4.3 GREENHOUSE GAS EMISSIONS

This section discusses potential impacts to global climate change as related to the anticipated Project-related greenhouse gas ("GHG") emissions. The GHG emissions analysis in this section is based on the *John Wayne Airport Settlement Agreement Amendment Greenhouse Gas Technical Report* ("*Greenhouse Gas Technical Report"*) prepared by Environ International Corporations and included in this EIR as Appendix E (Environ 2014b).

The Project does not propose any physical construction or change to the nature of the Airport ground operations. Therefore, the Project would not generate GHG emissions associated with construction activities.

4.3.1 BACKGROUND INFORMATION

SCIENTIFIC BACKGROUND

There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way as glass traps heat in a greenhouse. The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs.

GHGs allow the sun's radiation to penetrate the atmosphere and warm the Earth's surface, but do not let the infrared radiation emitted from the Earth to escape back into outer space. As a result, global temperatures are predicted to increase over the century. In particular, if climate change remains unabated, surface temperatures in California are expected to increase anywhere from 4.1 to 8.6 degrees Fahrenheit ("°F") by the end of the century. Not only would higher temperatures directly affect the health of individuals through greater risk of dehydration, heat stroke, and respiratory distress, the higher temperatures may increase ozone formation, thereby worsening air quality. Rising temperatures could also reduce the snowpack, which would increase the risk of water shortages. Higher temperatures along with reduced water supplies could reduce the quantity and quality of agricultural products. In addition, there could be an increase in wildfires and a shift in distribution of natural vegetation throughout the State. Global warming could also increase sea levels and coastal storms resulting in greater risk of flooding.

Emissions of carbon dioxide ("CO_2") are the leading cause of global warming, with other pollutants such as methane ("CH_4"), nitrous oxide ("N_2O"), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride also contributing. The magnitude of each GHGs impact on global warming differs because each GHG has a different global warming potential ("GWP"), which indicates, on a pound for pound basis, how much the pollutant will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O, for example, are substantially more potent than CO_2, with GWPs of 21 and 310, respectively.

The effect each GHG has on climate change is measured as a combination of the volume of its emissions and its GWP. Thus, GHG emissions are typically measured in terms of pounds, tons, tonnes, or metric tons of CO_2 equivalent ("CO_2e"). A tonne is the same as a metric tons (1,000 kilograms) and is equal to 2,205 pounds, or 1.103 tons. CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere.

Globally, CO_2 concentrations, which ranged from 265 parts per million ("ppm") to 280 ppm over the last 10,000 years, only began rising in the last 200 years to current levels of 397 ppm, which is a 42 percent increase.

In 2011, the United States emitted about 5.44 billion tonnes (net emissions) of CO_2e or about 17.2 tonnes per person per year ("tonnes/person/year"). This represents a 6.5 percent reduction below 2005 levels. Of the four major sectors nationwide—residential, commercial, industrial, and transportation—transportation accounts for the highest fraction of GHG emissions (approximately 33 percent); these emissions are entirely generated from direct fossil fuel combustion. Nearly 65 percent of the transportation emissions resulted from gasoline consumption for personal vehicle use. The remaining emissions came from other transportation activities, including the combustion of diesel-fuel in heavy duty vehicles and jet fuel in aircraft. According to the Sixth U.S. Climate Action Report, from 2005 to 2011, transportation emissions dropped by 8 percent due, in part, to increased fuel efficiency across the U.S. vehicle fleet; due to higher fuel prices; and due to an associated decrease in the demand for passenger transportation. However, from 1990 to 2011 as a whole, transportation emissions rose by 17 percent, principally because of increased demand for travel and the stagnation of fuel efficiency across the U.S. vehicle fleet.

In 2011, California emitted approximately 448 million tonnes of CO_2e, or about 7 percent of the U.S. emissions. Of these emissions, approximately 3.3 million tonnes were attributed to intrastate aviation. California's percentage contribution is due primarily to the sheer size of California, as compared to other states, as California has the fourth lowest per capita GHG emission rate in the country, due to the success of its energy-efficiency and renewable energy programs and to the commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise. Another factor that contributes to the low per capita rate is its mild climate compared to that of many other states.

The California Energy Commission found that transportation is the source of approximately 41 percent of the State's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 23 percent, and industrial sources at 20 percent. Agriculture and forestry is the source of approximately 8.3 percent. The source category "other", which includes residential and commercial activities, also comprised approximately 8.3 percent of the inventory.

It has not been demonstrated that new GHG emissions caused by a single project can affect global climate change, or that a project's net increase in GHG emissions, if any, when coupled with other activities in the region, would be cumulatively considerable.

POTENTIAL EFFECTS OF HUMAN ACTIVITY ON GLOBAL CLIMATE CHANGE

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. Some scientific modeling predicts that the continued emission of GHGs at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2 degree Celsius ("°C", 0.36°F) per decade is projected, and there are identifiable signs that global warming is taking place, including substantial loss of ice in the Arctic.

However, the understanding of the role that GHG emissions, particulate matter, and aerosols play on global climate trends remains uncertain. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the Intergovernmental Panel on Climate Change ("IPCC").

Acknowledging uncertainties regarding the rate at which anthropogenic GHG emissions would continue to increase (based upon various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions), and the impact of such emissions on climate change, the IPCC devised a set of six emission scenarios that utilize various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century. These emission scenarios are paired with various climate sensitivity models to attempt to account for the range of uncertainties that affect climate change projections. The wide range of temperature, precipitation, and similar projections yielded by these scenarios and models reveal the magnitude of uncertainty presently limiting climate scientists' ability to project long-range climate change.

