. The approach includes three basic steps: (1) identify and quantify emissions; (2) assess the significance of the emissions; and (3) if emissions are significant, identify mitigation measures or alternatives that will reduce the impact to a less-than-significant level.

#### California's Energy Efficiency Standards for Residential Buildings, Title 24, Part 6, of the California Code of Regulations

The Energy Efficiency Standards for Residential Buildings were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2008 Standards went into effect January 1, 2010. Projects that apply for a building permit on or after this date must comply with the 2010 Standards.

#### Senate Bill 375—California's Regional Transportation and Land Use Planning Efforts

Recently, California enacted legislation (SB 375) to expand the efforts of AB 32 by controlling indirect GHG emissions caused by urban sprawl. SB 375 would develop emissions-reduction goals in which regions can apply in planning activities. SB 375 provides incentives for local governments and developers to implement new conscientiously planned growth patterns. This includes incentives for creating attractive, pedestrian friendly and sustainable communities and revitalizing existing communities. The legislation also allows developers to bypass certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Development of more alternative transportation options that would reduce vehicle trips and miles traveled, along with traffic congestion, would be encouraged. SB 375 enhances CARB's ability to reach the AB 32 goals by directing the agency in developing regional GHG emission reduction targets to be achieved from the transportation sector for 2020 and 2035. CARB would work with the metropolitan planning organizations (e.g., ABAG and MTC) to align their regional transportation, housing, and land use plans to reduce vehicle miles traveled and demonstrate the region's ability to attain its greenhouse gas reduction targets. A similar process is used to reduce transportation emissions of ozone precursor pollutants in the Bay Area.

### California's Heavy Duty Vehicle GHG Emissions Reduction Measure

On December 12, 2008 (one day after adopting the AB32 Climate Action Plan), CARB adopted the Heavy Duty Vehicle Greenhouse Gas Emission Reduction measure that requires long-haul truckers to install fuel-efficient tires and aerodynamic devices on their trailers. This measure will reduce GHG emissions and through improved fuel economy.

### California Green Building Standards Code

The Green Building Standards Code (CALGREEN), requiring all new buildings in the state to be more energy efficient and environmentally responsible, will take effect on January 1, 2011. These comprehensive regulations will achieve major reductions in greenhouse gas emissions, energy consumption and water use to create a greener California.

CALGREEN will require that every new building constructed in California

- Reduce water consumption by 20 percent,
- Divert 50 percent of construction waste from landfills
- Install low pollutant-emitting materials
- Requires separate water meters for nonresidential buildings' indoor and outdoor water use
- Requires moisture-sensing irrigation systems for larger landscape projects

Requires mandatory inspections of energy systems (e.g., heat furnace, air conditioner and mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies.

## **SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT**

The Plan area falls within the San Joaquin Valley Air Basin and therefore under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). In December 2009, SJVAPCD adopted policy<sup>13</sup> and guidance for addressing greenhouse gas emissions impacts within its jurisdiction.

## **IMPACTS AND MITIGATION MEASURES**

### **STANDARDS OF SIGNIFICANCE**

This analysis has been written to address the adopted changes to the CEQA Guidelines in relation to addition of GHG emissions. These amendments became effective on March 18, 2010. According to these amended guidelines, the Plan would have a significant impact on greenhouse gas emissions if it would:

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<sup>13</sup> *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA and the policy: District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency, December 19, 2009*

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

In December 2009, San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted policy and guidance for addressing greenhouse gas emissions impacts within its jurisdiction.<sup>14</sup>

SJVAPCD has concluded that existing science is inadequate to support characterization of impacts that project specific GHG emissions have on global climatic change and therefore, that the effects of project-specific GHG emissions are cumulative. Unless reduced or mitigated, the incremental contribution to global climatic change could be considered significant.

SJVAPCD's guidance includes use of performance-based standards to determine significance of GHG emission impacts using GHG emission reduction measures that have demonstrated effective reduction or limiting of GHG emissions. SJVAPCD considers GHG emissions impacts to be less than significant when GHG emission reductions of 29% or more (compared to business-as-usual) are reached through application of GHG emission reduction measures.

## GREENHOUSE GAS IMPACTS

**Impact Climate-1: Greenhouse Gas Emissions.** New development in the Plan area would be an additional source of GHG emissions, primarily through consumption of energy for transportation and energy usage, that could contribute to significant impacts on the environment.

Carbon dioxide, the primary man-made greenhouse gas of concern, would be generated by the Plan primarily from mobile sources and energy usage. Whether these emissions would be “new” impacts, however, is speculative, since even if the Plan area is not developed as proposed, people would continue to live and travel in other areas and would likely produce greenhouse gases, just in a different part of the world. Air quality impact assessments for projects have traditionally assumed that emissions associated with projects would be entirely new to the air basin. This is a widely accepted assumption, since projects could bring new housing into an air basin, resulting in increased vehicle travel and other activities that may not have occurred without the project. Moreover, many of the air pollutants of concern have more localized impacts on health and the environment. Greenhouse gas emissions, however, have an impact on the planet as a whole. Greenhouse gas emissions generated in one city, state, or country have the same climate change impacts as those generated in any other city, state, or country. Thus, there is no evidence to justify the assumption that simply because the project would bring new housing to the City, and result in increased vehicle activity within the City's boundaries, that there would be an “increase” in greenhouse gas emissions to the earth as a whole.

