4.6 Greenhouse Gases

4.6.1 Introduction

The greenhouse gas (GHG) analysis conducted for the SPAS alternatives addresses emissions from operational activities (an on-airport stationary source, on-airport roadway sources, and off-airport regional traffic) that would occur during future (2025) conditions. The analysis also addresses emissions from construction activities that would occur between 2015 and 2025 for each alternative. The analysis of SPAS-related emissions includes a comparison to the GHG emissions associated with baseline conditions. For purposes of this analysis, the baseline conditions represent aircraft activity levels at LAX in 2009[285] and facilities/surface transportation generally as of 2010. Potential impacts related to air quality are addressed in Section 4.2, *Air Quality*. This section is based in part on more comprehensive information contained in Appendix F, *Greenhouse Gases*.

4.6.1.1 Global Climate Change

Briefly stated, global climate change (GCC) is a change in the average climatic conditions of the earth, as characterized by changes in wind patterns, storms, precipitation, and temperature. The baseline by which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. Many of the recent concerns over GCC use these data to extrapolate a level of statistical significance, specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change (IPCC) developed several emission projections of GHGs needed to stabilize global temperatures and climate change impacts. The IPCC predicted that the range of global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 to 6.4 degrees Celsius (C).[286] Regardless of analytical methodology, global average temperature and mean sea level are expected to rise under all scenarios.

Climate models applied to California's conditions project that, under different scenarios, temperatures in California are expected to increase by 3 to 10.5 degrees Fahrenheit (F).[287] Almost all climate scenarios include a continuing trend of warming through the end of the century given the substantial amounts of GHGs already released, and the difficulties associated with reducing emissions to a level that would stabilize the climate. According to the *2006 California Climate Action Team Report*, the following climate change effects are predicted in California over the course of the next century.[288]

- A diminishing Sierra snowpack declining by 70 to 90 percent, threatening the state's water supply.
- Increasing temperatures, as noted above, of up to approximately 10 degrees 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 Delta from a 4- 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.

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285 2009 represents a full calendar year of aircraft activity data for the year preceding issuance of the SPAS EIR Notice of Preparation.

286 Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.

287 California Climate Change Center, Our Changing Climate: Assessing the Risks to California, 2006.

288 California Environmental Protection Agency, Climate Action Team, Report to Governor Schwarzenegger and the California Legislature, March 2006.

- Increased challenges for the state's important agricultural industry from water shortages, increasing temperatures, and saltwater intrusion into the Sacramento Delta.
- Increased electricity demand, particularly in the hot summer months.

As such, temperature increases would lead to adverse environmental impacts in a wide variety of areas, including: sea level rise, reduced snowpack resulting in changes to existing water resources, increased risk of wildfires, and public health hazards associated with higher peak temperatures, heat waves, and decreased air quality.

4.6.1.2 Greenhouse Gases

Parts of the earth's atmosphere act as an insulating blanket, trapping sufficient solar energy to keep the global average temperature in a suitable range. The blanket is a collection of atmospheric gases called GHGs. These gases - water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone, chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) - all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities, such as producing electricity and driving vehicles, have elevated the concentrations of these gases in the atmosphere. Many scientists believe that these elevated levels, in turn, are causing the earth's temperature to rise. A warmer earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Climate change is driven by "forcings" and "feedbacks." A feedback is "an internal climate process that amplifies or dampens the climate response to a specific forcing."[289] Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. The global warming potential (GWP) is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas."[290] Individual GHG species have varying GWP and atmospheric lifetimes. The carbon dioxide equivalent (CO_2e) -- the mass emissions of an individual GHG multiplied by its GWP -- is a consistent methodology for comparing GHG emissions because it normalizes various GHG emissions to a consistent metric. The reference gas for GWP is CO_2; CO_2 has a GWP of 1. Compared to CH_4's GWP of 21, CH_4 has a greater global warming effect than CO_2 on a molecule-per-molecule basis. **Table 4.6-1** identifies the GWP of several select GHGs.

289 National Research Council of the National Academies, Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties, 2005.

290 U.S. Environmental Protection Agency, Glossary of Climate Terms, Available: http://www.epa.gov/climatechange/glossary.html, accessed February 14, 2012.

Table 4.6-1

Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100 Year Time Horizon)
Carbon Dioxide	50 - 200	1
Methane	12 $\pm$ 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Perfluromethane (CF_4)	50,000	6,500
PFC: Perfluoroethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: Intergovernmental Panel on Climate Change, Climate Change 1995: The Science of Climate Change. Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change, 1996.

According to a white paper on GHG emissions and GCC prepared by the Association of Environmental Professionals, total worldwide GHG emissions in 2004 were estimated to be 20,135 teragrams (Tg)[291] CO_2e, excluding emissions/removals from land use, land use change, and forestry.[292] In 2004, GHG emissions in the U.S. were 7,074.4 Tg CO_2e. California is a substantial contributor of GHG, as it is the second largest contributor in the U.S. and the sixteenth largest in the world (as compared to other nations). In 2004, California produced 484 Tg CO_2e,[293] which is approximately seven percent of U.S. emissions. The major source of GHG in California is transportation, contributing 38 percent of the state's total GHG emissions in 2004. Electricity generation is the second largest source, contributing 25 percent of the state's GHG emissions in 2004.

In estimating the GHG emissions of an individual business or facility, the *GHG Protocol Corporate Accounting and Reporting Standard*, developed by the World Business Council for Sustainable Development and World Resources Institute,[294] provides standards and guidance for companies and other organizations preparing a GHG emissions inventory. The standard is written primarily from the perspective of a business developing a GHG inventory. The *GHG Protocol* provides the accounting framework for nearly every GHG standard and program in the world from the International Standards Organization to the European Union Emissions Trading Scheme to the California Climate Action Registry (CCAR), as well as hundreds of GHG inventories prepared by individual companies.

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291 One Tg is equal to one million metric tons or approximately 2,204,600,000 pounds (lbs).

292 Association of Environmental Professionals, Final Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents, June 29, 2007.

293 California's estimated gross GHG emissions without forestry or land use sinks as reported by the California Air Resources Board in California Greenhouse Gas Inventory for 2000-2008 - by Category as Defined in the Scoping Plan, May 12, 2010.

294 World Business Council for Sustainable Development and World Resources Institute, The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition, April 2004, Available: http://www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf.

The *GHG Protocol* divides GHG emissions into three source types or "scopes," ranging from GHGs produced directly by the business to more indirect sources of GHG emissions, such as employee travel and commuting. Direct and indirect emissions can be generally separated into three broad scopes as follows:

- Scope 1. All direct GHG emissions.
- Scope 2. Indirect GHG emissions from consumption of purchased electricity, heat, or steam (i.e., GHG emissions generated at the power plant that provides electricity at the demand of the site/facility).
- Scope 3. Other indirect (optional) GHG emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, and construction.

4.6.2 Methodology

4.6.2.1 Construction Sources

GHG emissions associated with construction of the SPAS alternatives were calculated based on methodologies provided in the CCAR *General Reporting Protocol*, Version 3.1.[295] The *General Reporting Protocol* is the guidance document that LAWA and other CCAR members must use to prepare annual GHG inventories for the CCAR. Therefore, for consistency, the *General Reporting Protocol* also was used in this study. However, to adapt the *General Reporting Protocol* for CEQA purposes, a modification to the *General Reporting Protocol* operational and geographical boundaries was necessary. The *General Reporting Protocol* requires all California-based emissions to be reported, as well as all direct and indirect emissions owned or controlled by the reporting entity (in this case, LAWA). Since GHG emissions were restricted to only those that could be affected by the SPAS alternatives, this represents a deviation from the *General Reporting Protocol*.

The project-related construction sources for which GHG emissions were calculated include:

- Off-road construction equipment
- On-road trucks
- Worker commute vehicles

4.6.2.2 Operational Sources

The objectives of this analysis are to quantify baseline LAX-related emissions and to predict future LAX-related operational emissions under the SPAS alternatives. The methodology for determining baseline conditions, estimating airport-related emissions, and assessing the significance of impacts followed standard practices for determining impacts of aviation sources that have been found acceptable by the U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), and South Coast Air Quality Management District (SCAQMD), and is summarized below.

In accordance with the State CEQA Guidelines, the impacts of the SPAS alternatives were compared to baseline conditions to determine significance under CEQA. As indicated previously, for purposes of this analysis, the baseline conditions represent aircraft activity levels at LAX in 2009 (i.e., based on a full calendar year of aircraft activity data, for the year preceding issuance of the SPAS EIR Notice of Preparation) and facilities/surface transportation generally as of 2010 (i.e., based on traffic data available for 2010).

[295] California Climate Action Registry, General Reporting Protocol, Version 3.1, January 2009.

Emission Source Types

As part of the analysis, all on- and off-airport emission sources associated with LAX were identified. The GHG impact analysis addressed all sources located on airport property, motor vehicles carrying passengers and cargo to or from the airport, and construction activity on airport property. These sources were divided into two general categories: mobile and stationary.

For purposes of this analysis, mobile sources include both off- and on-road sources/vehicles. Off-road sources include aircraft, on-board auxiliary power units (APUs), ground support equipment (GSE), and that operate in the non-public access areas of LAX. An APU is a small, on-board engine that operates to provide power to an aircraft for lights and ventilation while it is parked at the gate when the main engines are off. GSE are surface vehicles used to service a flight while an aircraft is parked at a gate, including baggage tugs, lavatory carts, and push-back tractors. On-road vehicles include the automobiles, trucks, buses, and other motor vehicles that operate on the public roadways and in the parking areas at and near LAX.

Emissions Estimating

The emissions estimates (also called emissions inventories) were developed using emission factors and models from various USEPA, Federal Aviation Administration (FAA), CARB, and SCAQMD references.

Aircraft

Information on the number and types of aircraft operations considered at LAX for 2009 and 2025 was developed as part of the LAX SPAS forecasts. The aircraft activity levels for the baseline conditions are from calendar year 2009. The aircraft activity levels for future conditions were based on aircraft activity growth forecasts for LAX in the year 2025. These data were used to develop airport simulation models (SIMMOD) of aircraft operations for baseline (2009) conditions and future aircraft operations for each alternative. The SIMMOD used information about facilities and operations to predict specific timing, volume, and location (e.g., runway used) for future aircraft operations. Refer to the North Runway Alternatives Simulation Analysis in Appendix F, Operational Analysis, in the SPAS Report for additional details.

Aircraft CO_2 emissions were calculated using FAA's Emissions and Dispersion Modeling System (EDMS), Version 5.1.3.[296] EDMS is an air quality model that estimates emissions from airport sources based on information input to the model. Emissions produced by LAX activity during four aircraft operational modes (approach, taxi/idle, takeoff, and climbout) were calculated for each alternative. Airport-specific taxi/idle times-in-mode were used in the modeling because LAX handles more operations than a typical airport. Taxi and queue (idle) times were developed from the LAX SPAS SIMMOD results. The EDMS default times-in-mode were the basis for climbout, approach, and takeoff times; however, climbout and approach times were adjusted according to the average mixing height[297] adjustment parameters contained in EDMS. For LAX, a mixing height of 1,806 feet above mean sea level was used in the emissions modeling to be consistent with emissions calculations performed for the SCAQMD.[298]

CH_4 and N_2O emissions are not directly estimated by EDMS; therefore, it was necessary to estimate emissions using other methods. The results from LAWA's *Greenhouse Gas Inventory Report*[299] were

296 Federal Aviation Administration, Emissions and Dispersion Modeling System, Available: http://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/edms_model/, accessed February 15, 2012.

297 Mixing height is the vertical distance between the earth's surface and the height to which convection movements within the atmosphere extend, typically a few thousand feet. The height is often located at the interface of warm air situated on top of cooler air (thermal inversion). The thermal inversion suppresses turbulent mixing and thus limits the upward dispersion of polluted air.

298 South Coast Air Quality Management District, Development of the 2002 Aircraft Emission Inventory and Projected Activity and Emissions for 2010, 2020, and 2030, prepared by Eastern Research Group, November 17, 2005.

299 City of Los Angeles, Los Angeles World Airports, Greenhouse Gas Inventory Report, prepared by CDM, October 22, 2008.

used to estimate CH_4 and N_2O emissions based on the ratio of these pollutants to CO_2. The calculated ratios were then applied to the EDMS-estimated CO_2 emissions to estimate CH_4 and N_2O emissions.

Quarter-hourly temporal profiles[300] were created for each airframe, runway, gate, and approach/departure combination. Monthly and daily temporal profiles were also created based on LAX traffic comparison statistics.[301]

Ground Support Equipment and Auxiliary Power Units

Data on the specific GSE types and times-in-mode[302] used for servicing several common aircraft types were obtained from a survey at LAX. Although operations of APUs are expected to contribute to GHG emissions, EDMS does not estimate CO_2 emissions or fuel consumption; therefore, APUs are not included in the emissions inventory. Default GSE information included in EDMS, along with emission factors taken from the CARB OFFROAD2007 model,[303,304] were used to supplement the site-specific data. The use of alternative-fueled GSE (e.g., gasoline- and propane-fueled GSE) under baseline conditions was also determined. The future (2025) year inventories of alternative-fueled GSE were based on these evaluations; the annual operating hours for the GSE in the future year inventories were scaled upwards based on the ratio of landing/takeoff operations in 2025 and 2009.