The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects, according to the IPCC:

- Snow cover is projected to contract, with permafrost areas sustaining thawing;
- Sea ice is projected to shrink in both the Arctic and Antarctic;
- Hot extremes, heat waves, and heavy precipitation events are likely to increase in frequency;
- Future tropical cyclones (typhoons and hurricanes) will likely become more intense;
- Non-tropical storm tracks are projected to move toward the poles, with consequent changes in wind, precipitation, and temperature patterns. Increases in the amount of precipitation are very likely in high-latitudes, while decreases are likely in most subtropical regions; and
- Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean and parts of the North Atlantic Ocean.

Potential secondary effects from global warming include global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

4.3.2 REGULATORY SETTING

INTERNATIONAL

International Civil Aviation Organization

The International Civil Aviation Organization ("ICAO") was created in 1944 to promote the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. The ICAO serves as the forum for cooperation in all fields of civil aviation among its 191 Member States.

A comprehensive assessment concerning aviation's contribution to global atmospheric problems is contained in the Special Report on Aviation and the Global Atmosphere. This Special Report was prepared by the IPCC in collaboration with the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer and was published in 1999 at ICAO's request. The Special Report recognized that the effects of some types of aircraft emissions are well understood; revealed that the effects of others are not; and identified a number of key areas of scientific uncertainty that limit the ability to project aviation impacts on climate and ozone. The ICAO requested that the IPCC include an update of the main findings of the Special Report in its Fourth Assessment Report ("IPCC AR4"), which was published in 2007.

In 2007, the ICAO continued to study policy options to limit or reduce the environmental impact of aircraft engine emissions, and to develop concrete proposals and provide advice as soon as possible to the Conference of the Parties to the United Nations Framework Convention on Climate Change ("UNFCCC"). It called for special emphasis to be placed on the use of technical solutions, while continuing consideration of market-based measures and taking into account potential implications for developing and developed countries.

A global agreement reached by the 37th Session of the ICAO Assembly in October 2010 established ICAO's objective for aviation's role in the management of climate change. It provides a roadmap for action through 2050 for the 191 Member States and invited them to voluntarily submit their action plans to reduce CO_2 emissions to ICAO by June 2012. The action plans are intended to allow Member States to showcase the specific voluntary measures they intend to take in order to improve efficiency and thereby contribute to the global environmental aspirational goals established by the Assembly.

ICAO has taken immediate steps to help Member States prepare their action plans by developing guidance material and a framework for collecting, analyzing, and reporting aviation CO_2 emissions. ICAO has also prepared a web interface to serve as an electronic template for the submission of action plans. This web tool provides material to assist in the preparation of action plans and dissemination of information on the various measures being undertaken by Member States. In addition, ICAO held regional hands-on training workshops from May to July 2011 in its Regional Offices. These workshops allowed Member States to obtain maximum benefit from the guidance material and provide opportunities for them to help refine their material. The workshops trained participants in the use of the web interface. Twenty-four Member States have made their action plans publically available, including the United States (discussed further below).

FEDERAL

Federal Aviation Administration

2014 Climate Action Report

According to the 2014 Climate Action Report, the FAA is pursuing a comprehensive approach to reduce GHG emissions from commercial aviation through aircraft and engine technology development; operational improvements; development and deployment of sustainable alternative jet fuels; and additional policies and measures. The FAA funds diverse programs to improve aviation energy and emissions performance, and coordinates with other agencies as appropriate, including the National Aeronautics and Space Administration. Following are some examples of FAA programs:

- The Continuous Lower Energy, Emissions, and Noise ("CLEEN") program is a collaborative partnership between the FAA and five aviation manufacturers to develop technologies that will reduce emissions and fuel burn, and to expedite the integration of these technologies into current aircraft.

- The Aviation Climate Change Research Initiative ("ACCRI") is an FAA program that provides guidance to develop mitigation solutions based on state-of-the-art science results. The ACCRI results are key to quantifying cost–benefit analyses of various policy options. The ACCRI has reduced uncertainties, leading to overall improvement in understanding of the climate impacts of aviation. While the ACCRI does not provide mitigation solutions on its own, recently completed ACCRI Phase II results can be used to help identify effective mitigation options.

- The Voluntary Airport Low Emissions Program ("VALE") is a grant program that encourages airport sponsors to use Airport Improvement Program funds and Passenger Facility Charges to finance low-emission vehicles; refueling and recharging stations; gate electrification; and other airport air quality improvements. Under the FAA's most recent reauthorization, VALE's work is supplemented by new programs that reduce airport emissions. The FAA is creating a program where, following an assessment of airport energy requirements, the FAA may make capital grants for airports to increase energy efficiency. The FAA has also established a pilot program under which certain airports may acquire and operate zero-emission vehicles.

In addition, the FAA is a founding member of the Commercial Aviation Alternative Fuels Initiative ("CAAFI"). CAAFI is a public–private partnership established in 2006 with the objective of advancing alternative jet fuels with equivalent safety/performance (drop-in) and comparable cost, environmental improvement, and security of energy supply for aviation. Work through CAAFI has also expanded internationally. Fuel production capability is beginning to emerge, including a recently announced airline and fuel producer agreement.

Aviation Greenhouse Gas Emissions Reduction Plan

The United States is committed to addressing the climate change impacts of commercial aviation and is pursuing a multi-pronged approach to achieve GHG emissions reductions. The Aviation Greenhouse Gas Emissions Reduction Plan, which was submitted to ICAO as the U.S. Action Plan, identifies actions and progress toward GHG emission reductions in each of the following areas:

- **Aircraft and Engine Technology Improvement:** There are multiple technology initiatives dedicated to developing technology with significantly improved fuel burn and lower GHG emissions.

- **Operational Improvements:** The FAA is overhauling the National Airspace System through the NextGen program to improve efficiency and to reduce aircraft fuel burn.

- **Alternative Fuels Development and Deployment:** The U.S. has taken significant steps during the last five years to facilitate the development and deployment of sustainable alternative aviation fuels. Future efforts are aimed at identifying new alternative fuels pathways and on commercializing fuels with up to 80 percent lower lifecycle GHG emissions.