In fact, new development may actually generate less greenhouse gases than older development. For example, measures that reduce energy consumption and waste can be included in new development that would reduce emissions. These would include energy-efficient construction methods, inclusion of

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<sup>14</sup> *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA and the policy: District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency, December 19, 2009.*

solar photovoltaic panels to produce energy, passive solar design, appropriate landscape and water recycling systems, etc.

Nevertheless, emissions associated with the development of the proposed Plan were calculated and are assumed to be entirely “new” emissions for the purposes of this environmental analysis. The California Air Pollution Control Officers Association (CAPCOA) has provided guidance for calculating project emissions.<sup>15</sup> Emissions from area, mobile and electricity usage are recommended by CAPCOA. Area and mobile source emissions were calculated using the URBEMIS2007 model. The inputs to the model are the same as the inputs used to calculate emissions of air pollutants used in the Air Quality Section of this EIR.

Area source emissions in the form of natural gas combustion for heating (i.e., space and water) and cooking were computed. These emissions were calculated using the URBEMIS2007 model with default assumptions for single-family residences and commercial/retail. The URBEMIS2007 model was also used to estimate mobile source emissions from build out of the Plan. This model is based on the CARB’s EMFAC2007 on-road mobile source emission factor model. The model includes emission factors for CO<sub>2</sub>. Indirect emissions are associated with the generation of electricity provided to the Plan area were based on electricity usage rates recommended by the California Climate Action Registry General Reporting Protocol and electricity emission rates recommended by EPA<sup>16</sup>. CAPCOA and CCAR recommend an annual electricity usage rate of 16.7-kilowatt hours per square foot for commercial spaces. The electricity provider will be PG&E, which has a certified 2006 emission rate of 456 pounds of CO<sub>2</sub> per each 1,000-kilowatt hours of electricity produced<sup>17</sup>. It should be noted that the PG&E rate is about 52 percent of the statewide average emission rate for electricity production and 35 percent of the national average.

Development of the Plan area as proposed would result in the generation of GHG emissions, both during construction and once the proposed land uses are in place. URBEMIS modeling results presented in **Appendix E** indicate that carbon dioxide emissions associated with Plan area construction activity could be expected to be on the order of approximately 8,130 tons per year (unmitigated) during each full year of construction, and that carbon dioxide emissions associated with operation of the Plan area following development (e.g., vehicle emissions and area source emissions, including those associated with space heating and the operation of appliances) would be approximately 89,725 tons per year (unmitigated).

Although there are emissions of methane and nitrous oxide, which are more potent GHGs, these emissions are very small compared to CO<sub>2</sub> (i.e., less than three hundredths of a percent equivalent CO<sub>2</sub>). As a result, these emissions were estimated to be approximately less than three tons per year and are calculated in the reductions shown in Tables 10.3 and 10.5. **Table 10.1** shows the annual GHG emissions in tons per year. Emission calculations are contained in Appendix E.

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<sup>15</sup> *CEQA & Climate Change*, California Air Pollution Control Officers Association, January 2008.

<sup>16</sup> California Climate Action Registry. 2008. California Climate Action Registry General Reporting Protocol – Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.0. April.

<sup>17</sup> CARB, CCAR, ICLEI. 2008. Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions, Version 1.0 -. Sept. 2008.

**Table 10.1: Annual Operational CO<sub>2</sub> Emissions**

Source Type	Basis for Calculation	Annual Emissions (in tons per year)
		Proposed Project
Area Source	Natural gas and landscape equipment from URBEMIS2007	10,500
Mobile Sources	Traffic from URBEMIS2007	64,650
Electricity Usage	Estimated commercial space using PG&E Emission Rates	14,575
<b>Total</b>		<b>89,725 tons per year</b>

Source: Illingworth & Rodkin, 2009.

The results reported in **Table 10.1** are based primarily on a “business-as-usual” scenario, where current emission rates would apply. This will not likely be the case, as AB 32 will require GHG emission reductions in all sectors. Transportation emission rates will likely decrease due to increased fuel efficiency and lower carbon content in fuels. The URBEMIS2007 model does not reflect future fuel efficiency. Efficiency is regulated by the U.S. Department of Transportation and current CARB regulations that address climate change. Newer fuel standards would increase light-duty automobile and light-duty truck fuel efficiency by 10 miles per gallon (to 35 miles per gallon for cars and small trucks). These standards would apply to new vehicles sold, and therefore, would gradually affect the overall fleet as these new vehicles replace older vehicles.

### Mitigation Measure

**Climate-1: Implement Greenhouse Gas Emissions Reduction Measures.** Development projects within the Plan area shall demonstrate GHG emissions reductions to comply with State and Federal requirements, as feasible, through implementation of SJVAPCD GHG emission reduction measures or quantification of reduction from additional measures.

Or, if the City of Ceres has adopted an alternate GHG emission reduction plan or GHG mitigation program in the interim, compliance with that plan or program will satisfy this mitigation measure.