On-Road Vehicles

All vehicles traveling to or from LAX were considered in the analysis, including privately-owned vehicles, government-owned vehicles, and commercially-owned vehicles such as rental cars, shuttles, buses, taxicabs, and trucks. Temporal data that identify the vehicle volumes by hour of the day for traffic and on-airport parking were determined from the transportation analysis, which is based on data for all of calendar year 2010.

Emissions from on-road vehicles for all alternatives were estimated using CARB-mandated methodology. Baseline (2010) and future (2025) year emissions from on-road vehicles were calculated using the CARB Emission Factor 2011 model, or EMFAC2011, approved for use by USEPA.[305] EMFAC2011 uses site-specific data regarding vehicle trip distances, idle times, hot start vs. cold soak,[306] and average travel speeds to estimate vehicle emissions. Temporal data for traffic and on-airport parking were determined from the transportation analysis (see Section 4.12, *Transportation*).

Stationary Sources

Emissions could also occur directly from natural gas combustion used for space heating and indirectly from electricity and solid waste disposal. In addition to electricity purchased by LAWA and its tenants to operate LAX, electricity is also used indirectly to supply water to LAX and to deliver water to wastewater treatment facilities. Emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2011.1.1.[307] Changes in the size of airfield/terminal and ground access

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300 Temporal data provides information about the timing of operation and activities by hour-of-day, day-of-week, or month-of-year.

301 City of Los Angeles, Los Angeles World Airports, Statistics - Volume of Air Traffic, Available: http://www.lawa.org/LAXStatistics.aspx.

302 Time-in-mode is the time that an emission source spends in a specific mode of operation.

303 California Air Resources Board, OFFROAD2007 Model, Available: http://www.arb.ca.gov/msei/offroad/offroad.htm.

304 Although CARB no longer maintains the OFFROAD2007 model for GSE and has replaced it with the category-specific emission inventory models and databases, the 2011 Inventory Model for In-Use Off-Road Equipment (Construction, Industrial, Ground Support, and Oil Drilling), available at http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles, does not estimate GHG emissions. As a result, OFFROAD2007 was used to estimate emissions of CO_2, CH_4, and N_2O from GSE.

305 California Air Resources Board, EMFAC2011 Model, Available: http://www.arb.ca.gov/msei/modeling.htm.

306 A hot start occurs when a vehicle is started before the engine has cooled from its previous use. A cold soak is when the engine has reached ambient temperature from its previous use and needs to warm up again. Cold soaks result in greater emissions of air pollutants.

307 South Coast Air Quality Management District, California Emissions Estimator Model, prepared by ENVIRON International Corporation, Available: http://www.caleemod.com/.

components between baseline and each alternative were used to estimate the increase in GHG emissions that would occur from natural gas combustion, purchased electricity, water delivery (outdoor water), wastewater treatment (indoor water), and solid waste disposal. Water, electricity, natural gas, and solid waste usage rates were determined from information developed for the energy, solid waste, wastewater generation, and water supply analyses (see Section 4.13, *Utilities*). Default assumptions in CalEEMod were then adjusted with these parameters to estimate emissions.

4.6.3 Existing Conditions

4.6.3.1 Regulatory Setting

International and Federal Regulations and Directives

International Governmental Panel on Climate Change: In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess "the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation."

United Nations Framework Convention on Climate Change: On March 21, 1994, the U.S. joined other countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol: The Kyoto Protocol is a treaty made under the UNFCCC. Countries can sign the treaty to demonstrate their commitment to reduce their emissions of GHGs or engage in emissions trading. More than 160 countries, accounting for 55 percent of global emissions, are under the protocol. The U.S. symbolically signed the Protocol in 1998. However, in order for the Protocol to be formally ratified, it must be adopted by the U.S. Senate, which has not been done to date. The original GHG reduction commitments made under the Kyoto Protocol will expire at the end of 2012. No further emissions reductions commitments have been agreed to by the UNFCCC countries.

Massachusetts et al. v. United States Environmental Protection Agency et al.: *Massachusetts et. al. v. Environmental Protection Agency et. al.* (549 U.S. 497 [2007]) was argued before the U.S. Supreme Court on November 29, 2006, in which it was petitioned that USEPA regulate four GHGs, including CO_2, under Section 202(a)(1) of the Clean Air Act. The Court issued an opinion on April 2, 2007, in which it held that petitioners have standing to challenge the USEPA and that the USEPA has statutory authority to regulate emissions of GHGs from motor vehicles.

Endangerment Finding: The USEPA subsequently published its endangerment finding for GHGs in the Federal Register,[308] which responds to this court case. The USEPA Administrator determined that six GHGs, taken in combination, endanger both the public health and welfare of current and future generations. Although the endangerment finding discusses the effects of six GHGs, it acknowledges that transportation sources only emit four of the key GHGs: CO_2, CH_4, N_2O, and HFCs. Further, the USEPA Administrator found that the combined emissions of these GHGs from new motor vehicles contribute to air pollution that endangers the public health and welfare under the Clean Air Act, Section 202(a).

GHG and Fuel Efficiency Standards for Passenger Cars and Light-Duty Trucks: In April 2010, the USEPA and National Highway Traffic Safety Administration (NHTSA) finalized GHG standards for new (model year 2012 through 2016) passenger cars, light-duty trucks, and medium-duty passenger vehicles. Under these standards, CO_2 emission limits would decrease from 295 grams per mile (g/mi) in 2012 to 250 g/mi in 2016 for a combined fleet of cars and light trucks. If all of the necessary emission reductions

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308 U.S. Environmental Protection Agency, "Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act," Federal Register 74 (15 December 2009): 66496-66546.

were made from fuel economy improvements, then the standards would correspond to a combined fuel economy of 30.1 miles per gallon (mpg) in 2012 and 35.5 mpg in 2016. The agencies issued a proposal for a coordinated National Program for model years 2017 to 2025 light-duty vehicles on November 16, 2011 that would correspond to a combined fuel economy of 36.6 mpg in 2017 and 54.5 mpg in 2025. A final rule is expected by July 31, 2012.

GHG and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles: In October 2010, the USEPA and NHTSA announced a program to reduce GHG emissions and to improve fuel efficiency for medium- and heavy-duty vehicles (model years 2014 through 2018). These standards were signed into law on August 9, 2011. The two agencies' complementary standards form a new Heavy-Duty National Program that has the potential to reduce GHG emissions by 270 million metric tons and to reduce oil consumption by 530 million barrels over the life of the affected vehicles.

State Regulations and Directives

Title 24 Energy Standards: Although not originally intended to reduce GHG emissions, California's Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) were first 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 efficient technologies and methods. The latest amendments were made in April 2008 and went into effect on January 1, 2010. The premise for the standards is that energy efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions. Therefore, increased energy efficiency in buildings results in fewer GHG emissions on a building-by-building basis.

California Assembly Bill 1493 (AB 1493) - Pavley: Enacted on July 22, 2002, this bill required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light-duty trucks. Regulations adopted by CARB will apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce GHG emissions from the light-duty and passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030, compared to recent years. In 2011, the U.S. Department of Transportation, USEPA, and California announced a single timeframe for proposing fuel and economy standards, thereby aligning the Pavley standards with the federal standards for passenger cars and light-duty trucks.

Executive Order S-3-05: California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets for all of California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

California Assembly Bill 32 (AB 32): B 32, titled The California Global Warming Solutions Act of 2006 and signed by Governor Schwarzenegger in September 2006, requires CARB to adopt regulations to require the reporting and verification of statewide GHG emissions and to monitor and enforce compliance with the program. In general, the bill requires CARB to reduce statewide GHG emissions to the equivalent of those in 1990 by 2020. CARB adopted regulations in December 2007 for mandatory GHG emissions reporting. On August 24, 2011, CARB adopted the scoping plan indicating how emission reductions will be achieved. Part of the scoping plan includes an economy-wide cap-and-trade program. The final cap-and-trade plan was approved on October 21, 2011 and will go into effect by January 1, 2013.

California Senate Bill 375 (SB 375): B 375 requires CARB to set regional targets for 2020 and 2035 to reduce GHG emissions from passenger vehicles. A regional target will be developed for each of the 18 metropolitan planning organizations (MPOs) in the state; the Southern California Association of Governments (SCAG) is the MPO that would have jurisdiction over the SPAS project area. A Regional Targets Advisory Committee (RTAC) was appointed by CARB to provide recommendations to be considered and methodologies to be used in CARB's target setting process. The final RTAC report was released on January 23, 2009.

Each MPO is required to develop Sustainable Community Strategies (SCS) through integrated land use and transportation planning and to demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. CARB issued an eight percent per capita reduction target to the SCAG region for 2020 and a target of 13 percent by 2035. SCAG adopted the Regional Transportation Plan/SCS for the six-county Southern California region on April 4, 2012.

Executive Order S-01-07 and the Low Carbon Fuel Standard (LCFS): California Executive Order S-01-07 established a statewide goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020 from 2005. The Executive Order also mandated the creation of an LCFS for transportation fuels. The LCFS requires that the life-cycle GHG emissions for the mix of fuels sold in California decline on average. Each fuel provider may meet the standard by selling fuel with lower carbon content, using previously banked credits from selling fuel that exceeded the LCFS, or purchasing credit from other fuel providers who have earned credits.[309] On December 29, 2011, U.S. District Judge Lawrence O'Neill granted an injunction to prevent CARB from implementing the LCFS because it violates a federal law on interstate commerce. CARB's motion to stay the decision was also subsequently denied on January 24, 2012 (Rocky Mountain Farmers Union v. Goldstene, E.D. Cal., No. 09-cv-02234).

Senate Bill 97 (SB 97): SB 97 requires the Office of Planning and Research (OPR) to prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of GHG emissions or the effects of GHG emissions as required by CEQA. The Natural Resources Agency adopted amendments to the State CEQA Guidelines for GHG emissions on December 30, 2009. The amendments became effective on March 18, 2010. The guidelines apply retroactively to any incomplete EIR, negative declaration, mitigated negative declaration, or other related document, and are reflected in this EIR.[310]

Local Regulations and Directives

Green LA: In May 2007, the City of Los Angeles introduced *Green LA - An Action Plan to Lead the Nation in Fighting Global Warming*.[311] *Green LA* presents a framework targeted to reduce the City's GHG emissions by 35 percent below 1990 levels by 2030. The plan calls for an increase in the City's use of renewable energy to 35 percent by 2020 in combination with promoting water conservation, improving the transportation system, reducing waste generation, greening the ports and airports, creating more parks and open space, and greening the economic sector. *Green LA* identifies objectives and actions in various focus areas, including airports. The goal for airports is to "green the airports," and the following actions are identified: 1) fully implement the Sustainability Performance Improvement Management System (SPIMS) (discussed below); 2) develop and implement policies to meet the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) green building rating standards in future construction; 3) improve recycling, increase use of alternative fuel sources, increase use of recycled water, increase water conservation, reduce energy needs, and reduce GHG emissions; and 4) evaluate options to reduce aircraft-related GHG emissions.

Climate LA: In 2008, the City of Los Angeles followed up *Green LA* with an implementation plan called *Climate LA - Municipal Program Implementing the Green LA Climate Action Plan*.[312] A Departmental Action Plan for LAWA is included in *Climate LA*, which identifies goals to reduce CO_2 emissions 35 percent below 1990 levels by 2030 at LAX and the other three LAWA airports, implement sustainability practices, and develop programs to reduce the generation of waste and pollutants. Actions are specified in the areas of aircraft operations, ground vehicles, electrical consumption, building, and other actions.

City of Los Angeles Green Building Code: In December 2010, the Los Angeles City Council approved Ordinance No. 181,481, which amended Chapter IX of the Los Angeles Municipal Code by adding a new Article 9 to incorporate various provisions of the 2010 CALGreen Code. The requirements of the adopted City of Los Angeles Green Building Code apply to new building construction, building renovations, and

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[309] 17 California Code of Regulations, Section 95480 et seq., "Low Carbon Fuel Standard."

[310] Senate Bill 97, August 24, 2007.

[311] City of Los Angeles, Green LA - An Action Plan to Lead the Nation in Fighting Global Warming, 2007.