- **Policies, Standards, and Measures:** The U.S. is pursuing a variety of policies, standards, and measures that will supplement, and in some cases support, efforts on technology, operations, and fuels in order to achieve the carbon neutral growth goal.

- **Scientific Understanding and Modeling/Analysis:** The U.S. conducts ongoing scientific research to better understand and quantify the impacts of aviation on the climate.

The Aviation Greenhouse Gas Emissions Reduction Plan estimates that these improvements in aircraft technology and air traffic operations will result in an estimated reduction of 47 million metric tons (42.6 million tonnes) of CO_2 in 2020 for all aviation in the United States, relative to a baseline year of 2010.

Supreme Court Ruling in Massachusetts et al. v. Environmental Protection Agency

In *Massachusetts et al. v. Environmental Protection Agency* (549 US 497 [2007]), the U.S. Supreme Court held that the United States Environmental Protection Agency ("USEPA") has authority under the Clean Air Act to regulate CO_2 emissions from new motor vehicles. The Court did not mandate that the USEPA enact regulations to reduce GHG emissions, but found that the only instances in which the USEPA could avoid taking action were if it found that GHGs do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHGs contribute to climate change.

U.S. Environmental Protection Agency

On December 7, 2009, the USEPA issued an "endangerment finding" under the Clean Air Act, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution. These findings provide the basis for adopting new national regulations to mandate GHG emission reductions under the federal Clean Air Act.

On September 22, 2009, the USEPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires annual reporting to the USEPA of GHG emissions from large sources and suppliers of GHGs, including facilities that emit 25,000 metric tons (22,675 tonnes) or more a year of GHGs. Based on the applicability criteria listed in the rule (Code of Federal Regulations ["CFR"], Title 40, Part 98), mandatory reporting is only required for certain large industrial and commercial sources of GHGs. (Though John Wayne Airport ["JWA"] is not required to report GHG

emissions at the federal level, JWA does report GHG emissions for the Cogeneration Facility [natural gas use] to the State of California Air Resources Board ["CARB"].)

Section 233 of the Clean Air Act vests the authority to promulgate emission standards for aircraft or aircraft engines with the USEPA. States and other municipalities are preempted from adopting or enforcing any standard respecting aircraft engine emissions unless such standard is identical to the USEPA's standards. To date, the USEPA has not adopted GHG emission standards for aircraft engines.

However, the USEPA recently adopted oxides of nitrogen ("NOx") emission standards and related provisions for aircraft gas turbine engines with thrusts rated greater than 26.7 kilonewtons that were previously adopted by the ICAO. (These engines are used primarily on commercial passenger and freight aircraft.) Included in the rule are two new tiers of more stringent emission standards for NOx, which are known as Tier 6 standards and Tier 8 standards. The Tier 6 standards became effective for newly manufactured aircraft engines beginning in 2013. Engine models that were originally certificated beginning on or after January 1, 2014, must comply with the Tier 8 standards. Though these standards are not directly relevant to GHG emissions, these standards can influence and reduce GHG emissions over time as new aircraft engines are phased in because the standards require fuel efficiency improvements that will result in GHG emissions reductions.

U.S. Environmental Protection Agency and National Highway Transportation Safety Administration Joint Rulemaking for Vehicle Standards

In response to the Massachusetts v. EPA ruling discussed above, the Bush Administration issued an Executive Order on May 14, 2007, directing the USEPA, the Department of Transportation ("DOT"), and the Department of Energy ("DOE") to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008.

On October 10, 2008, the National Highway Transportation Safety Administration ("NHTSA") released a final environmental impact statement analyzing proposed interim standards for passenger cars and light trucks in model years 2011 through 2015. The NHTSA issued a final rule for model year 2011 on March 30, 2009. In addition, on May 7, 2010, the USEPA and the NHTSA issued a final rule regulating fuel efficiency and GHG pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016.

On May 21, 2010, President Obama issued a memorandum to the Secretaries of Transportation and Energy and to the Administrators of the USEPA and the NHTSA calling for the establishment of additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure.[1] In response to this directive, the USEPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The agencies proposed standards projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleetwide basis, which is equivalent to 54.5 miles per gallon ("mpg") if this level were achieved solely through fuel efficiency. California has announced its support of this national

[1] President Obama has demonstrated a commitment to reducing the U.S.' GHG emissions level; for example, on June 25, 2013, President Obama announced a set of executive actions that will cut carbon pollution, prepare for the impacts of climate change, and lead international efforts to address climate change.

program. The final rule was adopted in October 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

Heavy-Duty Engines and Vehicles Fuel Efficiency Standards

In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the USEPA and the NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles from model year 2014–2018. The USEPA and NHTSA have adopted standards for CO_2 emissions and fuel consumption, respectively, tailored to each of three main vehicle categories: combination tractors; heavy-duty pickup trucks and vans; and vocational vehicles. According to the USEPA, this program will reduce GHG emissions and fuel consumption for affected vehicles by 6 percent to 23 percent over the 2010 baseline year. (These emissions reductions were not included in the Project emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative [i.e., higher] Project emissions inventory.)

STATE

Executive Order S-3-05

In June 2005, former Governor Schwarzenegger signed Executive Order S-3-05, which established the following GHG emission reduction targets for California: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 (Statewide Greenhouse Gas Reductions)

Assembly Bill ("AB") 32, the California Global Warming Solutions Act of 2006 was signed into law in September 2006 after considerable study and expert testimony before the Legislature. The law instructs CARB to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. AB 32 specifically directed CARB to set a GHG emission limit based on 1990 levels, to be achieved by 2020; the bill also set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. CARB has accomplished the key preliminary milestones set forth in AB 32, including the following:

- On June 21, 2007, CARB approved three discrete early action measures. These were later supplemented by adding six other discrete early action measures.
- On December 6, 2007, CARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.
- On December 11, 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan), discussed in more detail below.
- On January 1, 2010, several discrete early action measures became effective.