SJVAPCD is working to quantify the mitigation points for potential measures in order to fully implement their current guidance/policy to require a 29% reduction in GHG emissions. Prior to finalization, SJVAPCD has directed use of interim measures and reductions. A list of the interim measures and reductions are included as Appendix J of SJVAPCD’s *Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act*. A calculator, which will be updated as measures and reductions are finalized then periodically thereafter has been posted on-line at [http://www.valleyair.org/programs/CCAP/CCAP\\_idx.htm#bps%20development](http://www.valleyair.org/programs/CCAP/CCAP_idx.htm#bps%20development).

Through review of the Specific Plan document, the City, in conjunction with the preparers of this environmental analysis, have identified GHG emissions reduction measures that are included in the Specific Plan or are likely to be included in some or all specific development projects in the Plan area, as summarized in **Table 10.2** and discussed in more detail following.

**TABLE 10.2: GREENHOUSE GAS REDUCTION MEASURES**

<i>Measure Number<sup>1</sup></i>	<i>Measure Name<sup>1</sup></i>	<i>Included in the Specific Plan</i>	<i>Potential to be Included in Development Projects<sup>2</sup></i>	<i>Estimated CO<sub>2</sub> Equivalent Point Reductions<sup>1</sup></i>
<b>Bicycle/Pedestrian/Transit Measures</b>				
1	Bike parking	x		0.625
2	End of trip facilities	x		0.625
3	Bike parking at multi-unit residential	x		0.625
4	Proximity to bike path/bike lanes	x		0.625
5	Pedestrian network	x		1
5a	Pedestrian Network	x		0.5
6	Pedestrian barriers minimized	x		1
7	Bus shelter for existing transit service			0.5
8	Bus shelter for planned transit service	x		0.25
9a	Traffic calming	x		0.25
9b	Traffic calming			0.5
9c	Traffic calming			0.75
9d	Traffic calming			1
<b>Parking Measures</b>				
10a	Paid parking			5
10b	Paid parking			1.50
10c	Paid parking			2
10d	Paid parking			1
10e	Paid parking			0.6
11	Minimum parking		x	3
12	Parking reduction beyond code		x	6
13	Pedestrian pathway through parking	x		0.5
14a	Off street parking		x	1.5
14b	Off street parking		x	1
14c	Off street parking		x	0.1
<b>Site Design Measures</b>				
15a	Office/Mixed-Use proximate to Planned Light Rail Transit			0.4-0.75
15b	Office/Mixed-Use proximate to Planned Bus Rapid Transit			0.2-0.3
15c	Office/Mixed-Use proximate to Existing Light Rail Transit			0.75-1.5
15d	Office/Mixed-Use proximate to Existing Bus Rapid Transit			0.4-0.75
16	Orientation toward existing transit, bikeway, or pedestrian corridor			0.5
17	Orientation toward planned transit, bikeway, or pedestrian corridor	x		0.25
18a	Residential Density with No Transit		x	1
18b	Residential Density with No Transit		x	3
18c	Residential Density with No Transit		x	5

<i>Measure Number<sup>1</sup></i>	<i>Measure Name<sup>1</sup></i>	<i>Included in the Specific Plan</i>	<i>Potential to be Included in Development Projects<sup>2</sup></i>	<i>Estimated CO<sub>2</sub> Equivalent Point Reductions<sup>1</sup></i>
18d	Residential Density with No Transit		x	6
18e	Residential Density with No Transit		x	8
18f	Residential Density with No Transit		x	10
18a	Residential density With Planned Light Rail Transit			0-10.75
18b	Residential density With Planned Bus Rapid Transit			0-10.25
18c	Residential Density with Existing Light Rail Transit			0-11.5
18d	Residential Density with Existing Bus Rapid Transit			0-11
19	Street grid			1
20a	Neighborhood Electric Vehicle access			1.5
20b	Neighborhood Electric Vehicle access			1
20c	Neighborhood Electric Vehicle access	x		0.5
21	Affordable Housing Component			0.6-4
<b>Mixed-Use Measures</b>				
22a	Urban Mixed-Use Measure		x	3
22b	Urban Mixed-Use Measure		x	6.6
22c	Urban Mixed-Use Measure		x	9
22d	Urban Mixed-Use Measure			7.29
22e	Urban Mixed-Use Measure			6
22f	Urban Mixed-Use Measure			5
22g	Urban Mixed-Use Measure			4.2
23	Suburban mixed-use	x		3
24	Other mixed-use			1
<b>Building Component Measures</b>				
25	Energy Star roof		x	0.5
26	Onsite renewable energy system			1
27	Exceed title 24		x	1
28	Solar orientation			0.5
29	Non-Roof Surfaces	x		1
30	Green Roof			0.5
<b>TDM and Misc.</b>				
31	Electric Lawnmower		x	1
<b>Additional Measures Not Yet Quantified<sup>3</sup></b>				
1	Bike Lane Street Design		x	TBD
2	Bike and Pedestrian Design		x	TBD
3	School Siting		x	TBD
4	Transit Street Design		x	TBD
5	Site Design Measures		x	TBD