[312] City of Los Angeles, Climate LA - Municipal Program Implementing the Green LA Climate Action Plan, 2008.

building additions within the City of Los Angeles. Specific mandatory requirements and elective measures are provided for three categories: (1) low-rise residential buildings; (2) nonresidential and high-rise residential buildings; and (3) additions and alterations to nonresidential and high-rise residential buildings. Many of the measures included in the Green Building Code are similar to those of the LAWA *Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects*, which is further described below. Key measures in the Green Building Code that apply to nonresidential buildings include, but are not limited to, the following:

- Construction--A Storm Water Pollution Prevention Plan (SWPPP) conforming to the State Storm Water NPDES Construction Permit or local ordinance, whichever is stricter, is required for project regardless of acreage disturbed;
- Construction--Construction waste reduction of at least 50 percent of construction debris;
- Construction--100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled;
- Transportation Demand--Designated parking for any combination of low emitting, fuel-efficient, and carpool/vanpool vehicles shall be provided;
- Energy Conservation--Electric vehicle supply wiring for a minimum of 5 percent of the total number of parking spaces shall be provided;
- Energy Conservation--Energy conservation for new buildings must exceed California Energy Commission (CEC) requirements, based on the 2008 Energy Efficiency Standards, by 15 percent using an Alternative Calculation Method approved by the CEC;
- Energy Conservation--Each appliance provided and installed shall meet Energy Star requirements, if an Energy Star designation is applicable for that appliance;
- Renewable Energy--Future access, off-grid prewiring, and space for electrical solar systems shall be provided;
- Water--A schedule of plumbing fixtures and fixture fittings shall be provided that will reduce the overall use of potable water within the building by at least 20 percent based on the maximum allowable water use per plumbing fixture and fittings as required by the California Building Standards Code; and
- Wastewater--Each building shall reduce wastewater by 20 percent based on the maximum allowable water use per plumbing fixture and fittings as required by the California Building Standards Code.

<u>Sustainability Vision and Principles Policy</u>: In 2007, the Los Angeles Board of Airport Commissioners adopted a *Sustainability Vision and Principles Policy* that includes a commitment to integrating sustainable practices into operations and administration processes under a set of six principles related to environmental stewardship, economic growth, and social responsibility.[313] LAWA has since adopted several plans and policies aimed at implementing the *Sustainability Vision and Principles Policy*.

<u>Sustainability Performance Improvement Management System</u>: LAWA adopted SPIMS in August 2007 as a tool for identifying sustainability objectives, implementing actions to achieve the objectives, establishing targets, and continually monitoring progress. As part of the SPIMS process, the following fundamental objectives were identified to help LAWA achieve its goal of being the global leader in airport sustainability:

- Increase water conservation in all airport facilities and for all operations.
- Increase use of environmentally and socially responsible products.
- Increase recycling and source reduction efforts at all facilities and for all operations.
- Reduce energy usage and increase usage of green power at all airport facilities and in all operations.

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313 City of Los Angeles, Los Angeles World Airports, <u>Sustainability Vision and Principles</u>, 2007.

- Reduce emissions from all operations including stationary and mobile sources.
- Reduce single occupancy trips to, from, and within LAWA airports.
- Incorporate sustainable planning, design, and construction practices into all airport projects.
- Promote sustainability awareness to airport employees and the greater community.
- Integrate sustainable practices into internal policies, business processes, and written agreements.

Los Angeles World Airports Sustainability Plan: LAWA's *Sustainability Plan*,[314] developed in April 2008, describes LAWA's current sustainability practices and sets goals and actions that LAWA will undertake to implement the initiatives described above (Green LA, Climate LA, Sustainability Visions and Principles Policy, and SPIMS). The *Sustainability Plan* presents initiatives for the fiscal year 2008-2009 and long-term objectives and targets to meet the fundamental objectives identified above.

Sustainable Airport Planning, Design and Construction Guidelines: In 2008, LAWA developed the *Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects*.[315] The Guidelines were developed to provide a comprehensive set of performance standards focusing on sustainability specifically for airport projects on a project-level basis. A portion of the Guidelines is based on the LEED® rating systems for buildings. The Guidelines incorporate a "LAWA-Sustainable Rating System" based on the number of planning and design points and construction points a project achieves, based on the criteria and performance standards defined in the Guidelines. The Guidelines have been successfully utilized on several major improvement projects at LAX such as the Crossfield Taxiway Project, including the new Aircraft Rescue and Fire Fighting (ARFF) facility that achieved LEED® Gold certification, the Tom Bradley International Terminal Renovation Project that achieved a LEED® Silver certification, and the Bradley West Project currently under construction. LAWA is currently reevaluating and revising the existing Guidelines in light of the City of Los Angeles Green Building Ordinance, bringing the Guideline requirements and checklists into closer alignment with the requirements of the Green Building Ordinance.

Based on the above, LAWA has taken steps to increase its sustainability practices related to daily airport operations, many of which directly or indirectly contribute to a reduction in GHG emissions. Actions that LAWA has been undertaking include promoting and expanding the FlyAway non-stop shuttle services to the airport in an effort to reduce the number of vehicle trips to the airport, establishing an Employee Rideshare Program, using alternative fuel vehicles,[316] purchasing renewably generated Green Power from the Los Angeles Department of Water and Power (LADWP), and reducing electricity consumption by installing energy efficient lighting, variable demand motors on terminal escalators, and variable frequency drive on fan units at terminals and LAWA buildings.[317] Additional information regarding LAWA's sustainability efforts and progress can be found within the most recent annual LAWA Sustainability Report.[318]

4.6.3.2 Existing GHG Emissions

The baseline airport-related operational emissions, including those from aircraft, GSE, and APU operations, on-airport and off-airport roadways, and parking lots and structures are shown in **Table 4.6-2**.

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314 City of Los Angeles, Los Angeles World Airports, Los Angeles World Airports Sustainability Plan, April 2008.

315 City of Los Angeles, Los Angeles World Airports, Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects, Version 3.1, January 2008.

316 Over 60 percent of LAWA-owned fleet vehicles use alternative fuel (compressed natural gas (CNG), liquid natural gas (LNG), propane, hydrogen, solar, hybrid electric and pure electric).

317 City of Los Angeles, Climate LA - Municipal Program Implementing the Green LA Climate Action Plan, LAWA Departmental Action Plan, 2008.

318 City of Los Angeles, Los Angeles World Airports, Sustainability Report, June 2010, http://lawa.org/uploadedFiles/LAWA/pdf/Final%20Sustainability%20Report-2009_v2.pdf, accessed on June 24, 2012.

Table 4.6-2

Baseline Conditions - Operational Emissions

Emission Source	Annual Emissions, metric tons CO_2e[1,2] per year: CO_2[3]	CH_4[4]	N_2O[5]	Total	Percent of Total Baseline Emissions
Aircraft[6]	625,910	2,098	6,416	634,424	27.99%
Ground Support Equipment	59,778	192	581	60,551	2.67%
Auxiliary Power Units[7]	N/A	N/A	N/A	0	NA
Parking Facilities[6]	104,740	1,285	2,759	108,784	4.80%
On-Airport Roadways[6]	47,049	577	1,239	48,865	2.16%
On-Airport Stationary	7,738	4	22	7,763	0.34%
On-Airport Subtotal	**845,215**	**4,155**	**11,017**	**860,387**	**37.97%**
Building Electricity	66	<1	<1	66	<0.01%
Solid Waste Disposal	154	191	<1	345	0.02%
Indoor/Outdoor Water Usage	597	35	16	646	0.03%
Off-Airport Roadways	1,315,179	18,577	71,021	1,404,778	61.99%
Off-Airport Subtotal	**1,315,996**	**18,803**	**71,037**	**1,405,835**	**62.03%**
Total Baseline Emissions	**2,161,211**	**22,959**	**82,053**	**2,266,222**	**100.00%**

Notes:

Totals may not add due to rounding.

1 CO_2e = carbon dioxide equivalent
2 CO_2e emissions are determined by multiplying the individual pollutant emissions by its respective GWP. The GWPs used in this analysis are from the IPCC's *Second Assessment Report* (1995). The GWP for CH_4 is 21 and the GWP for N_2O is 310.
3 CO_2 = carbon dioxide
4 CH_4 = methane
5 N_2O = nitrous oxide
6 CH_4 and N_2O emissions were estimated from the Los Angeles World Airports *GHG Emissions Inventory* (CDM, 2008).
7 EDMS does not provide GHG emissions or fuel consumption data for APUs; therefore, GHG emissions cannot be estimated.

Source: CDM Smith, 2012.

4.6.4 Thresholds of Significance

There are no widely-established or readily accepted thresholds of significance for GHG emissions. The amendments to the State CEQA Guidelines that became effective in March 2010 do not identify a threshold of significance for GHG emissions but, instead, allow lead agencies to exercise discretion and make their own determinations of significance. In developing a threshold of significance for evaluating GHG impacts associated with the SPAS alternatives, LAWA has carefully reviewed and taken into consideration the *Interim CEQA Greenhouse Gas (GHG) Significance Threshold* set forth in 2008 by the SCAQMD[319] including information subsequently developed by SCAQMD staff, as described below. In addition, LAWA reviewed and considered the *CEQA & Climate Change-Evaluating and Aggressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* white paper prepared by the California Air Pollution Control Officers Association (CAPCOA) in January 2008 and the

319 South Coast Air Quality Management District, Board Meeting Agenda No. 31, Available: http://www.aqmd.gov/hb/2008/December/081231a.htm, accessed March 27, 2012.

Bay Area Air Quality Management District's adopted GHG thresholds. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. For industrial projects where SCAQMD is the lead agency, the SCAQMD's adopted threshold is 10,000 metric tons of carbon dioxide equivalent per year ($MTCO_2eq$/yr). Selection of 10,000 $MTCO_2eq$/yr as the threshold of significance for industrial projects was based largely on the GHG emissions associated with the natural gas consumption characteristics of numerous facilities evaluated by the SCAQMD. Selection of that threshold for industrial projects also took into consideration that industrial facilities typically containing stationary source equipment are largely permitted or regulated by the SCAQMD, consequently providing some ability to directly address GHG emissions. Notwithstanding that this adopted threshold applies to only industrial projects where the SCAQMD is the lead agency, LAWA does not consider 10,000 $MTCO_2eq$/yr to be an appropriate threshold that could possibly be extended to the SPAS analysis, as GHG emissions associated with SPAS are substantially different from those of the sources considered by SCAQMD.

SCAQMD staff included preliminary recommendations related to thresholds for residential and commercial development in the supporting documentation for the interim threshold for industrial projects described above; however, the SCAQMD Board did not adopt those other thresholds.[320] Staff recommended that 3,000 $MTCO_2eq$/yr be used by lead agencies as a screening level threshold for residential and commercial developments, including industrial parks, warehouses, etc. The 3,000 $MTCO_2eq$/yr threshold took into consideration an approach set forth in the 2008 CAPCOA white paper, whereby a threshold of 900 $MTCO_2eq$/yr would capture 90 percent of all development projects, which should translate into at least 90 percent of GHG emissions for the residential and commercial sectors. Using that basic construct, SCAQMD identified a screening level significance threshold of 3,000 $MTCO_2eq$/yr as capturing 90 percent of all GHG emissions for the Southern California region (i.e., South Coast Air Basin). Although LAX is in the South Coast Air Basin and has certain aspects that may be analogous to a commercial development or industrial/office park, the overall GHG emission characteristics of LAX, as potentially affected by each SPAS alternative, are substantially different from those uses, as further described below. Given the unique GHG-related nature of LAX, the use of the 3,000 $MTCO_2eq$/yr threshold or any other such mass emissions threshold was determined by LAWA to be unsuitable for the SPAS GHG impacts analysis.

Subsequent to the SCAQMD Board adopting an interim threshold in 2008, SCAQMD staff, as part of the SCAQMD's GHG CEQA Significance Threshold Stakeholder Working Group, continued to investigate potential options for establishing a GHG threshold for residential and commercial projects. In the Working Group Meeting on September 28, 2010, staff reiterated its recommendation for use of 3,000 $MTCO_2eq$/yr as a numerical screening threshold for residential/commercial projects, and also explored the option of using performance standards as an efficiency-based threshold to assess the potential for significant GHG impacts. Similar to the approach taken by the Bay Area Air Quality Management District (BAAQMD) in developing an efficiency-based threshold,[321] the SCAQMD identified a per capita GHG emissions level based on the AB 32 goal for statewide reductions in GHG emissions. Since the goal of AB 32 is to return to 1990 GHG emission levels by 2020, the basis for this threshold is the statewide emission inventory for 1990 based on "land use" related sectors divided by the statewide service population, which includes population and employment numbers. The GHG threshold recommended by SCAQMD staff in the September 2010 meeting is 4.8 $MTCO_2eq$ per service population (i.e., individual resident or employee) per year (4.8 MT/SP/YR). The rationale behind this threshold was to take the statewide 1990 GHG emissions estimates related to transportation, electric power generation, commercial and residential land uses, and recycling and waste, which total approximately 295,530 $MTCO_2eq$/yr and divide that number by the amount of statewide growth projected to occur by 2020, which includes a resident population of

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320 South Coast Air Quality Management District, Draft Guidance Document - Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008.