- On October 28, 2010, CARB released its proposed cap-and-trade regulations, which cover sources responsible for approximately 85 percent of California's GHG emissions. CARB's Board ordered CARB's Executive Director to prepare the final regulatory package for cap-and-trade on December 16, 2010. The regulations were subsequently adopted in 2011 and became enforceable on January 1, 2012.

As noted above, on December 11, 2008, CARB adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors.

In the Scoping Plan, CARB determined that achieving the 1990 emission level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent in the absence of new laws and regulations (referred to as "Business-As-Usual" ["BAU"] or "No Action Taken" ["NAT"]). The Scoping Plan evaluates opportunities for sector-specific reductions; integrates all CARB and California Climate Action Team early actions and additional GHG reduction measures; identifies additional measures to be pursued as regulations; and outlines the role of the cap-and-trade program.

The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs, as well as building and appliance standards.

- Achieving a statewide renewable energy mix of 33 percent.

- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions.

- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.

- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard ("LCFS").

- Creating targeted fees, including a public goods charge on water use; fees on high global warming potential gases; and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

In connection with its preparation of the August 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB released revised estimates of the 2020 emissions level projection in light of the economic recession and the availability of updated information from development of measure-specific regulations. Based on the new economic data, CARB determined the 2020 emissions level projection in the BAU condition would be reduced from 596 metric tonnes of CO_2 equivalent ("$MTCO_2e$") to 545 $MTCO_2e$. Under that assessment, achieving the 1990 emissions level in 2020 would require a reduction of GHG emissions of 118 $MTCO_2e$, or 21.7 percent (down from 28.5 percent), from the BAU condition.

When the 2020 emissions level projection also was updated to account for implemented regulatory measures, including Pavley (vehicle model-years 2009–2016) and the renewable portfolio standard (12 percent–20 percent), the 2020 projection in the BAU condition was reduced further to 507 $MTCO_2e$. As a result, based on the updated economic and regulatory data, CARB determined that achieving the 1990 emissions level in 2020 would now require a reduction of GHG emissions of 80 $MTCO_2e$, or approximately 16 percent of the BAU emissions.

On February 10, 2014, CARB released a Draft Proposed First Update of the Scoping Plan. The draft recalculates 1990 GHG emissions using new global warming potentials identified in the IPCC Fourth Assessment Report released in 2007. Using those GWPs, the 427 $MTCO_2e$ 1990 emissions level and 2020 GHG emissions limit identified in the 2008 Scoping Plan would be slightly higher, at 431 $MTCO_2e$. Based on the revised 2020 emissions level projection identified in the 2011 Final Supplement and the updated 1990 emissions levels identified in the discussion draft of the First Update, achieving the 1990 emissions level in 2020 would require a reduction of 78 $MTCO_2e$ (down from 509 $MTCO_2e$), or approximately 15.3 percent of the BAU emissions.

Renewable Portfolio Standards

Established in 2002 under Senate Bill ("SB") 1078, and accelerated in 2006 under SB 107 and again in 2011 under SBX1-2, California's Renewable Portfolio Standards ("RPS") require retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. The 33 percent standard is consistent with the RPS goal established in the Scoping Plan. As interim measures, the RPS requires 20 percent of retail sales to be sourced from renewable energy by 2013, and 25 percent by 2016. Initially, the RPS provisions applied only to investor-owned utilities, community choice aggregators, and electric service providers. SBX1-2 added, for the first time, publicly owned utilities to the entities subject to RPS.

The expected growth in RPS to meet the standards in effect in 2008 is not reflected in the BAU calculation in the AB 32 Scoping Plan, discussed above. In other words, the Scoping Plan's BAU 2020 analysis does not take credit for implementation of RPS that occurred after its adoption.

Mobile Source Reductions

Assembly Bill 1493 ("the Pavley Standard" or AB 1493) required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 through 2016. AB 1493 also required the California Climate Action Registry ("CCAR") to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emission reduction credits. AB 1493 further authorized CARB to grant emission reduction credits for reductions of GHG emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, CARB applied to the USEPA for a waiver under the Federal Clean Air Act to authorize implementation of the AB 1493 regulations. Subsequently, on June 30, 2009, the USEPA granted the waiver to California for its GHG emission standards for motor vehicles. As part of this waiver, USEPA specified the following provision: CARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year.

Under AB 1493, CARB's approach to passenger vehicles (cars and light trucks) combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. This new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards will apply to all passenger and light duty trucks used by customers, employees of and deliveries to the Project site.

Low Carbon Fuel Standard

Executive Order S-01-07 (January 18, 2007) requires a ten percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020. (Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "lifecycle" of a transportation fuel.) Accordingly, CARB identified the LCFS as a Discrete Early Action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009. In 2009, CARB approved the LCFS regulation, which became fully effective in April 2010 and is codified in the *California Code of Regulations* ("CCR", Title 17, Sections 95480–95490).

On December 29, 2011, the U.S. District Court for the Eastern District of California issued several rulings in the federal lawsuits challenging the LCFS. One of the district court's rulings preliminarily enjoined CARB from enforcing the regulation. In January 2012, however, CARB appealed that decision to the Ninth Circuit Court of Appeals. On September 18, 2013, the Ninth Circuit concluded that the LCFS ethanol and initial crude-oil provisions are not facially discriminatory, but remanded the case to the district court to determine whether the LCFS ethanol provisions are discriminatory in purpose and effect. Additionally, the Ninth Circuit remanded to the District Court with instructions to vacate the preliminary injunction against CARB's enforcement of the regulation.

Advanced Clean Cars

In January 2012, CARB approved the Advanced Clean Cars ("ACC") program, a new emissions-control program for model year 2017 through 2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

Senate Bill 375 and Southern California Association of Governments' Regional Transportation Plan/Sustainable Community Plan

SB 375 provides for a new planning process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction mandates established in AB 32. SB 375 also includes provisions for streamlined California Environmental Quality Act ("CEQA") review for some infill projects, such as transit-oriented development.