Measure Number <sup>1</sup>	Measure Name <sup>1</sup>	Included in the Specific Plan	Potential to be Included in Development Projects <sup>2</sup>	Estimated CO <sub>2</sub> Equivalent Point Reductions <sup>1</sup>
6	Other Mixed-Use			TBD
7	Mixed-Use			TBD
8	Open Space		x	TBD
9	Natural Gas		x	TBD
10	Solar Design			TBD
11	Vehicle Idling			TBD
12	Ride Sharing			TBD
13	Shuttle Service			TBD
14	School Bus Service			TBD
15	Shuttle Bus Service			TBD
16	Energy Efficient Appliances		x	TBD
17	Renewable Energy Use			TBD
18	Solar Panels in Parking Areas			TBD
19	Photovoltaic Roofing Tiles			TBD
20	Tree Planting		x	TBD
21	Local Farmer's Market			TBD
22	Community Gardens			TBD
23	Best Management Practices			TBD
24	Land Use Density		x	TBD
25	Zero Emission Infrastructure			TBD
26	Low Carbon Fuel Incentive Program			TBD
<p>1 Measure Number, Name and Equivalent Point Reductions corresponds to those listed in Appendix J of SJVAPCD's <i>Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act</i>, December 2009.</p> <p>2 This column indicates measures that are considered likely to be implemented by some or all development projects in the Plan area. Development Projects are not precluded from implementing measures that are not indicated here.</p> <p>3 While equivalent point reductions have not yet been quantified for these measures, their likely applicability to the Plan and/or development projects in the Plan area has been indicated.</p>				

With the implementation of measures shown in Table 10.2 the GHG emissions will be reduced. The amount of reductions that are estimated to occur with the implementation of these measures is detailed in **Table 10.3**.

**Table 10.3: Potential Greenhouse Gas Emission San Joaquin Valley Air Pollution Control District Quantified Reduction Estimate at Buildout**

Measure Number	REDUCTION METHODOLOGY	Percent GHG Emission Reduction Factor	GHG Emission Reduction (tons/Year)
1	Bike parking	0.625	561
2	End of trip facilities	0.625	561
3	Bike parking at multi-unit residential	0.625	561
4	Proximity to bike path/bike lanes	0.625	561
5	Pedestrian network	1	897
5a	Pedestrian Network	0.5	449
6	Pedestrian barriers minimized	1	897
8	Bus shelter for planned transit service	0.25	224
9a	Traffic calming	0.25	224
13	Pedestrian pathway through parking	0.5	449
17	Orientation toward planned transit, bikeway, or pedestrian corridor	0.25	224
20c	Neighborhood Electric Vehicle access	0.5	449
23	Suburban mixed-use	3	2,692
29	Non-Roof Surfaces	1	897
<b>Total Plan and Project-Related Emissions Reductions</b>			<b>9,646</b>

Along with the above Plan or project related mitigation measures listed in Tables 10.2 and 10.3, there are changes in regulations that will substantially reduce GHG emissions. With the passage of AB 1493, the Pavley Bill, will reduce the amount of GHG emitted from new passenger vehicles from 2009 through 2016. Mobile sources are the largest source of GHG associated with the project; the anticipated 23.16 percent reduction represents a reduction of 14,973 tons of CO<sub>2</sub> per year. Other regulations by CARB and others will further reduce GHG emissions as shown in Table 10.4.

**Table 10.4: GHG Reductions from Application of New Regulations**

Sector		California Legislation	Reduction from 2020 GHG Sector Inventory (%)	Total Regulation Reductions for the Applicable Sector (%)	CO <sub>2</sub> Emission Reduction (tons/year)
Mobile	Passenger vehicles	AB 1493 Pavley LCFS	17.2%	23.16 <sup>1</sup> %	14,973
		Passenger Vehicle Efficiency	0.9%		
Area	Trucks	LCFS	7.2%	9.1%	2
		Heavy-Duty Vehicle Efficiency	1.9%		
Area	Natural Gas	Energy Efficiency Measures	9.2%		956
Indirect	Electricity	Renewable Portfolio Standard (RPS) Energy Efficiency Measures	15.3%	26.2%	3,819
			10.9%		
Stationary	Refrigerants	Refrigerant Management Program	50%	50%	2
<b>Total Regulatory Reduction</b>					<b>19,747</b>

<sup>1</sup> -Pavley reduction is applied first then the LCFS reduction is applied net reduction is 23.16%

<sup>2</sup> - No quantified emissions figure was available from the project so the regulatory reduction was not applied to the total GHG emissions.

**Table 10.5** sums the total reductions from Tables 10.3 and 10.4, the total GHG reduction is 29,393 tons of CO<sub>2</sub> per year. This represents a 32.8 percent reduction of GHG emissions from the Business as Usual (BAU) figure of 89,725 tons of CO<sub>2</sub> per year.