321 Bay Area Air Quality Management District, California Environmental Quality Act Air Quality Guidelines, Appendix D-Threshold of Significance Justification, updated May 2011. In March 2012, a court issued a writ of mandate ordering the District to set aside the thresholds and cease dissemination of them until the Air District had complied with CEQA. There is no prohibition; however, on local agencies use of the draft thresholds.

approximately 44 million and employment of approximately 17 million. Based on this equation, a GHG emission level of no more than 4.8 $MTCO_2eq$ per capita per year in 2020 would produce GHG emissions no greater than the total amount that occurred in 1990, which is consistent with the state policy objective of reducing GHG emissions projected for 2020 down to 1990 levels.

While this type of efficiency-based approach to defining a GHG threshold of significance is more relevant to SPAS than the mass emissions based approached described above, the use of a service population comprised of residents and employees as the basis for calculating per capita emissions is not applicable to the GHG emissions associated with a major airport. This is especially true in quantifying and assessing the significance of GHG emissions related to each of the SPAS alternatives. As shown above in **Table 4.6-2**, approximately 30 percent of the total GHG emissions in baseline conditions for SPAS are associated with aircraft operations and another 69 percent of the total GHG emissions are associated with on-airport and off-airport vehicle travel. The number of employees at LAX has essentially no relationship to the amount of aircraft-related GHG emissions at LAX and the majority of vehicle-related GHG emissions at LAX relates to passenger travel, not employee travel. There are no residents at LAX. Application of the 4.8 MT/SP/YR threshold, which is tied to residents and employees, would not provide a valid or meaningful basis for characterizing the significance of GHG impacts associated with each SPAS alternative.

As indicated in the CAPCOA white paper's discussion of different GHG threshold approaches, an efficiency-based threshold that addresses GHG emissions on a per capita basis offers the benefit of seeking to benchmark GHG intensity against target levels of efficiency. Relative to GHG emissions at LAX and how those emissions would change under each SPAS alternative, the most appropriate metric to benchmark GHG intensity is the annual passenger level. As indicated above, over 99 percent of the GHG emissions associated with baseline conditions are from aircraft and passenger vehicle travel. Over 92 percent of the average daily aircraft operations (i.e., takeoffs, landings, taxiing, idling, etc.) are associated with commercial aircraft bringing passengers to and from LAX, with the remaining eight percent of operations being associated with cargo, general aviation, and military aircraft. Similarly, the vast majority of vehicle traffic on airport roadways, at airport parking lots, and off-airport relative to travel to and from LAX is related to passenger activity levels. As LAX passenger activity levels increase or decrease over time, which is market driven and closely tied to national and worldwide economic conditions, aircraft operations levels at LAX tend to increase or decrease accordingly, as do airport-related traffic volumes. Characterizing GHG emissions at LAX in terms of the $MTCO_2eq$ per passenger per year is considered by LAWA to be the most appropriate and representative metric of GHG intensity at LAX.

In establishing a target level of efficiency below which the level or intensity of GHG emissions associated with implementation of the SPAS project would be less than significant, LAWA has carefully reviewed and taken into consideration the GHG reduction goals presented in the adopted AB 32 Climate Change Scoping Plan, as re-approved by CARB in August 2011. As indicated in the current Scoping Plan, a 16 percent reduction in projected GHG emissions would be necessary for the state to return to a 1990 level by 2020. The 2008 and the revised 2011 Scoping Plan provide substantial evidence for the 16 percent reduction.

Based on the above, LAWA has set forth the following threshold of significance relative to GHG emissions:

- A significant impact relative to GHG emissions would occur if the annual GHG emissions per passenger at buildout of the SPAS alternatives (i.e., at 78.9 million annual passengers [MAP]) are not at least 16 percent less than the annual GHG emissions per passenger at baseline conditions (i.e., 56.5 MAP).

4.6.5 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan, LAWA adopted commitments and mitigation measures pertaining to air quality (denoted with "AQ") in the Alternative D Mitigation Monitoring and Reporting Program (MMRP). Of the three commitments and four mitigation measures that were designed to address air quality impacts related to implementation of the LAX Master Plan, none of the commitments are applicable to the SPAS alternatives, but all of the mitigation measures are and were considered in the GHG analysis herein.

The LAX Master Plan Final EIR requires LAWA to expand and revise the existing air quality mitigation programs at LAX through the development of an LAX Master Plan-Mitigation Plan for Air Quality (LAX MP-MPAQ). The objectives of the LAX MP-MPAQ are to reduce emissions associated with implementation of the LAX Master Plan to levels equal to, or less than, the thresholds of significance identified in the LAX Master Plan Final EIR and, at a minimum, to reduce construction, transportation, and operational emissions associated with implementation of the LAX Master Plan to the mitigated levels identified in the Addendum to the Final EIR and the MMRP. It would accomplish these objectives through the use of technologically and legally feasible and economically reasonable methods to reduce emissions both on and off the airport. The LAX MP-MPAQ consists of four components: MM-AQ-1 (*Framework*), MM-AQ-2 (*Construction-Related Mitigation Measure*), MM-AQ-3 (*Transportation-Related Mitigation Measure*), and MM-AQ-4 (*Operations-Related Mitigation Measure*). These four components are described further below.

- **MM-AQ-1. LAX Master Plan - Mitigation Plan for Air Quality.**

  This mitigation measure specifies that LAWA will expand and revise existing air quality mitigation programs at the airport through the development of an LAX Master Plan-Mitigation Plan for Air Quality (LAX MP-MPAQ). The goal of the LAX MP-MPAQ is to reduce air pollutant emissions associated with implementation of the LAX Master Plan to levels equal to, or less than, the thresholds of significance identified in the LAX Master Plan Final EIR. The LAX MP-MPAQ process has commenced and LAWA is working with its consultants to define the framework for the overall air quality mitigation program and to define specific measures to be implemented in three categories of emission - construction, transportation, and operations.

- **MM-AQ-2. LAX Master Plan - Mitigation Plan for Air Quality: Construction-Related Mitigation Measure.**

  This mitigation measure describes numerous specific actions to reduce fugitive dust emissions and exhaust emissions from on-road and off-road construction-related mobile and stationary sources. As discussed in the MMRP and Section 4.6.8 of the LAX Master Plan Final EIR, the LAX Master Plan did not quantify potential emission reductions associated with all of the mitigation measures that fall under MM-AQ-2. Emission reduction measures that were quantified and included in the mitigated emissions inventory presented in Section 4.6.8.5 of the LAX Master Plan Final EIR included one that could also reduce CO_2 emissions: Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "cleaner burning diesel" fuel and exhaust emission controls. In the subsequent completion of the more detailed implementation plan for MM-AQ-2, the specification was set forth that a minimum of 33 percent of electricity required for construction activities be provided by electric line power (i.e., power drops/poles). Based on the construction equipment list developed for SPAS, at least one (500 kilowatt) portable diesel generator is anticipated to be required for the project. There will also be limited use of portable light stands. The generator and light stands have been accounted for in the construction emission estimates. Some components of MM-AQ-2 are not readily quantifiable, but will be implemented as part of SPAS. Several of these mitigation strategies, presented in **Table 4.6-3**, are expected to further reduce construction-related CO_2 emissions associated with SPAS.

Table 4.6-3

Construction-Related GHG Mitigation Measures

Measure	Type of Measure
To the extent feasible, have construction employees work/commute during off-peak hours.	On-Road Mobile
Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips.	On-Road Mobile
Prohibit construction vehicle idling in excess of ten minutes.	Non-Road Mobile
Utilize on-site rock crushing facility, when feasible, during construction to reuse rock/concrete and minimize off-site truck haul trips.	Non-Road Mobile
Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "clean burning diesel" fuel and exhaust emission controls.	Stationary Point Source Controls
Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).	Mobile and Stationary
Require that all construction equipment working on-site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	Mobile and Stationary
Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Mobile and Stationary
The contractor or builder shall designate a person or persons to ensure the implementation of all components of the construction-related measure through direct inspections, record review, and investigations of complaints.	Administrative

Source: CDM Smith, 2012.

- **MM-AQ-3. LAX Master Plan - Mitigation Plan for Air Quality: Transportation-Related Mitigation Measure.**

  This measure applies to mass transit, surface traffic, and on-site parking facilities. The principal feature of MM-AQ-3 is to replicate and expand the current LAX FlyAway service to other communities within regions of Los Angeles County. Under this program, at least eight new remote terminals were planned to be in operation by the year 2015 with the aim of reducing motor vehicle trips and their emissions both near the airport and throughout the region. This initiative also includes a public outreach program to encourage the use of both the existing and new facilities. For the mitigated emissions inventory presented in Section 4.6.8.5 of the LAX Master Plan Final EIR, only emissions reductions associated with the new FlyAway capacity were quantified to account for the ensuing decrease in VMT region-wide combined with less traffic congestion in the vicinity of the airport and the use of clean-fueled buses used in FlyAway service. The remaining, secondary, transportation-related air quality mitigation measures contained in MM-AQ-3 may also be implemented to help ensure the emission reduction goals of the LAX Master Plan Final EIR and MMRP are achieved. It should be noted that no quantification of the air quality benefit (i.e., emission reductions) was estimated in the LAX Master Plan Final EIR for these remaining, secondary transportation-related measures. These mitigation strategies, presented in **Table 4.6-4**, are expected to reduce further the transportation-related emissions associated with the LAX SPAS alternatives. Other transportation-related air quality mitigation measures that are found to be equally feasible and practical, but that were not specifically identified in the MMRP, may also be considered. The elements of MM-AQ-3 would apply to all SPAS alternatives that include ground access components, and LAWA would complete preparation of MM-AQ-3 prior to the commencement of implementing any SPAS alternative.

Table 4.6-4

Transportation-Related Air Quality Mitigation Measures

Measure	Type of Measure
Construct on-site or off-site bus turnouts, passenger benches, or shelters to encourage transit system use.	Transit Ridership
Construct on-site or off-site pedestrian improvements, including showers for pedestrian employees to encourage walking/bicycling to work by LAX employees.	Transit Ridership
Link Intelligent Transportation Systems (ITS) with off-airport parking facilities with ability to divert/direct trips to these facilities to reduce traffic/parking congestion and the associated air emissions in the immediate vicinity of the airport.	Highway/Roadway Improvements
Expand ITS and Adaptive Traffic Control Systems (ATCS), concentrating on I-405 and I-105 corridors, extending into South Bay and Westside surface street corridors to reduce traffic/parking congestion and associated air emissions in the immediate vicinity of the airport.	Highway/Roadway Improvements
Link LAX traffic management system with airport cargo facilities, with ability to re-route cargo trips to/from these facilities to reduce traffic/parking congestion and associated air emissions in the immediate vicinity of the airport.	Highway/Roadway Improvements
Develop a program to minimize use of conventional-fueled fleet vehicles during smog alerts to reduce air emissions from vehicles at the airport.	Highway/Roadway Improvements
Provide free parking and preferential parking locations for ultra low emission vehicles/super low emission vehicles/zero emission vehicles (ULEV/SULEV/ZEV) in all (including employee) LAX lots; provide free charging stations for ZEV; include public outreach to reduce air emissions from automobiles accessing airport parking.	Parking
Develop measures to reduce air emissions of vehicles in line to exit parking lots such as pay-on-foot (before getting into car) to minimizing idle time at parking check out, including public outreach.	Parking
Implement on-site circulation plan in parking lots to reduce time and associated air emissions from vehicles circulating through lots looking for parking.	Parking
Encourage video conferencing capabilities at various locations on the airport to reduce off-site local business travel and associated VMT and air emissions in the vicinity of the airport.	Parking
Expand LAWA's rideshare program to include all airport tenants.	Additional Ridership
Promote commercial vehicles/trucks/vans using terminal areas (LAX and regional intermodal) to install SULEV/ZEV engines to reduce vehicle air emissions.	Clean Vehicle Fleets
Promote "best-engine" technology for rental cars using on-airport rent-a-car facilities to reduce vehicle air emissions.	Clean Vehicle Fleets

Table 4.6-4

Transportation-Related Air Quality Mitigation Measures

Measure	Type of Measure
Consolidate non-rental car shuttles using SULEV/ZEV engines to reduce vehicle air emissions.	Clean Vehicle Fleets
Cover, if feasible, any parking structures that receive direct sunlight, to reduce volatile emissions from vehicle gasoline tanks; and install solar panels on these roofs where feasible to supply electricity or hot water to reduce power production demand and associated air emissions at utility plants.	Energy Conservation

Source: CDM Smith, 2012.