SB 375 specifically requires the Metropolitan Planning Organization ("MPO") relevant to the Project area (i.e., the Southern California Association of Governments ["SCAG"]) to incorporate a sustainable communities strategy ("SCS") into its regional transportation plans ("RTPs") that will achieve GHG emission reduction targets set by CARB by reducing vehicle miles traveled ("VMT") from light-duty vehicles through the development of more compact, complete, and efficient

communities. SB 375 is similar to the Regional Blueprint Planning Program, established by the California Department of Transportation, which provides discretionary grants to fund regional transportation and land use plans voluntarily developed by MPOs working in cooperation with Councils of Governments. (The Scoping Plan, adopted by CARB in December 2008 relies on the requirements of SB 375 to implement the carbon emissions reductions anticipated from land use decisions.)

On September 23, 2010, CARB adopted Regional Targets for the reduction of GHGs applying to years 2020 and 2035. For the area under SCAG's jurisdiction, including the Project area, CARB adopted Regional Targets for reduction of GHG emissions by 8 percent for 2020 and by 13 percent for 2035. On February 15, 2011, CARB's Executive Officer approved the final targets.

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (*California Public Resources Code,* Sections 40000 et seq.) requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; and (2) diversion of 50 percent of all solid waste on and after January 1, 2000, through source reduction, recycling, and composting activities Additionally, jurisdictions are not prohibited from implementing source reduction, recycling, and composting activities designed to exceed these requirements.

AB 341 (2011) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the State that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery ("CalRecycle") to develop strategies to achieve the State's policy goal. CalRecycle conducted several stakeholder workshops and published a discussion document in May 2012 entitled *California's New Goal: 75 Percent Recycling,* which identifies concepts that CalRecycle believes would assist the state in reaching the 75 percent goal by 2020.

REGIONAL

Southern California Association of Governments

As previously discussed, SB 375 specifically required MPOs, including SCAG, to incorporate an SCS in their RTPs that will achieve GHG emission reduction targets set by CARB. SCAG's first-ever SCS is included in its *2012–2035 Regional Transportation Plan Sustainable Communities Strategy* ("RTP/SCS"). The document was adopted by SCAG in April 2012. The goals and policies of the RTP/SCS that reduce VMT focus on transportation and land use planning that include building infill projects, locating residents closer to where they work and play and designing communities so there is access to high quality transit service. The 2012–2035 RTP/SCS is expected to reduce per capital transportation emissions by 9 percent by 2020 and by 16 percent by 2035. In June of 2012, CARB accepted SCAG's determination that the Final RTP/SCS would meet the region's GHG reduction target.

South Coast Air Quality Management District

The SCAQMD is principally responsible for comprehensive air pollution control in the South Coast Air Basin ("SoCAB" or "the Basin"), which includes Los Angeles, Orange, and the urbanized

portions of Riverside and San Bernardino Counties, including the Project site. The SCAQMD works directly with SCAG, County transportation commissions, and local governments and cooperates actively with all federal and State government agencies to regulate air quality.

In April 2008, the SCAQMD convened a Working Group to develop GHG significance thresholds. On December 5, 2008, the SCAQMD Governing Board adopted an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency; specifically, the Board adopted an interim threshold of 10,000 $MTCO_2e$ per year for industrial stationary source projects.

For all other projects, SCAQMD staff developed a draft, multiple tier framework to assist with the significance evaluation. The draft framework includes the following tiers: Tier 1 is any applicable CEQA exemption(s); Tier 2 is consistency with a GHG reduction plan; Tier 3 is a screening value or bright line; Tier 4 is a performance-based standard; and Tier 5 is GHG mitigation offsets.

According to the presentation given at the September 28, 2010, Working Group meeting, SCAQMD staff reviewed the tiered significance threshold approach. The draft tiers are as follows:

- **Tier 1:** Determine if any CEQA exemption(s) is (are) applicable. If not, move to Tier 2.

- **Tier 2:** Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan (often called a Climate Action Plan) that has gone through public hearings and CEQA review, which has an approved inventory that includes monitoring, etc. If not, move to Tier 3.

- **Tier 3:** For all land use types, if projects emit less than 3,000 metric tonnes/year of CO_2e, the project is presumed to be less than significant for GHGs. If the project emits more than 3,000 metric tonnes of CO_2 equivalent per year ("$MTCO_2e$/yr"), move to Tier 4.

  (More specific screening thresholds were also provided, which include 1,400 $MTCO_2e$/yr for commercial projects and 3,500 $MTCO_2e$/yr for residential and mixed use projects. These thresholds were based on a review of the Office of Planning and Research database, which included 711 CEQA projects using a 90 percent capture approach.)

- **Tier 4:** The proposed performance standards include three options:

  1. *Percent Emission Reduction Target (no further recommendation)*

     This target is typically defined as a percent reduction target that is based on consistency with AB 32, as it was based on the same numeric reductions calculated in the Scoping Plan to reach 1990 levels by 2020.

  2. *Early Implementation of Applicable AB 32 Scoping Plan Measures (incorporated into option 3, below)*

  3. *SCAQMD Efficiency Target*

     This efficiency metric per service population threshold was developed based on the statewide 1990 GHG emissions estimates for transportation, electric power generation, commercial and residential land uses, and recycling and waste and divided by the projected statewide growth for 2020. For option 3, there are targets for 2020 and 2035.

The proposed 2020 target is:

- 4.8 tonnes per year of CO_2e per service population for project level threshold (land use employment only).
- 6.6 tonnes/year CO_2e per service population for plan level threshold.