**Table 10.5 - Summary of Project GHG Reductions**

Emission Reduction Summary	GHG Emissions (tons/year)
Total Business as Usual (BAU) Emissions	89,725
Project-Related CO <sub>2</sub> Reduction	<9,649>
Regulatory Reduction	<19,747>
Total GHG Emission Reduction	<29,393>
Remaining Emissions	60,332
Percent Reduction from Business as Usual	32.8
District Percent Reduction Threshold for less than significant Determination	29.0

#### Description of GHG Reduction Measures Applicable to the Plan Area

Through review of the Specific Plan document, the City, in conjunction with the preparers of this environmental analysis, have identified the following interim GHG emissions reduction measures that are applicable to the Plan area. Note that the numbers corresponds to those listed in Appendix J of SJVAPCD's *Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act* followed by the name of the measure, the resultant mitigation points applicable under the Plan, and a description of the measure:

#### *Bicycle/Pedestrian/Transit Measures*

##### **1. Bike Parking Measure – Reduction = 0.625%**

Non-residential projects provide plentiful short-term and long-term bicycle parking facilities to meet peak season maximum demand. Short-term facilities are provided at a minimum ratio of one bike rack space per 20 vehicle spaces. Long-term facilities provide a minimum ratio of one long-term bicycle storage space per 20 employee parking spaces.

##### **2. End of Trip Facilities Measure - Reduction = 0.625%**

Non-residential projects provide “end-of-trip” facilities including showers, lockers, and changing space. Facilities shall be provided in the following ratio: four clothes lockers and one shower provided for every 80-employee parking spaces. For projects with 160 or more employee parking spaces, separate facilities are required for each gender.

##### **3. Bike Parking at Multi-Unit Residential Measure - Reduction = 0.625%**

Long-term bicycle parking is provided at apartment complexes or condominiums without garages. Project provides one long-term bicycle parking space for each unit without a garage. Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, or a standard rack in a location that is staffed and/or monitored by video surveillance 24 hours per day.

##### **4. Proximity to Bike Path/Bike Lanes Measure - Reduction = 0.625%**

Entire project is located within 1/2 mile of an existing Class I or Class II bike lane and project design includes a comparable network that connects the project uses to the existing offsite facility. Existing

facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted. Project design includes a designated bicycle route connecting all units, on-site bicycle parking facilities, offsite bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within 1/2 mile. Bicycle route connects to all streets contiguous with project site. Bicycle route has minimum conflicts with automobile parking and circulation facilities. All streets internal to the project wider than 75 feet have class II bicycle lanes on both sides.

#### **5. Pedestrian Network Measure - Reduction = 1%**

The project provides a pedestrian access network that internally links all uses and connects to **existing** external streets and pedestrian facilities. Existing facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted.

#### **5a. Pedestrian Network Measure - Reduction = 0.5%**

The project provides a pedestrian access network that internally links all uses for connecting to **planned** external streets and pedestrian facilities (facilities must be included pedestrian master plan or equivalent).

#### **6. Pedestrian Barriers Minimized - Reduction = 1%**

Site design and building placement minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential uses that impede bicycle or pedestrian circulation are eliminated. Barriers to pedestrian access of neighboring facilities and sites are minimized. This measure is not meant to prevent the limited use of barriers to ensure public safety by prohibiting access to hazardous areas, etc.

#### **8. Bus Shelter for planned Transit Service - Reduction = 0.25%**

Project provides transit stops with safe and convenient bicycle/pedestrian access. Project provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting) in anticipation of future transit service.

#### **9. Traffic Calming Measure - Reduction = 0.25%**

Project design includes pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements. Roadways are designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips by featuring traffic calming measures. Traffic calming measures include: bike lanes, center islands, closures (cul-de-sacs), diverters, education, forced turn lanes, roundabouts, speed humps, etc.

The listed mitigation points assumes 25% to 50% of streets and intersections include traffic calming measures, consistent with the Specific Plan.

#### **14. Pedestrian Pathway through Parking Measure - Reduction = 0.5%**

Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances. Pathway must connect to all transit facilities internal or adjacent to project site. Site plan should demonstrate how the pathways are clearly marked, shaded, and are placed between transit facilities and building entrances.

*Site Design Measures***17. Orientation toward planned transit, bikeway, or pedestrian corridor - Reduction = 0.25%**

Project is oriented towards planned transit, bicycle, or pedestrian corridor. Setback distance is minimized. Planned transit, bicycle or pedestrian corridor must be in the MTP, RT Master Plan, General Plan, or Community Plan. Setback distance between project and existing or planned adjacent uses is minimized or non-existent. Setback distance between different buildings on project site is minimized. Setbacks between project buildings and planned or existing sidewalks are minimized. Buildings are oriented towards existing or planned street frontage. Primary entrances to buildings are located along planned or existing public street frontage. Project provides bicycle access to any planned bicycle corridor(s). Project provides pedestrian access to any planned pedestrian corridor(s).

**20c. Neighborhood Electric Vehicle Access - Reduction = 0.5%**

Make physical development consistent with requirements for neighborhood electric vehicles (NEV). Current studies show that for most trips, NEVs do not replace gas, fueled vehicles as the primary vehicle. For the purpose of providing incentives for developers to promote NEV use, assume the percent reductions noted below.

For 0.5% reduction, a neighborhood has internal connections only.

Note that street-safe NEVs generally have a top speed of 25 mph and can be driven legally and safely on local streets with speed limits of 35 mph or below. The internal roadway network in the Specific Plan will have low speed limits allowing the use of NEVs.

*Mixed-Use Measures***23. Suburban Mixed-Use Measure - Reduction = 3%**

Have at least three of the following on site and/or offsite within ¼ mile: Residential Development, Retail Development, Park, Open Space, or Office.