- **MM-AQ-4. LAX Master Plan - Mitigation Plan for Air Quality: Operations-Related Mitigation Measure.**

  Consistent with the LAX Master Plan Final EIR and the MMRP, the principle feature of this measure is the conversion of LAX GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies), and emissions reductions associated with this measure were quantified in the LAX Master Plan Final EIR to account for emissions that would otherwise be generated from the combustion of fossil fuels in GSE. Both LAWA- and tenant-owned equipment would be included in this conversion program which would be implemented in phases and completed at the build-out of the LAX Master Plan projects. LAWA would assign a GSE coordinator whose responsibilities it would be to ensure the successful conversion of GSE in a timely manner. This coordinator must have adequate authority to negotiate on behalf of the City and have sufficient technical support to evaluate technical issues that arise during the implementation of this measure. Other operations-related air quality mitigation measures that are found to be equally feasible and practical, but that were not specifically identified in the MMRP, may also be considered. MM-AQ-4 would apply to all SPAS alternatives that include airport operations components, and LAWA would complete preparation of MM-AQ-4 prior to the commencement of implementing any SPAS alternative.

Additionally, the LAX Master Plan Community Benefits Agreement (CBA) includes several air quality mitigation measures applicable to LAX Master Plan projects. The following components from Section X, Air Quality, of the CBA would apply to some or all of the SPAS alternatives. Similarly, the LAX Master Plan Stipulated Settlement also has air quality mitigation measures that are comparable to many of those in the CBA and are generally embodied in the measures below, as related to SPAS.

- **LAX Master Plan Community Benefits Agreement; X.A., Electrification of Passenger Gates.**

  This provision requires that all passenger gates newly constructed by LAWA shall be equipped with and able to provide grid electricity to parked aircraft (for lighting and ventilation) from and after the date of initial operation and that LAWA will ensure that all aircraft (unless exempt) use the gate-provided grid electricity in lieu of electricity provided by operation of an auxiliary or ground power unit. This provision would apply in conjunction with construction or modification of passenger gates that occurs as a result of implementing any of the SPAS alternatives, specifically Alternatives 1, 2, 3, 5, 6, and 7.

- **LAX Master Plan Community Benefits Agreement; X.M., Limits on Diesel Idling.**

  This provision requires LAWA to prohibit idling or queuing of diesel-fueled vehicles and equipment for more than ten consecutive minutes on-site. This requirement would be included in specifications for any SPAS alternative requiring on-site construction.

- **LAX Master Plan Community Benefits Agreement; X.N., Provision of Alternative Fuel.**

  This provision requires LAWA to make sure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This would apply not only to construction equipment but to operations-related vehicles on-site. This provision would apply in conjunction with construction or modification of passenger gates that occurs as a result of implementing any of the SPAS alternatives to provide appropriate infrastructure for electric GSE.

4.6.6 Impacts Analysis

4.6.6.1 Construction Emissions

Annual construction GHG emissions for Alternatives 1 through 9 before mitigation are presented in **Table 4.6-5**. SCAQMD recommends that amortized GHG construction emissions (i.e., total construction emissions divided by the lifetime of the project, assumed to be 30 years) be added to operational emissions to evaluate significance.[322] As a result, construction-related significance is not determined on an individual basis for GHG emissions; rather, Section 4.6.6.2 below evaluates the significance of the combined construction-related and operations-related GHG emissions for each alternative.

To provide a more representative basis of comparison between all nine alternatives, the emissions of those alternatives that focus solely on airfield and related terminal improvements (Alternatives 5, 6, and 7) were combined with the range of emissions that could occur under various ground access improvements scenarios. Similarly, the emissions of those alternatives that focus solely on ground access improvements (i.e., Alternatives 8 and 9) were combined with the range of emissions that could occur under various airfield/terminal improvements scenarios -- see Notes 1 and 2 in **Table 4.6-5**. In so doing, the total potential emissions associated with these focused alternatives can be better compared to the emissions associated with the "fully integrated" alternatives (i.e., Alternatives 1 through 4, which consider airfield, terminal, and ground access improvements within each alternative).

4.6.6.2 Operational Emissions

Operational GHG emissions, plus amortized construction GHG emissions, for Alternatives 1 through 9 at buildout of the alternatives in 2025 are presented in **Table 4.6-6**. Also shown in **Table 4.6-6** are the baseline operational GHG emissions in 2009-2010. The per capita (per passenger) emissions for baseline conditions and for each alternative are identified at the bottom of each emissions column in the table, along with an indication of how much less, percentage-wise, the per capita emissions of each alternative are compared to per capita emissions for baseline conditions. The determination of per capita emissions is based on 56.5 MAP for baseline (2009) conditions and 78.9 MAP for future (2025) baseline conditions. For those alternatives where the per capita GHG emissions are not at least 16 percent less than those of baseline conditions, a significant impact is identified.

As noted above, in order to provide a more representative basis of comparison between all nine alternatives, the emissions of those alternatives that focus solely on airfield and related terminal improvements (Alternatives 5, 6, and 7) were combined with the range of emissions that could occur under various ground access improvements scenarios. Similarly, the emissions of those alternatives that focus solely on ground access improvements (i.e., Alternatives 8 and 9) were combined with the range of emissions that could occur under various airfield/terminal improvements scenarios -- see Notes 2 and 3 in **Table 4.6-6**. In so doing, the total potential emissions associated with these focused alternatives can be better compared to the emissions associated with the "fully integrated" alternatives (i.e., Alternatives 1 through 4, which consider airfield, terminal, and ground access improvements within each alternative).

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[322] South Coast Air Quality Management District, Draft Guidance Document - Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008.

4.6.6.2.1 Alternative 1

Incremental changes in GHG emissions associated with Alternative 1, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a notable increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 1 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 1 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 1, aircraft emissions in 2025 would be approximately one percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

With regards to other increases in GHG emissions under Alternative 1 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 1 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025.[323] The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. In comparing the 2025 GHG emissions for Alternative 1 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 1 would be greater. This is primarily due to the Consolidated Rental Car Facility (CONRAC) associated with Alternative 4, which would consolidate and reduce the number of rental car company shuttle trips on- and off-airport, compared to Alternative 1, which assumes continued operation of individual rental car companies and associated shuttle trips dispersed east of the Central Terminal Area (CTA). Stationary source GHG emissions for Alternative 1, as well as all other alternatives, are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 1 would be approximately 13.06 percent less than the per capita (per passenger) GHG emissions for baseline conditions. Notwithstanding that reduction in per capita GHG emissions would be a substantial improvement over baseline conditions, the reduction is less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 1 would be significant.

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[323] The EMFAC2011 emission factors used to estimate GHG emissions for each alternative in 2025 do not include the GHG reductions anticipated to occur from implementation of several measures specifically included in the AB 32 Scoping Plan for future reductions. Such measures that were not included in the GHG emissions estimates for future conditions include those associated with continued implementation of the Pavley greenhouse gas vehicle standards (i.e., Pavley II) and Advanced Clean Cars improvements. As such, the on-road vehicle GHG emissions estimates for each alternative are conservative and would actually be lower than estimated with future implementation of these, and other, measures.

Table 4.6-5

Total GHG Construction Emissions

	$MTCO_2e$[3]/year								
Source	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**	**Alt. 5**[1]	**Alt. 6**[1]	**Alt. 7**[1]	**Alt. 8**[2]	**Alt. 9**[2]
Airfield/Terminal Construction	315,985	96,681	269,988	13,836	355,679	274,241	232,678	96,681 to 355,679	96,681 to 355,679
Ground Access Construction	45,356	45,356	183,758	32,196	45,356 to 66,130	45,356 to 66,130	45,356 to 66,130	56,180	66,130
Total	361,341	142,037	453,746	46,031	401,035 to 421,810	319,597 to 340,371	278,033 to 298,808	152,862 to 411,860	162,812 to 421,810
Amortized Total[4]	12,045	4,735	15,125	1,534	13,368 to 14,060	10,653 to 11,346	9,268 to 9,960	5,095 to 13,729	5,427 to 14,060

Notes:

Totals may not add due to rounding.

1 Alternatives 5 through 7 focus primarily on airfield improvements and related terminal and roadway improvements. Those improvements are compatible with the ground access improvements under Alternatives 1, 2, 8, and 9. The emissions presented relative to construction of airfield and terminal improvements under Alternatives 1, 2, 5, 6, and 7 are specific to characteristics of each of these alternatives; however, the non-airfield construction emissions (i.e., roadways, parking, stationary, and off-airport) shown for Alternatives 5 through 7 reflect the range of those types of emissions for Alternatives 1, 2, 8, and 9. The total emissions for Alternatives 5 through 7 would fall within the range shown for each, depending on which set of ground access improvements is assumed. The emissions presented relative to both airfield and non-airfield construction activity for Alternatives 3 and 4 are specific to the characteristics of each of these alternatives, which still provide a basis for comparison with the other alternatives.

2 Alternatives 8 and 9 focus primarily on ground access improvements; however, those improvements are compatible with the airfield improvements, and related terminal and roadway improvements, under Alternatives 1, 2, 5, 6, and 7. The emissions presented relative to construction of non-airfield improvements (i.e., roadways, parking, stationary, and off-airport) under Alternatives 1, 2, 8, and 9 are specific to characteristics of each of these alternatives; however, the construction-related airfield/terminal improvements emissions shown for Alternatives 8 and 9 reflect the range of those types of emissions for Alternatives 1, 2, 5, 6, and 7. The total emissions for Alternatives 8 and 9 would fall within the range shown for each, depending on which set of airfield improvements is assumed. The emissions presented relative to both airfield and non-airfield construction activity for Alternatives 3 and 4 are specific to the characteristics of each of these alternatives, which still provide a basis for comparison with the other alternatives.

3 $MTCO_2e$ = metric tons carbon dioxide equivalent

4 Amortized total equals the grand total (airside plus ground access construction) divided by the lifetime of the project, assumed to be 30 years.

Source: Environmental Compliance Solutions, 2012; CDM Smith, 2012.

Table 4.6-6

Incremental Changes in GHG Emissions Compared to Baseline Conditions

		Incremental Increase or Decrease Compared to Baseline								
Source	**Baseline**[1] **$MTCO_2e$/year**[4]	**Alt. 1 $MTCO_2e$/year**[4]	**Alt. 2 $MTCO_2e$/year**[4]	**Alt. 3 $MTCO_2e$/year**[4]	**Alt. 4 $MTCO_2e$/year**[4]	**Alt. 5**[2] **$MTCO_2e$/year**[4]	**Alt. 6**[2] **$MTCO_2e$/year**[4]	**Alt. 7**[2] **$MTCO_2e$/year**[4]	**Alt. 8**[3] **$MTCO_2e$/year**[4]	**Alt. 9**[3] **$MTCO_2e$/year**[4]
Aircraft	634,424	322,013	309,695	362,422	332,648	322,570	311,742	323,335	309,695 to 323,335	309,695 to 323,335
Ground Support Equipment[5]	60,551	18,287	18,287	18,287	18,287	18,287	18,287	18,287	18,287	18,287
Auxiliary Power Units	0	0	0	0	0	0	0	0	0	0
Parking Facilities	108,784	-618	-618	-7,528	-3,268	-9,985 to -618	-9,985 to -618	-9,985 to -618	-9,985	-9,985
On-Airport Roadways	48,865	-3,797	-3,797	-845	-4,353	-5,583 to -3,797	-5,583 to -3,797	-5,583 to -3,797	-4,128	-5,583
On-Airport Stationary	7,763	7,389	7,389	47,263	956	5,670	6,584	4,457	6,175 to 9,107	6,175 to 9,107
On-Airport Subtotal	852,690	335,947	323,630	372,738	343,322	325,338 to 336,490	314,518 to 325,670	326,092 to 337,244	320,044 to 336,616	318,590 to 335,161
Building Electricity	66	63	63	402	8	48	56	38	52 to 77	52 to 77
Solid Waste Disposal	345	329	329	2,103	43	252	293	198	275 to 405	275 to 405
Indoor/Outdoor Water Usage	646	615	615	3,933	80	472	548	371	514 to 758	514 to 758
Off-Airport Roadways	1,404,778	128,677	128,677	35,851	100,450	78,560 to 128,677	78,560 to 128,677	78,560 to 128,677	78,560	78,560
Off-Airport Subtotal	1,413,532	137,010	137,010	89,150	101,528	84,954 to 135,072	85,985 to 136,102	83,586 to 133,703	79,401 to 79,801	79,401 to 79,801
Amortized Construction		12,045	4,735	15,125	1,534	13,368 to 14,060	10,653 to 11,346	9,268 to 9,960	5,095 to 13,729	5,427 to 14,060