The proposed 2035 target is:

- 3.0 tonnes/year CO_2e per service population for project level threshold.
- 4.1 tonnes/year CO_2e per service population for plan level threshold.
- Incorporate Sustainable Communities and Climate Protection Act of 2008 or SB 375 regional targets.

- **Tier 5:** Off-site mitigation for life of project (30 years); if this threshold is to be used, however, GHG emissions must be mitigated to less than the Tier 3 screening significance threshold.

  SCAQMD staff clarified that offsets should have a 30-year project life, should be real, quantifiable, verifiable, and surplus and will be considered in the following prioritized manner:

  - Project design feature/on-site reduction measures.
  - Off site within neighborhood.
  - Off site within district.
  - Off site within state.
  - Off site out of state.
  - Substitution allowed via enforceable commitment (e.g., when an offset project ends prematurely).

If the proposed project cannot meet any of the Tiers, it is presumed to result in a significant impact for purposes of GHG emissions.

The Working Group has not convened since the fall of 2010. As of April 2014, the proposal has not been considered or approved for use by the SCAQMD Board. In the meantime, no GHG significance thresholds are approved for use in the Basin.

COUNTY OF ORANGE

There are no County of Orange policies or regulations adopted specifically for the reduction of GHG emissions.

4.3.3 METHODOLOGY

As described in Section 4.3.2, in the Scoping Plan, CARB determined that achieving the 1990 emission level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent in the absence of new laws and regulations (referred to as "Business-As-Usual" ["BAU"] or "No Action Taken"). This analysis includes comparisons of the existing GHG emissions to the GHG emissions of the Proposed Project and each alternative using a BAU or No Action Taken ("NAT") approach in terms of design, methodology, and technology. For this comparative analysis, both the proposed and NAT scenarios are calculated for the year 2020, consistent with the Scoping Plan target.

PROPOSED PROJECT AND ALTERNATIVES

This analysis evaluates the potential GHG-related impacts of the Proposed Project, Alternatives A, B and C, and the No Project Alternative. The GHG emissions are calculated for the three phases (i.e., Phase 1: 2016–2020; Phase 2: 2021–2025; Phase 3: 2026–2030).

Where not otherwise specified, emissions for the alternatives were based on the same data and same models as used for the Proposed Project analysis. For aircraft, EDMS was used to calculate emissions based on alternative-specific aircraft estimates. Since the basis for other sources of emissions was similar to the Proposed Project, the Million Annual Passengers ("MAP") level for each alternative was used to estimate emissions for the stationary sources, utilities, and parking. The number of average daily departures ("ADD") for each alternative was used to estimate emissions for ground support equipment ("GSE") and JWA vehicles and equipment sources. The trip generation data was used to estimate emissions for traffic.

EMISSIONS MODELS

Emissions Dispersion and Modeling System

The Emissions Dispersion and Modeling System ("EDMS") 5.1.4 was used to quantify GHG emissions from aircraft. EDMS is a combined emissions and dispersion model for assessing GHG impacts at civilian airports and military air bases that was developed by the FAA in cooperation with the United States Air Force ("USAF").

EDMS performs two primary functions: (1) it generates emissions inventories and (2) it performs dispersion analyses. EDMS calculates CO_2 emissions for aircraft based on aircraft engine performance, times in mode, and landing takeoff counts ("LTOs") by engine type for each inventory. EDMS incorporates both USEPA-approved emissions inventory methodologies and dispersion models to ensure that analyses performed with the application conform to USEPA guidelines.

California Emission Estimator Model™

The California Emissions Estimator Model ("CalEEMod") Version 2013.2.2 was used to quantify the GHG emissions for Project-related traffic, water and solid waste. CalEEMod calculates GHG emissions for projects located in California and was developed under the auspices of the SCAQMD upon receiving input from other California air districts.

CalEEMod utilizes widely accepted models for emissions estimates combined with appropriate default data that can be used if site-specific information is not available. For example, CalEEMod incorporates the USEPA-developed emission factors; CARB's on-road and off-road equipment emission models (EMFAC and OFFROAD); and studies commissioned by California agencies, such as the California Energy Commission ("CEC") and CalRecycle. (EMFAC is an emissions factor model used to calculate emissions rates from on-road vehicles, such as passenger vehicles and haul trucks. OFFROAD is an emissions factor model used to calculate emission rates from off-road mobile sources, such as construction equipment and agricultural equipment.)

As for the CalEEMod default values and existing regulation methodologies, the program is set to be customized for use in each specific local air district region. The GHG emissions analysis provided in this EIR used default factors for Orange County, unless otherwise noted in the methodology descriptions below.

PROJECT GREENHOUSE GAS EMISSIONS SOURCES

Aircraft

Aircraft operational emissions are based on Project-specific projections of aircraft landings and takeoffs, and are modeled using EDMS. The aircraft data included 44 potential aircraft types (as summarized in Appendix E, Table 4.6-1, which identifies the aircraft classifications and engine types included in the inventories). Emission factors for each aircraft type are EDMS defaults.

Note that the analysis conservatively assumes the continuation of the existing fleet mix for the entire term of the Project. Given the length of this planning timeframe (i.e., through 2030), it is reasonable to assume that there will be some fleet turnover and interest in introducing newer and next generation aircraft, which are anticipated to be more fuel efficient and produce less GHG emissions. However, because of the uncertainty regarding the specifics of the emission benefits attributable to the next generation of aircraft, and the uncertainty regarding the timing of the introduction of those aircraft into the commercial market, the assumption of no improvement in the fleet's GHG emission characteristics has been made to evaluate the maximum environmental impact.

Additional inputs to the EDMS model included:

- LTO estimates for commercial aviation and general aviation aircraft (see Appendix E, Table 4.6-2);
- EDMS default times-in-mode for approach, takeoff, and climb out, which vary by aircraft (see Appendix E, Table 4.6-3); and
- Taxi time, based on data estimated for JWA (see Appendix E, Table 4.6-4).