*Building Component Measures***29. Non Roof Surfaces Measure - Reduction = 1%**

Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's non-roof impervious surfaces, including parking lots, walkways, plazas, etc.; OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use an open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area. Unshaded parking lot areas, driveways, fire lanes, and other paved areas have a minimum albedo of .3 or greater.

This measure is implemented by the Parking/Paved Areas Section of the Specific Plan, Section 9.7

The above GHG reduction measures incorporated into the design or policy provisions of the Specific Plan would add up to 11.25% mitigation points out of the 29% required under the SJVAPCD guidelines. Note that these GHG reduction measures and mitigation points are not officially adopted, and are subject to change prior to development project submittal. Additional measures are applicable on a Plan level, but not currently quantified. Thus, the Plan currently does not demonstrate that it can achieve GHG reductions of a minimum of 29% over business-as-usual on a Plan level.

### GHG Reduction Measures Potentially Applicable to Development Projects Within the Plan Area

Subsequent development projects under the Plan will be required to demonstrate additional mitigation points on a project-specific basis to achieve the full 29% reduction over business-as-usual. Measures that are likely to be implemented on a project-specific basis through subsequent development projects within the Plan area are listed below, though this is not intended to be a comprehensive list.

#### **11. Minimum Parking - Reduction = 3%**

Provide minimum amount of parking required. If zoning codes in the San Joaquin Valley area have provisions that allow a project to build less than the typically mandated amount of parking if the development features design elements that reduce the need for automobile use. This measure recognizes the air quality benefit that results when facilities minimize parking needs, and grants mitigation value to project that implement all available parking reductions. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the Institute of Transportation Engineers (ITE) Parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. The maximum achievable trip reduction is 6%. For projects where retail space occupies 50% or more of the total built space, do not use December specific parking generation rates (from ITE). Percent Trip Reduction =  $50 * [(min\ parking\ required\ by\ code - ITE\ peak\ parking\ demand) / (ITE\ peak\ parking\ demand)]$ .

#### **12. Parking Reduction Beyond Code Measure - Reduction = 6%**

Provide parking reduction less than code. Recommend a Shared Parking strategy. Trip reductions associated with parking reductions beyond code shall be computed in the same manner as described under measure 11, as the same methodology applies. The maximum achievable trip reduction is 12%. This measure can be readily implemented through a Shared Parking strategy, wherein parking is utilized jointly among different land uses, buildings, and facilities in an area that experience peak parking needs at different times of day and day of the week. For example, residential uses and/or restaurant/retail uses, which experience peak parking demand during the evening/night and on the weekends, arrange to share parking facilities with office and/or educational uses, which experience peak demand during business hours and during the week.

#### **14. Off Street Parking Measure - Reduction = 0.1% to 1.5%**

Parking facilities are not adjacent to street frontage.

For 1.5% reduction, parking facilities shall not be sited adjacent to public roads contiguous with project site. Functioning pedestrian entrances to major site uses are located along street frontage. Parking facilities do not restrict pedestrian, bicycle, or transit access from adjoining uses. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a description of where parking is located relative to the buildings on the site, site plans, maps, or other graphics, which demonstrate the placement of parking facilities behind on-site buildings relative to streets contiguous with the project site. Surrounding uses should be high density or mixed-use, there shall be other adjoining pedestrian and bicycle connections, such as wide sidewalks and bike lanes, and surrounding uses shall also implement measure 15.

For 1.0% reduction, (parking structures only) proponent must show that parking facilities that face street frontage feature ground floor retail along street frontage. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a written

description of the parking facility and the amount of retail space on the ground floor, site plans, maps, or other graphics demonstrating the placement of retail/commercial space along all street fronts contiguous with parking structure.

For 0.1% reduction, the project is not among high-density or mixed uses, is not connected to pedestrian or bicycle access ways, or is among uses that do not also hide parking. This point value is reflective of the importance that other pedestrian and density measures be in place in order for this measure to be effective.

### **18. Residential Density Measure - Reduction = 0% to 10%**

Residential Density with “no transit”, project provides high-density residential development. Mitigation value is based on project density with no transit. Density is calculated by determining the number of units per acre (“du/acre”) within the residential portion of the project’s net lot area. (Note that shuttle and standard bus service does not change the mitigation points and falls under the “no transit” category.)

The net densities will be project-specific for residential development projects within the Specific Plan area. The following list displays the net densities and resultant mitigation points:

3-6 Du/acre, Reduction = 0%

7-10 Du/acre, Reduction = 1%

11-20 Du/acre, Reduction = 3%

21-30 Du/acre, Reduction = 5%

31-40 Du/acre, Reduction = 6%

41-50 Du/acre, Reduction = 8%

50+ Du/acre, Reduction = 10%

### **22. Urban Mixed-Use Measure - Reduction = 3% to 9%**

Development of projects predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential are combined in a single building or on a single site in an integrated development project with functional inter-relationships and a coherent physical design. Mitigation points for this measure depend on job to housing ratio (as listed below).