Table 4.6-6

Incremental Changes in GHG Emissions Compared to Baseline Conditions

Source	Baseline[1] $MTCO_2e$/year[4]	Incremental Increase or Decrease Compared to Baseline								
		Alt. 1 $MTCO_2e$/year[4]	Alt. 2 $MTCO_2e$/year[4]	Alt. 3 $MTCO_2e$/year[4]	Alt. 4 $MTCO_2e$/year[4]	Alt. 5[2] $MTCO_2e$/year[4]	Alt. 6[2] $MTCO_2e$/year[4]	Alt. 7[2] $MTCO_2e$/year[4]	Alt. 8[3] $MTCO_2e$/year[4]	Alt. 9[3] $MTCO_2e$/year[4]
Total Incremental Emissions		485,002	465,374	477,013	446,384	423,660 to 485,622	411,155 to 473,117	418,946 to 480,908	404,540 to 430,145	403,418 to 429.022
Total Emissions (Baseline + Increment)	**2,266,222**	**2,751,224**	**2,731,596**	**2,743,235**	**2,712,606**	**2,689,882 to 2,751,844**	**2,677,377 to 2,739,339**	**2,685,168 to 2,747,130**	**2,670,762 to 2,696,367**	**2,669,640 to 2,695,244**
Per Capita Emissions ($MTCO_2e$/year)	0.04011	0.03487	0.03462	0.03477	0.03438	0.03409 to 0.03488	0.03393 to 0.03472	0.03403 to 0.03482	0.03385 to 0.03417	0.03384 to 0.03416
Percent Reduction Compared to Baseline Conditions	**NA**	**13.06%**	**13.69%**	**13.32%**	**14.29%**	**15.00% to 13.05%**	**15.40% to 13.44%**	**15.15% to 13.19%**	**15.61% to 14.80%**	**15.64% to 14.83%**
Significance Threshold		>16%	>16%	>16%	>16%	>16%	>16%	>16%	>16%	>16%
Significant Impact?		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Notes:

1 Emissions totals may not add due to rounding.

2 Alternatives 5 through 7 focus primarily on airfield improvements and related terminal and roadway improvements. Those improvements are compatible with the ground access improvements under Alternatives 1, 2, 8, and 9. The emissions presented relative to airfield operations (i.e., aircraft, APU, and GSE) under Alternatives 1, 2, 5, 6, and 7 are specific to characteristics of each of these alternatives; however, the non-airfield emissions (i.e., roadways, parking, stationary, and off-airport) shown for Alternatives 5 through 7 reflect the range of those types of emissions for Alternatives 1, 2, 8, and 9. The total emissions for Alternatives 5 through 7 would fall within the range shown for each, depending on which set of ground access improvements is assumed. The emissions presented relative to both airfield and non-airfield operations for Alternatives 3 and 4 are specific to the characteristics of each of these alternatives, which still provide a basis for comparison with the other alternatives.

3 Alternatives 8 and 9 focus primarily on ground access improvements; however, those improvements are compatible with the airfield improvements, and related terminal and roadway improvements, under Alternatives 1, 2, 5, 6, and 7. The emissions presented relative to non-airfield operations (i.e., roadways, parking, stationary, and off-airport) under Alternatives 1, 2, 8, and 9 are specific to characteristics of each of these alternatives; however, the airfield emissions (i.e., aircraft, APU, and GSE) shown for Alternatives 8 and 9 reflect the range of those types of emissions for Alternatives 1, 2, 5, 6, and 7. The total emissions for Alternatives 8 and 9 would fall within the range shown for each, depending on which set of airfield/terminal improvements is assumed. The emissions presented relative to both airfield and non-airfield operations for Alternatives 3 and 4 are specific to the characteristics of each of these alternatives, which still provide a basis for comparison with the other alternatives.

4 $MTCO_2e$/year = metric tons carbon dioxide equivalent per year

5 GSE operations and activity levels are assumed to be directly related to aircraft activity levels; therefore, GSE emissions are the same for all future alternatives since aircraft activity is the same for all alternatives in 2025.

Source: CDM Smith, 2012.

4.6.6.2.2 Alternative 2

Incremental changes in GHG emissions associated with Alternative 2, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 2 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 2 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 2, aircraft emissions in 2025 would be approximately two percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

With regards to other increases in GHG emissions under Alternative 2 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 2 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025. The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. In comparing the 2025 GHG emissions for Alternative 2 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 2 would be greater. This is primarily due to the CONRAC associated with Alternative 4, which would consolidate and reduce the number of rental car company shuttle trips on- and off-airport, compared to Alternative 2, which assumes continued operation of individual rental car companies and associated shuttle trips dispersed east of the CTA. Stationary source GHG emissions for Alternative 2 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 2 would be approximately 13.69 percent less than the per capita (per passenger) GHG emissions for baseline conditions. Notwithstanding that reduction in per capita GHG emissions would be a substantial improvement over baseline conditions, the reduction is less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 2 would be significant.

4.6.6.2.3 Alternative 3

Incremental changes in GHG emissions associated with Alternative 3, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Aircraft operations-related GHG emissions under Alternative 3 in 2025 would, however, be greater than those that would otherwise occur at that time if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 3 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 3, aircraft emissions in 2025 would be approximately three percent greater than would otherwise occur if no airfield improvements were implemented. Although aircraft ground movement in 2025 without airfield improvements (Alternative 4) would be less efficient than with the improvements under Alternative 3, suggesting that GHG emissions associated with the less efficient movements would be comparatively higher, the relative imbalance in aircraft gates distribution associated with Alternative 3 (i.e., far more aircraft gates on the south side of the CTA than on the north side) would result in longer aircraft taxiing distances for aircraft traveling to and from the north airfield complex.

With regards to other increases in GHG emissions under Alternative 3 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 3 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025. The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. In comparing the 2025 GHG emissions for Alternative 3 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 3 would be lower. This is primarily due to substantial ground access improvements that would reduce vehicular traffic to LAX when compared to Alternative 4. Stationary source GHG emissions for Alternative 3 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 3 would be approximately 13.32 percent less than the per capita (per passenger) GHG emissions for baseline conditions. Notwithstanding that reduction in per capita GHG emissions would be a substantial improvement over baseline conditions, the reduction is less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 3 would be significant.

4.6.6.2.4 Alternative 4

Incremental changes in GHG emissions associated with Alternative 4, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

With regards to other increases in GHG emissions under Alternative 4 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 4 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025. The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. Stationary source GHG emissions for Alternative 4 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 4 would be approximately 14.29 percent less than the per capita (per passenger) GHG emissions for baseline conditions. Notwithstanding that reduction in per capita GHG emissions would be a substantial improvement over baseline conditions, the reduction is less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 4 would be significant.

4.6.6.2.5 <u>Alternative 5</u>

Incremental changes in GHG emissions associated with Alternative 5, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 5 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 5 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 5, aircraft emissions in 2025 would be approximately one percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

As previously stated in Section 4.6.6.2, Alternative 5 focuses on variations to the airfield improvements, which, in turn, affect the terminal improvements and ground access to the CTA. The airfield and terminal improvements in this alternative are equally compatible with the ground access improvements in Alternatives 1, 2, 8, and 9; therefore, ground access emissions are represented as a range of emissions representing the minimum and maximum emissions from these four alternatives. In comparing the 2025 GHG emissions for Alternative 5 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 5 would vary depending on the assumed ground access improvements for Alternatives 1, 2, 8, and 9. Discussions on these alternatives should be reviewed to evaluate the possible range of emissions and the reasons for any increase or decrease in ground access emissions. Stationary source GHG emissions for Alternative 5 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 5 would be between approximately 13.05 and 15.00 percent less than the per capita (per passenger) GHG emissions for baseline conditions, depending on which set of ground access improvements this alternative is paired with. Notwithstanding that range of reductions in per capita GHG emissions would be a substantial improvement over baseline conditions, the reductions are less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 5 would be significant.

4.6.6.2.6 <u>Alternative 6</u>

Incremental changes in GHG emissions associated with Alternative 6, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 6 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 6 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 6, aircraft emissions in 2025 would be approximately two percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

As previously stated in Section 4.6.6.2, Alternative 6 focuses on variations to the airfield improvements, which, in turn, affect the terminal improvements and ground access to the CTA. The airfield and terminal improvements in this alternative are equally compatible with the ground access improvements in Alternatives 1, 2, 8, and 9; therefore, ground access emissions are represented as a range of emissions representing the minimum and maximum emissions from these four alternatives. In comparing the 2025 GHG emissions for Alternative 6 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 6 would vary depending on the assumed ground access improvements for Alternatives 1, 2, 8, and 9. Discussions on these alternatives should be reviewed to evaluate the possible range of emissions and the reasons for any increase or decrease in ground access emissions. Stationary source GHG emissions for Alternative 6 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 6 would be between approximately 13.44 and 15.40 percent less than the per capita (per passenger) GHG emissions for baseline conditions, depending on which set of ground access improvements this alternative is paired with. Notwithstanding that range of reductions in per capita GHG emissions would be a substantial improvement over baseline conditions, the reductions are less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 6 would be significant.

4.6.6.2.7 Alternative 7

Incremental changes in GHG emissions associated with Alternative 7, compared to baseline conditions, are summarized in **Table 4.6-6**. As indicated in **Table 4.6-6**, the majority of increases in GHG emissions compared to baseline conditions would be from aircraft operations, which is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 7 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 7 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 7, aircraft emissions in 2025 would be approximately one percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

As previously stated in Section 4.6.6.2, Alternative 7 focuses on variations to the airfield improvements, which, in turn, affect the terminal improvements and ground access to the CTA. The airfield and terminal improvements in this alternative are equally compatible with the ground access improvements in Alternatives 1, 2, 8, and 9; therefore, ground access emissions are represented as a range of emissions representing the minimum and maximum emissions from these four alternatives. In comparing the 2025 GHG emissions for Alternative 7 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 7 would vary depending on the assumed ground access improvements for Alternatives 1, 2, 8, and 9. Discussions on these alternatives should be reviewed to evaluate the possible range of emissions and the reasons for any increase or decrease in ground access emissions. Stationary source GHG emissions for Alternative 7 are anticipated to be greater than baseline conditions because of the additional airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 7 would be between approximately 13.19 and 15.15 percent less than the per capita (per passenger) GHG emissions for baseline conditions, depending on which set of ground access improvements this alternative is paired with. Notwithstanding that range of reductions in per capita GHG emissions would be a substantial improvement over baseline conditions, the reductions are less than the 16 percent targeted reduction reflected in the AB 32 Scoping Plan, which is the basis for the threshold of significance in this analysis; hence, the GHG emissions associated with Alternative 7 would be significant.

4.6.6.2.8 Alternative 8

Incremental changes in GHG emissions associated with Alternative 8, compared to baseline conditions, are summarized in **Table 4.6-6**. As previously indicated in Section 4.6.6.2, Alternative 8 focuses on variations to the ground access improvements and is equally compatible with airfield and terminal improvements in Alternatives 1, 2, 5, 6, and 7; therefore, airfield/terminal emissions are represented as a range of emissions representing the minimum and maximum emissions from these five alternatives. As indicated in **Table 4.6-6**, the majority of GHG increases compared to baseline conditions would be from aircraft operations under any of the airfield improvement options that Alternative 8 might be paired with. This increase is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 8 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 8 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 8, aircraft emissions in 2025 would be approximately one to two percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

With regards to other increases in GHG emissions under Alternative 8 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 8 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025. The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. In comparing the 2025 GHG emissions for Alternative 8 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 8 would be less. This is primarily due to the improved parking infrastructure that would reduce the number of off-airport roadway trips. Stationary source GHG emissions for Alternative 8 are anticipated to be less than baseline conditions because of reduced heating, electrical, and water demand at the airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 8 would be between approximately 14.80 and 15.61 percent less than the per capita (per passenger) GHG emissions for baseline conditions, depending on which set of airfield improvements this alternative is paired with. Regardless of which set of airfield improvements, assuming either Alternative 1, 2, 5, 6, or 7, the ground access improvements proposed under Alternative 8 were paired with, the total GHG emissions, on a per capita basis would provide for less than a 16 percent reduction in GHG emissions compared to baseline conditions. As such, the GHG emissions impact associated with Alternative 8 would be significant.

4.6.6.2.9 Alternative 9

Incremental changes in GHG emissions associated with Alternative 9, compared to baseline conditions, are summarized in **Table 4.6-6**. As previously indicated in Section 4.6.6.2, Alternative 9 focuses on variations to the ground access improvements and is equally compatible with airfield and terminal improvements in Alternatives 1, 2, 5, 6, and 7; therefore, airfield/terminal emissions are represented as a range of emissions representing the minimum and maximum emissions from these five alternatives. As indicated in **Table 4.6-6**, the majority of GHG increases compared to baseline conditions would be from aircraft operations under any of the airfield improvement options that Alternative 8 might be paired with. This increase is entirely attributable to the anticipated growth in airport activity levels that is common to 2025 buildout of any and all of the alternatives. Although there would be a substantial increase in aircraft emissions compared to baseline conditions, the airfield improvements under Alternative 9 would actually reduce GHG emissions for future conditions if no airfield improvements were implemented. This can be seen in comparing the aircraft emissions between Alternatives 9 and 4, the latter of which includes no airfield improvements other than safety-related improvements. Under Alternative 9, aircraft emissions in 2025 would be approximately one to two percent less than would otherwise occur if no airfield improvements were implemented. Under federal law, LAWA has no direct control over aircraft operations relative to GHG emissions; however, the airfield improvements proposed by LAWA and the ability of those improvements to enable aircraft to operate more efficiently (i.e., reduce the amount of time that aircraft are operating in the taxi/idle mode) would serve to reduce GHG emissions.