Aircraft GHG emissions for the Baseline (2013), Proposed Project, and Alternatives A, B, and C are provided in the *Greenhouse Gas Technical Report*, (Appendix E, Table 4.6-5). The No Project Alternative has the same activity as the Proposed Project, Phase 1. Thus, emissions for No Project Alternative are equal to the Proposed Project Phase 1 emissions.

The CARB 2020 NAT scenario conservatively assumes the same aircraft-related emissions. While the USEPA has adopted standards regarding NOx emission standards from aircraft and the United States has an Aviation Greenhouse Gas Emissions Reduction Plan, a quantitative method

to estimate the potential GHG reductions from these commitments is not available. Thus, this analysis conservatively assumes no difference in aircraft emissions between the Project and CARB 2020 NAT scenario.

Ground Support Equipment

GSE includes air conditioners, air starts, aircraft tractors, baggage tractors, belt loaders, cabin service trucks, cargo loaders, catering trucks, forklifts, fuel trucks, hydrant trucks, lavatory trucks, service trucks, and water service equipment. EDMS does not estimate GHG emissions for GSE; however, EDMS does contain default aircraft GSE assignments for fuel type, operating time, horsepower and load factor, which are presented in Appendix E (see Table 4.6-6). These data were used to determine overall GSE usage for JWA per year. JWA fuel use records also were used to determine baseline fuel usage.

Fuel usage for the Project was estimated by scaling based on changes in ADD and by incorporating the JWA commitment to increase the percentage of electrified GSE from baseline conditions by 15 percent for Phase 1; by 35 percent for Phase 2; and by 50 percent for Phase 3. This commitment is mitigation measure AQ/GHG-7(i). Gasoline and diesel emission factors are from USEPA sources (see Appendix E, Table 4.6-7). Baseline and Project fuel usage and electrification are shown in the *Greenhouse Gas Technical Report*, (Appendix E, Table 4.6-7), which also shows the calculated GSE GHG emissions.

The CARB 2020 NAT scenario assumes the same commitment to increase electrification of GSE since JWA previously committed to electrifying GSE prior to the enactment of AB 32. Thus, this analysis conservatively assumes no difference in GSE emissions between the Project and the CARB 2020 NAT scenario.

Mobile Sources

The emissions inventory includes three types of mobile sources: vehicles in the JWA parking lots and structures; passenger-related terminal and off-site traffic; and JWA-owned vehicles and equipment.

Parking Lots

GHG emissions for parking lot activity were calculated in accordance with the methodology outlined in the EDMS. The related inputs included idling time, distance traveled (based on size of parking lot), and total number of vehicles entering and exiting per hour of day. Idling and speed assumptions are estimates specific to JWA, and parking lot volumes for existing traffic were provided in the Project's traffic analysis (see Appendix G). The parking lot traffic includes employee and delivery vehicles, including aircraft fuel tank truck deliveries.

Parking lot activity for each phase was estimated by scaling the ratio of the MAP for each Phase to the Baseline MAP. It also was assumed that the Parking Structure C2 extension would be completed by the beginning of Phase 1 of the Project.[2] Emission factors are from EMFAC 2011. For the Project, the emission factors include the emissions reductions that will result from the

[2] Parking Structure C was an improvement addressed in Final Supplemental EIR 582, certified in October 2004. JWA is planning to construct Phase 2 of Parking Structure C ("C2"), which would add 1,381 parking spaces by 2016. The first phase of Parking Structure C was completed with the new Terminal C in November 2011. The Phase 2 project will begin in 2015 and will be completed in 2016. Currently, documents are being prepared so that a design-build contract can be awarded by summer 2014.

implementation of the Pavley light-duty vehicle regulations and the LCFS and conservatively does not include emissions reductions that will result from the ACC program. The Pavley and LCFS reductions are not included in the CARB 2020 NAT emissions calculations.

Input data, including vehicle trips and trip distance by parking area, emission factors, and emission totals are provided in the *Greenhouse Gas Technical Report*, (Appendix E) for the Proposed Project scenario (Table 4.6-8a) and for the NAT scenario (in Table 4.6-8b).

Terminal Traffic

GHG emissions from terminal traffic, including off-site traffic, were calculated from trip generation rates and average trip lengths provided in Fehr & Peers' *John Wayne Airport Transportation Impact Analysis Draft Report* (Traffic Technical Report), which is Appendix G of this EIR. CalEEMod emission factors, which include emissions reductions associated with Pavley and LCFS regulations, were used to estimate Proposed Project GHG emissions for each Phase years (2016-2020, 2021-2025, and 2026-2030). Fleet mix and emission factor data, as well as Baseline and Project terminal traffic vehicle trips and GHG emissions, are provided in the *Greenhouse Gas Technical Report*, (Appendix E, see Table 4.6-9a).

The Project 2020 analysis includes the benefit of emissions reductions from the Pavley and LCFS regulations and also includes reductions anticipated from ACC regulations. The emission factors were adjusted for the ACC regulation based on the CARB's LEV III database model ("LEV3 Tool"), which was used to estimate the statewide ACC emissions reduction factors for 2020. (Terminal traffic Phase 1, Phase 2, and Phase 3 emissions of the Proposed Project and alternative scenarios conservatively do not account for emission reductions due to ACC because ACC emission factors have only been estimated for the year 2020.)

The CARB 2020 NAT terminal traffic GHG emission calculations do not include the Pavley, LCFS, or ACC regulations. Fleet mix and emission factor data for the 2020 scenarios, as well as the Baseline, Project 2020, and NAT 2020 terminal traffic vehicle trips and GHG emissions, are provided in the *Greenhouse Gas Technical Report*, (Appendix E, see Table 4.6-9b).