Jobs/housing ratio 0.5 to 1, Reduction = 3%

Jobs/housing ratio 1 to 1.5, Reduction = 6.6%

Jobs/housing ratio 1.5 to 2.0, Reduction = 9%

Jobs/housing ratio 2.0 to 2.5, Reduction = 7.29%

Jobs/housing ratio 2.5 to 3.0, Reduction = 6%

Jobs/housing ratio 3.0 to 3.5, Reduction = 5%

Jobs/housing ratio 3.5 to 4.0, Reduction = 4.2%

*Building Component Measures*

**25. Energy Star Roof Measure - Reduction = 0.5%**

Install Energy Star labeled roof materials. Energy star qualified roof products reflect more of the sun's rays, decreasing the amount of heat transferred into a building.

**27. Exceed Title 24 Measure - Reduction = 1%**

Project Exceeds Title 24 requirements by 20%.

**31. Electric Lawnmower Measure - Reduction = 1%**

Provide a complimentary electric lawnmower to each residential buyer.

The above GHG reduction measures potentially applicable to development projects within the Plan area could amount to up to an additional 23.5% mitigation points out of the 29% required under the SJVAPCD guidelines and mitigation measure Climate-1. (However, note that these GHG reduction measures and mitigation points are not officially adopted, so could change prior to development project submittal.)

Potentially Applicable GHG Reduction Measures That Are Not Yet Quantified

Additional GHG reduction measures for which mitigation points have not yet been quantified may be applicable to the Plan area and/or specific development projects. These measures are listed here with the preface NQ to indicate they could be applicable, but are currently not quantified.

**NQ1. Bike Lane Street Design Measure - Reduction = Not Quantified**

Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.

**NQ2. Bike & Pedestrian Design Measure – Reduction = Not Quantified**

Include pedestrian and bicycle-only streets and plazas within developments. Create travel routes that ensure that destinations may be reached conveniently by public transportation, bicycling or walking.

**NQ3. School Siting Measure – Reduction = Not Quantified**

Site schools to increase the potential for students to walk and bike to school.

**NQ4. Transit Street Design Measure – Reduction = Not Quantified**

The project will provide for on-site road and off-site bus turnouts, passenger benches, and shelters as demand and service routes warrant subject to review and approval by local transportation planning agencies.

**NQ5. Site Design Measures – Reduction = Not Quantified**

Site design to minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.

**NQ8. Open Space Measure – Reduction = Not Quantified**

Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.

**NQ9. Natural Gas Stove Measure – Reduction = Not Quantified**

Project features only natural gas or electric stoves in residences.

**NQ16. Energy Efficient Appliances Measure – Reduction = Not Quantified**

Install energy efficient heating and cooling systems, appliances and equipment, and control systems.

**NQ20. Tree Planting Measure – Reduction = Not Quantified**

Protect existing trees and encourage the planting of new trees. Adopt a tree protection and replacement ordinance, e.g., requiring that trees larger than a specified diameter that are removed to accommodate development must be replaced at a set ratio.

**NQ24. Land Use Density – Reduction = Not Quantified**

The project should provide densities of nine units per acre or greater, where allowed by the General Plan and/or Zone Plan, along bus routes and at bus stops to encourage transit use, where feasible.

California Attorney General Global Warming Measures

The California Attorney General (AG) has published a list of Global Warming Mitigation Measures to meet AB32 greenhouse gas emission reduction targets.<sup>18</sup> While SJVAPCD guidelines and measures are intended to be the more local version of an implementation plan, because they have not yet been adopted, AG measures have been identified that could be applicable to the Plan development projects within the Plan area, as follows:

*Energy Efficiency***Meet recognized green building and energy efficiency benchmarks.**

Projects in the Plan area will be required to at a minimum, meet Title 24 energy efficiency standards and development projects can surpass this standard for additional mitigation points (see SJVAPCD GHG reduction measure 27).

**Install light colored “cool” roofs and cool pavements.**

Projects in the Plan area could include Energy Star qualified roof products (see SJVAPCD GHG reduction measure 25).

**Install efficient lighting, (including LEDs) for traffic, street and other outdoor lighting.**

The City of Ceres will use LED traffic signals in new applications.

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<sup>18</sup> California Attorney General’s Office, Revised 1/6/2010, *Addressing Climate Change at the Project Level*, available at: [http://ag.ca.gov/globalwarming/pdf/GW\\_mitigation\\_measures.pdf](http://ag.ca.gov/globalwarming/pdf/GW_mitigation_measures.pdf)

**Reduce unnecessary outdoor lighting.**

Can be applied for specific development projects, but isn't addressed in the Specific Plan.

**Use automatic covers, efficient pumps and motors, and solar heating for pools and spas.**

Can be applied for specific development projects, but isn't addressed in the Specific Plan.

**Provide education on energy efficiency to residents, customers and/or tenants.**

This measure is implemented by the Specific Plan (Table 4.3), requiring developers to furnish currently-available information on these topics at closing.

*Water Conservation and Efficiency*

**Incorporate water-reducing features into building and landscape design.**

Buildings within the plan will use water-efficient fixtures.

**Create water-efficient landscapes.**

The City of Ceres applies the Water Efficient Landscape Ordinance to all new development.

**Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls and use water-efficient irrigation methods.**

Public and non-residential landscaped areas will utilize water-efficient irrigation systems.