With regards to other increases in GHG emissions under Alternative 9 compared to baseline conditions, there would be an approximately 30 percent increase in GSE emissions, again being attributable to the projected growth in airport activity by 2025 independent of the alternatives. Vehicle-related GHG emissions at buildout of Alternative 9 would be slightly more than or less than those of baseline conditions, depending on trip type. Although the volume of airport-related traffic would increase substantially by 2025, compared to baseline conditions, due the aforementioned projected growth in airport activity, the ongoing implementation of motor vehicle emission control and fuel mileage standards in new vehicles along with the gradual transition to newer, cleaner, and more fuel efficient vehicles over time would result in reduced GHG emissions per vehicle by 2025. The amount of per vehicle GHG emission reductions would largely offset the increase in the volume of vehicles projected to occur between the baseline year and 2025. In comparing the 2025 GHG emissions for Alternative 9 to those of Alternative 4 (i.e., the alternative with minimal improvements), the vehicle-related emissions of Alternative 9 would be less. This is primarily due to the improved parking infrastructure that would reduce the number of off-airport roadway trips. Stationary source GHG emissions for Alternative 9 are anticipated to be less than baseline conditions because of reduced heating, electrical, and water demand at the airfield/terminal and ground access components.

On a per capita (per passenger) basis, the GHG emissions associated with implementation of Alternative 9 would be between approximately 14.83 and 15.64 percent less than the per capita (per passenger) GHG emissions for baseline conditions, depending on which set of airfield improvements this alternative is paired with. Regardless of which set of airfield improvements, assuming either Alternative 1, 2, 5, 6, or 7, the ground access improvements proposed under Alternative 9 were paired with, the total GHG emissions, on a per capita basis would provide for less than a 16 percent reduction in GHG emissions compared to baseline conditions. As such, the GHG emissions impact associated with Alternative 9 would be significant.

4.6.6.3 Summary of Impacts

GHG emissions (operational plus amortized construction) associated with all of the SPAS alternatives would exceed the threshold of significance described in Section 4.6.4 as measured against baseline conditions; therefore, implementation of any of the alternatives would result in significant GHG impacts.

Of the nine SPAS alternatives, the per capita GHG emissions would be highest under Alternative 1, or Alternative 5 depending on which ground access improvements this alternative is paired with, and lowest under Alternative 9.

4.6.7 Mitigation Measures

The SPAS alternatives include mitigation measures to reduce construction equipment operations/duration, as described above. Additionally, GHG emissions associated with the SPAS alternatives would be reduced directly or indirectly through compliance with LAWA's Sustainable Airport Planning, Design and Construction Guidelines and/or the requirements of the City of Los Angeles Green Building Ordinance. There are no other feasible mitigation measures to reduce construction-related GHG emissions other than those already identified above in Section 4.6.5 and in Section 4.2, *Air Quality*, of this EIR.

For operational impacts, the SPAS alternatives would comply with the requirements of the City of Los Angeles Green Building Ordinance and with LAWA policies and programs related to sustainability and reducing GHG emissions that are implemented on project-specific and on an airport-wide basis. As noted in OPR's Technical Advisory on CEQA and Climate Change, LAWA's programmatic efforts to address GHG emissions agency-wide can be a more effective approach than mitigating GHG emissions at a project level.[324] **Tables 4.6-7** and **4.6-8** present a comprehensive list of suggested mitigation measures for new development projects throughout the state of California. The list presented in **Table 4.6-7** is prepared by the California Office of the Attorney General relative to addressing GHG emissions and climate change impacts within an EIR.[325] The list presented in **Table 4.6-8** is prepared by OPR and presents examples of measures that have been used by some public agencies to reduce GHG emissions.[326] **Tables 4.6-7** and **4.6-8** and text below indicate how the SPAS alternatives, as well as LAWA's overall sustainability actions and objectives, relates to each of the applicable mitigation measures.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Energy Efficiency	
Incorporate green building practices and design elements.	New development occurring under any of the SPAS alternatives would be subject to the LAWA's sustainability guidelines (i.e., LAWA *Sustainable Airport Planning, Design and Construction Guidelines for Implementation on All Airport Projects* [LSAG] and/or the City of Los Angeles Green Building Ordinance). Those guidelines and Ordinance requirements address green building practices and design elements. LAWA requires new terminal facilities to achieve LEED® Silver certification.[1]
Meet recognized green building and energy efficiency benchmarks.	As noted above, all of the SPAS alternatives would be subject to LSAG and/or the Green Building Ordinance, which include provisions for energy efficiency and conservation. For example, the Green Building Ordinance requires that a project exceed CEC 2008 Energy Efficiency Standards by 15 percent.

324 State of California, Governor's Office of Planning and Research, Technical Advisory - CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review, June 19, 2008.

325 State of California Department of Justice, Office of the California Attorney General, Addressing Climate Change at the Project Level California Attorney General's Office, Available: http://ag.ca.gov/globalwarming/pdf/GW_mitigation_measures.pdf, accessed April 3, 2012.

326 State of California, Governor's Office of Planning and Research, Technical Advisory - CEQA and Climate Change Addressing Climate Change Through California Environmental Quality Act (CEQA) Review, Attachment 3, June 19, 2008.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Install energy efficient lighting (e.g., light emitting diodes [LEDs]), heating and cooling systems, appliances, equipment, and control systems.	The use of energy efficient lighting, systems, and equipment in new facilities and in the renovation/modification of existing facilities is standard practice by LAWA and is generally reflected in the requirements of the Green Building Ordinance.
Use passive solar design, e.g., orient buildings and incorporate landscaping to maximize passive solar heating during cool seasons, minimize solar heat gain during hot seasons, and enhance natural ventilation. Design buildings to take advantage of sunlight.	Utilization of passive solar design features in new development is an option available through LSAG and would be considered under any of the SPAS alternatives.
Install light colored "cool" roofs and cool pavements.	LSAG includes provisions for "heat island" reduction including the use of cool roofs as an option available under all of the SPAS alternatives.
Install efficient lighting, (including LEDs) for traffic, street, and other outdoor lighting.	As indicated above, the use of energy efficient lighting is standard practice by LAWA and would also occur in meeting the energy conservation requirements of the Green Building Ordinance, which would be applicable to all of the SPAS alternatives. With regard to traffic lights, LAWA and LADOT install LEDs for any major upgrades to existing signals or addition of new signals, which would also be the case with all of the SPAS alternatives.
Reduce unnecessary outdoor lighting.	Development of improvements involving outdoor lighting under any of the SPAS alternatives is anticipated to avoid any unnecessary lighting, as a means to help achieve the energy conservation requirements of the Green Building Ordinance.
Provide education on energy efficiency to residents, customers, and/or tenants.	Provisions for education of LAWA contractors, suppliers, tenants, and the community relative to the benefits of sustainability measures are included in the LSAG, which would apply to all of the SPAS alternatives.
Renewable Energy and Energy Storage	
Meet "reach" goals for building energy efficiency and renewable energy use.	While the ability to achieve "zero net energy" buildings in conjunction with any of the SPAS alternatives is uncertain, the energy efficiency and conservation provisions of Green Building Ordinance would support progress towards such a goal.
Install solar, wind, and geothermal power systems and solar hot water heaters.	Based on land constraints and airfield safety considerations, it is generally infeasible to install alternative energy systems at the airport. LAWA is, however, committed to, and a participant in, LADWP's "Green Power for LA" program, which promotes the use of green power provided through LADWP.
Install solar panels on unused roof and ground space and over carports and parking areas.	As noted above, land constraints and airfield safety considerations limit the opportunities for solar panels at the airport.
Where solar systems cannot feasibly be incorporated into the project at the outset, build "solar ready" structures.	Please see above.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Incorporate wind and solar energy systems into agricultural projects where appropriate.	Not applicable.
Include energy storage where appropriate to optimize renewable energy generation systems and avoid peak energy use.	Although separate from SPAS, the LAX Central Utility Plant (CUP) Replacement Project, currently under construction, includes a thermal energy storage system (i.e., large tank below grade to store cooled water, which can reduce needs during peak energy use periods). The new CUP will help provide for the heating and cooling needs of the terminal improvements associated with all of the SPAS alternatives, except Alternative 4, which does not include terminal improvements.
Use on-site generated biogas, including CH_4, in appropriate applications.	Not applicable.
Use combined heat and power (CHP) in appropriate applications.	The CUP Replacement Project, described above, also includes cogeneration for the production of electricity from heat generated during the production of steam.
Water Conservation and Efficiency	
Incorporate water-reducing features into building and landscape design.	Provisions for incorporating water-reducing features into building and landscape design are included in the Green Building Ordinance, which would be applicable to all of the SPAS alternatives.
Create water-efficient landscapes.	Please see above.
Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls and use water-efficient irrigation methods.	Please see above.
Make effective use of graywater. (Graywater is untreated household wastewater from bathtubs, showers, bathroom wash basins, and water from clothes washing machines. Graywater to be used for landscape irrigation.)	Not applicable; generation of such graywater from the types of uses associated with the SPAS alternatives would be negligible.
Implement low-impact development practices that maintain the existing hydrology of the site to manage storm water and protect the environment.	All of the SPAS alternatives would comply with the City's Low Impact Development (LID) Ordinance requirements, as applicable.
Devise a comprehensive water conservation strategy appropriate for the project and location.	As indicated above, the Green Building Ordinance includes provisions for water conservation, which would be applicable to all of the SPAS alternatives.
Design buildings to be water-efficient. Install water-efficient fixtures and appliances.	Please see above.
Offset water demand from new projects so that there is no net increase in water use.	Please see above.
Provide education about water conservation and available programs and incentives.	Provisions for education of LAWA contractors, suppliers, tenants, and the community relative to the benefits of sustainability measures, which water conservation is an element, are included in the LSAG.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Solid Waste Measures	
Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).	The Green Building Ordinance includes provisions for waste reduction and management, including, but not limited to, reuse and recycling of construction and demolition waste, which would be applicable to all of the SPAS alternatives.
Integrate reuse and recycling into residential, industrial, institutional, and commercial projects.	In addition to the requirements of the Green Building Ordinance, LAWA has a comprehensive facility-wide solid waste diversion/recycling program at LAX. That program is described in Section 4.13.2, *Solid Waste*, of this EIR and would be applicable to all of the SPAS alternatives.
Provide easy and convenient recycling opportunities for residents, the public, and tenant businesses.	Please see above.
Provide education and publicity about reducing waste and available recycling services.	Please see above.
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.	Not applicable.
Meet recognized "smart growth" benchmarks.	Not applicable.
Educate the public about the many benefits of well-designed, higher density development.	Not applicable.
Incorporate public transit into the project's design.	Transit bus stops/connections for several municipalities are currently provided at LAX, in addition to the LAWA shuttle system between the CTA and the existing Metro Green Line Station. With the exception of Alternative 4, all of the SPAS alternatives include facilities that can improve and encourage transit use at the airport, such as the Intermodal Transportation Facility (ITF) (Alternatives 1, 2, 8, and 9), the Ground Transportation Center (GTC) and Intermodal Transportation Center (ITC) (Alternative 3), and the elevated/dedicated busway or Automated People Mover (APM) that would connect the CTA to the ITF and the future LAX/Crenshaw Metro Light Rail Station (Alternatives 1, 2, 8, and 9).
Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.	Not applicable.
Develop "brownfields" and other underused or defunct properties near existing public transportation and jobs.	Not applicable.
Include pedestrian and bicycle facilities within projects and ensure that existing non-motorized routes are maintained and enhanced.	The improvements proposed under all of the SPAS alternatives would include provisions for pedestrian and bicycle facilities, as appropriate.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Transportation and Motor Vehicles	
Meet an identified transportation-related benchmark.	As noted above, all of the SPAS alternatives, except for Alternative 4, include improvements that can improve and encourage transit use at the airport. The success of these and other such measures can help reduce vehicle miles traveled (VMT). Reduction of VMT is a GHG reduction strategy recognized in the California Energy Commission's 2007 Staff Report *The Role of Land Use in Meeting California's Energy and Climate Change Goals*.
Adopt a comprehensive parking policy that discourages private vehicle use and encourages the use of alternative transportation.	While LAWA could develop and implement a parking policy that discourages private vehicles use, such ability would be limited to only those facilities controlled by LAWA. It is likely that the effect of such restrictions would be substantially diminished by the availability of many other privately-owned/operated parking facilities near the airport.
Build or fund a major transit stop within or near the development.	Please see the transit discussion in Land Use Measures above.
Provide public transit incentives such as free or low-cost monthly transit passes to employees, or free ride areas to residents and customers.	LAWA has a comprehensive rideshare and vanpool program available to all employees. LAWA's Rideshare Program offers financial incentives and discounts to participating employees. This program would continue agency-wide and is not particular to any specific SPAS alternative.
Promote "least polluting" ways to connect people and goods to their destinations.	Please see measures above regarding transit.
Incorporate bicycle lanes, routes, and facilities into street systems, new subdivisions, and large developments.	The improvements proposed under all of the SPAS alternatives would include provisions for bicycle facilities, as appropriate.
Require amenities for non-motorized transportation, such as secure and convenient bicycle parking.	Please see above.
Ensure that the project enhances, and does not disrupt or create barriers to, non-motorized transportation.	Please see measures above regarding facilities that would improve and enhance transit access.
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.	Not applicable.
Work with the school districts to improve pedestrian and bicycle access to schools and to restore or expand school bus service using lower-emitting vehicles.	Not applicable.
Institute teleconferencing, telecommute, and/or flexible work hour programs to reduce unnecessary employee transportation.	LAWA offers flexible work hour programs to employees, which would continue agency-wide and is not particular to any specific SPAS alternative.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Provide information on alternative transportation options for consumers, residents, tenants, and employees to reduce transportation-related emissions.	It is anticipated that the facilities described above relative to improving transit access at LAX would be reflected in the routes, schedules, and other information available from the affected transit agencies.
Educate consumers, residents, tenants, and the public about options for reducing motor vehicle-related GHG emissions. Include information on trip reduction; trip linking; vehicle performance and efficiency (e.g., keeping tires inflated); and low or zero-emission vehicles.	Beyond scope of project.
Purchase, or create incentives for purchasing, low or zero-emission vehicles.	The majority of LAWA's vehicle fleet is comprised of low-emission vehicles, and LAWA continues to increase that percentage. LAWA would continue that program agency-wide, which is not particular to any specific SPAS alternative.
Create a ridesharing program. Promote existing ridesharing programs e.g., by designating a certain percentage of parking spaces for ridesharing vehicles, designating adequate passenger loading and unloading for ridesharing vehicles, and providing a website or message board for coordinating rides.	Please see above regarding LAWA's existing ridesharing program.
Create or accommodate car sharing programs, e.g., provide parking spaces for car share vehicles at convenient locations accessible by public transportation.	LAWA would consider, and incorporate if feasible, this measure in the design of the transportation facilities associated with Alternatives 1, 2, 3, 8, and 9 (i.e., ITF, GTC, and ITC).
Provide a vanpool for employees.	Please see above regarding LAWA's existing vanpool program.
Create local "light vehicle" networks, such as neighborhood electric vehicle systems.	Not applicable.
Enforce and follow idling time limits for commercial vehicles, including delivery and construction vehicles.	The LAX Master Plan MMRP and state law include provisions to limit construction vehicle idling, which would apply to all of the SPAS alternatives.
Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles.	Electric vehicle charging stations are available to the public near Parking Structure 1 within the CTA. Such facilities would continue to be available and possibly expanded, if/as feasible, in conjunction with all of the SPAS alternatives. Additionally, aircraft gate improvements associated with concourse modifications or additions under any of the SPAS alternatives, except for Alternative 4 which does not include such improvements, would accommodate electric ground support equipment (eGSE) charging stations.
Require best management practices in agriculture and animal operations to reduce emissions, conserve energy and water, and utilize alternative energy sources, including biogas, wind, and solar.	Not applicable.
Preserve forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas, and other open space that provide carbon sequestration benefits.	Not applicable.