**Make effective use of graywater.** (Graywater is untreated household waste water from bathtubs, showers, bathroom wash basins, and water from clothes washing machines. Graywater to be used for landscape irrigation.)

The Plan is designed to provide for use of Recycled water to irrigate public landscaped areas and parks.

**Implement low-impact development practices that maintain the existing hydrology of the site to manage storm water and protect the environment.**

The Plan design provides for retention and percolation of all stormwater within the Project boundaries.

**Devise a comprehensive water conservation strategy appropriate for the project and location.**

Water conservation and efficiency measures addressed in this section combine into a water conservation strategy for the Plan area.

**Design buildings to be water-efficient. Install water-efficient fixtures and appliances.**

Buildings within the plan will use water-efficient fixtures.

**Provide education about water conservation and available programs and incentives.**

This measure is implemented by the Specific Plan (Table 4.3), requiring developers to furnish currently-available information on these topics at closing.

*Solid Waste Measures*

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

Recycling of demolition waste is encouraged, and facilities for such recycling are locally available.

**Integrate reuse and recycling into residential industrial, institutional and commercial projects.**

Recycling is integrated through a waste pick-up program that uses a separate container for recyclables, and separate pick-up for green waste.

**Provide easy and convenient recycling opportunities for residents, the public, and tenant businesses.**

The City provides a waste pick-up program that uses a separate container for recyclables, and separate pick-up for green waste.

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

This measure is implemented by the Specific Plan (Table 4.3), requiring developers to furnish currently-available information on these topics at closing. Additionally, the City has a regular program of dissemination of publicity and educational materials regarding recycling.

*Land Use Measures*

**Ensure consistency with “smart growth” principles** – mixed-use, infill, and higher density projects that provide alternatives to individual vehicle travel and promote the efficient delivery of services and goods.

The Specific Plan provides a mix of uses within close proximity to promote walking and other alternative forms of transportation, including high-density residential, commercial, business parks, schools and parks.

**Incorporate public transit into the project’s design.**

The Plan includes expansion of transit service transit stops

**Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.**

The Plan makes specific provision for parks, open space and required street trees.

**Include pedestrian and bicycle facilities within projects and ensure that existing non-motorized routes are maintained and enhanced.**

The plan includes pedestrian and bicycle facilities.

*Transportation and Motor Vehicles*

**Incorporate bicycle lanes, routes and facilities into street systems, new subdivisions, and large developments.**

The Plan incorporates bicycle lanes and routes throughout.

**Require amenities for non-motorized transportation, such as secure and convenient bicycle parking.**

The Plan incorporates a non-motorized circulation facility. Bicycle parking will be provided at non-residential facilities.

**Ensure that the project enhances, and does not disrupt or create barriers to, non-motorized transportation.**

Site design, building placement, and pedestrian pathways through parking lots minimize barriers to pedestrian access and interconnectivity within the Plan area. Barriers such as walls, berms, landscaping, and slopes to pedestrian access between residential and non-residential sites are minimized.

**Connect parks and open space through shared pedestrian/bike paths and trails to encourage walking and bicycling. Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.**

The Plan incorporates such connections.

**Work with the school districts to improve pedestrian and bike access to schools and to restore or expand school bus service using lower-emitting vehicles.**

Schools in the Plan area are sited to provide ready access by walking and bicycle to surrounding neighborhoods.

**Provide information on alternative transportation options for consumers, residents, tenants and employees to reduce transportation-related emissions.**

San Joaquin Commute Connection provides this service in the area.

**Educate consumers, residents, tenants and the public about options for reducing motor vehicle-related greenhouse gas emissions. Include information on trip reduction; trip linking; vehicle performance and efficiency (e.g., keeping tires inflated); and low or zero-emission vehicles.**

This measure is implemented by the Specific Plan (Table 4.3), requiring developers to furnish currently-available information on these topics at closing.

**Create a ride sharing program. Promote existing ride sharing programs e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading for ride sharing vehicles, and providing a web site or message board for coordinating rides.**

A ride-sharing program is in place through San Joaquin Commute Connection. Non-residential projects will be encouraged to participate in this program.

**Create local “light vehicle” networks, such as neighborhood electric vehicle systems.**

The internal roadway network in the Specific Plan will have low speed limits allowing the use of street-safe Neighborhood Electric Vehicle Systems.

**Enforce and follow limits idling time for commercial vehicles, including delivery and construction vehicles.**

The City of Ceres enforces this existing law.

**CONCLUSION**

With full implementation of mitigation measure Climate-1: GHG emissions would be reduced by a minimum of 32.8% over business-as-usual, and the impact would be considered less than significant under the SJVAPCD guidelines. However, implementation of additional GHG reduction measures applicable to subsequent development projects is not certain. These additional project-specific measures are dependent upon the design and practices of subsequent development projects that are not yet designed or fully envisioned. It is uncertain how many of these project-specific measures can be reasonably and feasibly implemented by these subsequent development projects. Additionally, SJVAPCD’s interim GHG reduction measures and mitigation points are not yet officially adopted. Therefore, because specifics of finalized measures and resultant reductions are unknown and the feasibility of additional project-specific measures is uncertain, the impact would be considered to remain *significant and unavoidable*.

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