Table 4.6-7

Evaluation of Potential GHG Mitigation Measures from the California Office of the Attorney General

Measure	Discussion
Protect existing trees and encourage the planting of new trees. Adopt a tree protection and replacement ordinance.	The incorporation of trees and other landscaping into development plans for all of the SPAS alternatives will be considered, giving due consideration to federal requirements and guidelines related to airport safety (i.e., avoid/discourage bird attractants which may increase risk of birdstrike incidents).

[1] Los Angeles World Airports, Sustainability Report, June 2010.

Source: CDM Smith, 2012.

Table 4.6-8

Evaluation of Potential GHG Reduction Measures from the Governor's Office of Planning and Research

Measure	Discussion
Land Use and Transportation	
Implement land use strategies to encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density development along transit corridors. Encourage compact, mixed-use projects, forming urban villages designed to maximize affordable housing and encourage walking, bicycling, and use of public transit systems.	Not applicable.
Encourage infill, redevelopment, and higher-density development, whether in incorporated or unincorporated settings.	Not applicable.
Encourage new developments to integrate housing, civic, and retail amenities (jobs, schools, parks, and shopping opportunities) to help reduce VMT resulting from discretionary automobile trips.	Not applicable.
Apply advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods, and services.	All of the SPAS alternatives include ground transportation improvements designed to improve operational efficiency of transportation systems and movement of people.
Incorporate features into project design that would accommodate the supply of frequent, reliable, and convenient public transit.	Transit bus stops/connections for several municipalities are currently provided at LAX, in addition to the LAWA shuttle system between the CTA and the existing Metro Green Line Station. With the exception of Alternative 4, all of the SPAS alternatives include facilities that can improve and encourage transit use at the airport, such as the ITF (Alternatives 1, 2, 8, and 9), the GTC and ITC (Alternative 3), and the elevated/dedicated busway or APM that would connect the CTA to the ITF and the future LAX/Crenshaw Metro Light Rail Station (Alternatives 1, 2, 8, and 9).
Implement street improvements that are designed to relieve pressure on a region's most congested roadways and intersections.	Beyond the scope/control of the project.

Table 4.6-8

Evaluation of Potential GHG Reduction Measures from the Governor's Office of Planning and Research

Limit idling time for commercial vehicles, including delivery and construction vehicles.	The LAX Master Plan MMRP and state law include provisions to limit construction vehicle idling, which would apply to all of the SPAS alternatives.
Urban Forestry	
Plant trees and vegetation near structures to shade buildings and reduce energy requirements for heating/cooling.	The incorporation of trees and other landscaping into development plans for all of the SPAS alternatives will be considered, giving due consideration to federal requirements and guidelines related to airport safety (i.e., avoid/discourage bird attractants which may increase risk of birdstrike incidents).
Preserve or replace on-site trees (that are removed due to development) as a means of providing carbon storage.	Please see above regarding the planting of trees at the airport. Removal of existing mature trees due to development of any of the SPAS alternatives could be replaced off-site.
Green Buildings	
Encourage public and private construction of LEED®-certified (or equivalent) buildings.	LAWA requires new terminal facilities to achieve LEED® Silver certification.[1]
Energy Conservation Policies and Actions	
Recognize and promote energy saving measures beyond Title 24 requirements for residential and commercial projects.	The Green Building Code requires a project to exceed CEC 2008 Energy Efficiency Standards by 15 percent. All of the SPAS alternatives would be subject to the requirements of the Green Building Code.
Where feasible, include in new buildings facilities to support the use of low/zero carbon fueled vehicles, such as charging of electric vehicles from green electricity sources.	Electric vehicle charging stations are available to the public near Parking Structure 1 within the CTA. Such facilities would continue to be available and possibly expanded, if/as feasible, in conjunction with all of the SPAS alternatives. Additionally, aircraft gate improvements associated with concourse modifications or additions under any of the SPAS alternatives, except for Alternative 4 which does not include such improvements, would accommodate eGSE charging stations.
Educate the public, schools, other jurisdictions, professional associations, business, and industry about reducing GHG emissions.	Provisions for education of LAWA contractors, suppliers, tenants, and the community relative to the benefits of sustainability measures are included in the LSAG, which would apply to all of the SPAS alternatives.
Replace traffic lights, street lights, and other electrical uses to energy efficient bulbs and appliances.	The use of energy efficient lighting is standard practice by LAWA and would also occur in meeting the energy conservation requirements of the Green Building Ordinance, which would be applicable to all of the SPAS alternatives. With regard to traffic lights, LAWA and LADOT install LEDs for any major upgrades to existing signals or addition of new signals, which would also be the case with all of the SPAS alternatives.
Purchase Energy Star equipment and appliances for public agency use.	The utilization of Energy Star equipment is required by the Green Building Ordinance, as would apply to all of the SPAS alternatives.

Table 4.6-8

Evaluation of Potential GHG Reduction Measures from the Governor's Office of Planning and Research

Incorporate on-site renewable energy production, including installation of photovoltaic cells or other options.	Although separate from SPAS, the LAX CUP Replacement Project, currently under construction, includes a thermal energy storage system (i.e., large tank below grade to store cooled water, which can reduce needs during peak energy use periods). It also includes cogeneration for the production of electricity from heat generated during the production of steam. The new CUP will help provide for the heating and cooling needs of the terminal improvements associated with all of the SPAS alternatives, except Alternative 4, which does not include terminal improvements.
Execute an Energy Savings Performance Contract with a private entity to retrofit public buildings. This type of contract allows the private entity to fund all energy improvements in exchange for a share of the energy savings over a period of time.	Beyond the scope/control of the project.
Design, build, and operate schools that meet the Collaborative for High Performance Schools best practices.	Beyond the scope/control of the project.
Retrofit municipal water and wastewater systems with energy efficient motors, pumps, and other equipment, and recover wastewater treatment methane for energy production.	LAX has water efficient computer controlled irrigation systems. Energy efficient utility systems, including water conservation, are reflected in the requirements of the Green Building Ordinance, as would apply to all of the SPAS alternatives.
Convert landfill gas into energy sources for use in fueling vehicles, operating equipment, and heating buildings.	Beyond the scope/control of the project.
Purchase government vehicles and buses that use alternative fuels or technology, such as electric hybrids, biodiesel, and ethanol. Where feasible, require fleet vehicles to be low-emission vehicles. Promote the use of these vehicles in the general community.	The majority of LAWA's vehicle fleet is comprised of low-emission vehicles, and LAWA continues to increase that percentage. LAWA would continue that program agency-wide, which is not particular to any specific SPAS alternative. Also, as noted above, electric vehicle charging stations are available to the public near Parking Structure 1 within the CTA. Such facilities would continue to be available and possibly expanded, if/as feasible, in conjunction with all of the SPAS alternatives. Additionally, aircraft gate improvements associated with concourse modifications or additions under any of the SPAS alternatives, except for Alternative 4 which does not include such improvements, would accommodate eGSE charging stations.
Offer government incentives to private businesses for developing buildings with energy and water efficient features and recycled materials. The incentives can include expedited plan checks and reduced permit fees.	Beyond the scope/control of the project.
Offer rebates and low-interest loans to residents that make energy-saving improvements on their homes.	Beyond the scope/control of the project.
Create bicycle lanes and walking paths directed to the location of schools, parks, and other destination points.	Beyond the scope/control of the project.

Table 4.6-8

Evaluation of Potential GHG Reduction Measures from the Governor's Office of Planning and Research

Programs to Reduce Vehicle Miles Traveled	
Offer government employees financial incentives to carpool, use public transportation, or use other modes of travel for daily commutes.	LAWA has a comprehensive rideshare and vanpool program available to all employees. LAWA's Rideshare Program offers financial incentives and discounts to participating employees. This program would continue agency-wide and is not particular to any specific SPAS alternative.
Encourage large businesses to develop commute trip reduction plans that encourage employees who commute alone to consider alternative transportation modes.	Please see above.
Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	Beyond the scope/control of the project.
Create an online ridesharing program that matches potential carpoolers immediately through email.	LAWA's Rideshare Program, noted above, uses RideMatch.info which provides one-stop ride-matching services to employees. This program would continue agency-wide and is not particular to any specific SPAS alternative.
Develop a Safe Routes to School Program that allows and promotes bicycling and walking to school.	Beyond the scope/control of the project.
Programs to Reduce Solid Waste	
Create incentives to increase recycling and reduce generation of solid waste by residential users.	Beyond the scope/control of the project.
Implement a Construction and Demolition Waste Recycling Ordinance to reduce the solid waste created by new development.	LSAG includes provisions for waste reduction and management, including, but not limited to, reuse and recycling of construction and demolition waste, which would be applicable to all of the SPAS alternatives.
Add residential/commercial food waste collection to existing greenwaste collection programs.	LAWA has an ongoing waste reduction program.

[1] Los Angeles World Airports, Sustainability Report, June 2010.

Source: CDM Smith, 2012.

4.6.8 Level of Significance After Mitigation

Continued implementation of LAWA's existing practices and programs that promote sustainability and reduction in GHG emissions, along with compliance with the City of Los Angeles Green Building Ordinance, would help reduce GHG emissions associated with all of the SPAS alternatives; however, the GHG emissions associated with Alternatives 1 through 9 would remain significant and unavoidable.