John Wayne Airport Vehicles and Equipment

Vehicles associated with the Airport's day-to-day operations include landside and airside vehicles owned and operated by the Airport and by third parties, such as on-site maintenance trucks, shuttle services, employee and passenger transportation, taxis, and off-road equipment not included in GSE above. The estimated emissions are based on site-specific data, including a list of equipment/vehicles, horsepower or model year, annual mileage/operating hours, fuel type, and fuel consumption totals. GHG emissions from JWA-owned vehicles and equipment were calculated utilizing site-specific fuel usage information and USEPA-published emission factors as shown in Appendix E (see Table 4.6-10). The Baseline and Project JWA vehicle and equipment GHG emissions are shown in Appendix E, Table 4.6-10.

Purchased Electricity

JWA uses electricity from two sources: the on-site natural gas fueled cogeneration facility ("CoGen") and purchased electrical power supplied by Southern California Edison ("SCE"). Estimates of current electrical use are based on site-specific data. Electrical demand is comprised of two elements: (1) uses that would not vary with implementation of the Proposed Project or

alternatives and (2) uses that would vary with implementation of the Proposed Project or alternatives. Estimates of the electrical use that would vary with implementation of the Proposed Project or alternatives were developed from a base load requirement at night (when there are no passengers) plus a daytime load requirement assumed to be proportional to the number of passengers. The variable demand was calculated for the Proposed Project and alternatives.

The generation of purchased electricity off site results in indirect GHG emissions. The amount of GHG emissions per unit of electricity—called the "GHG intensity"—is derived from the composition of the electrical suppliers' generation sources, which may include coal, oil, natural gas, nuclear, and renewable sources (e.g., solar and wind). As described in Section 4.3.2, retail sellers of electric services are required to provide at least 33 percent of their power from renewable energy resources by 2020. Therefore, project emissions were calculated using a Southern California Edison ("SCE") emission factor that accounts for the 33 percent RPS required by 2020.

Estimated GHG emissions resulting from purchased electricity for the Baseline and Project are provided in Appendix E (see Table 4.6-16a). While the amount of purchased electricity would be constant through all three phases of the Project, the GHG emissions would be reduced beginning in Phase 2 because of the increased renewable energy sources in the SCE inventory.

The CARB 2020 NAT scenario does not include the 33 percent RPS in the SCE emission factor consistent with the CARB AB 32 Scoping Plan. All other assumptions of electricity demand are the same for the CARB 2020 NAT scenario. Baseline, Project 2020, and NAT 2020 purchased electricity GHG emissions are provided in Appendix E (see Table 4.6-16b).

Stationary Sources

GHG emissions from JWA stationary source equipment were estimated for two categories. The first category includes sources such as boilers, space heaters, and engines for emergency generators. Baseline GHG emissions estimates are based on site-specific fuel usage information and USEPA-published emission factors as shown in Appendix E (see Table 4.6-11). Project GHG emissions are scaled from the baseline based on the anticipated increase in Class A ADDs for each Phase. Baseline and Project stationary source GHG emissions are shown in Appendix E (see Table 4.6-11).

The second category of stationary sources is the CoGen facility, which is a primary source of electricity at the Airport terminal. The CoGen facility is fueled by natural gas, and thus it generates direct GHG emissions. The CoGen facility's operating parameters and annual electrical energy use estimates are provided in Appendix E (see Table 4.6-12). The increased demand for electricity as described above was the basis to estimate CoGen emissions. Electrical use is comprised of two elements: (1) uses that would not vary with implementation of the Proposed Project or alternatives and (2) uses that would vary implementation of the Proposed Project or alternatives.

Estimates of the electrical use that would vary with implementation of the Proposed Project or alternatives were developed from a base requirement at nighttime (when there are no passengers) plus a daytime requirement assumed to be proportional to the number of passengers. The total electrical demand for the Proposed Project and alternatives was calculated with the daytime demand for each scenario scaled in proportion to the scenario MAP. For scenarios where the demand exceeds the CoGen facility's capacity, additional electricity would

be purchased. Estimated CoGen facility GHG emissions for the Baseline and Project are shown in Appendix E (see Table 4.6-13).

The CARB 2020 NAT scenario assumes the same commitment to operate the CoGen as the Project since JWA committed to operating the CoGen prior to the enactment of AB 32. Thus, this analysis conservatively assumes no difference in CoGen and stationary source emissions between the Project and CARB 2020 NAT scenario.

Water Supply, Treatment, and Distribution

Indirect GHG emissions result from the production of electricity used to convey, treat, and distribute water and wastewater. The amount of electricity required to convey, treat, and distribute water depends on the volume of water and the sources of the water. Additionally, direct emissions from wastewater treatment include CH_4 and N_2O, which are GHGs.

Water demand values were estimated based on site-specific data for the Baseline conditions and scaled based on MAP for the Project. Calculations include CalEEMod default assumptions for average embodied energy for distribution and treatment of water in Southern California. The calculations also include the RPS assumptions for electricity. Estimated GHG emissions resulting from water use and wastewater treatment for the Baseline and Project are shown in Appendix E (see Table 4.6-17a).

The CARB 2020 NAT scenario assumed the same water usage as the Project, which is a conservative assumption given the State's increasing efforts to enhance water efficiency and reduce water demand. Consistent with the CARB 2020 NAT scenario, GHG emissions related to the water and wastewater conveyance were based on the utility emission factors assuming that the 33 percent RPS requirement did not exist. All other assumptions regarding water supply and wastewater treatment for the Project 2020 and NAT 2020 scenarios were the same as for the Project. Baseline, Project 2020, and NAT 2020 water supply and treatment GHG emissions are shown in Appendix E (see Table 4.6-17b).

Solid Waste

Municipal solid waste ("MSW") is the amount of material that is disposed of by landfilling, recycling, or composting. CalEEMod calculates the indirect GHG emissions associated with waste that is disposed of at a landfill in quantities that are based upon land use type according to waste disposal studies conducted by CalRecycle.

Solid waste quantities were estimated based on site-specific data for the Baseline conditions and scaled based on MAP for the Project. The analysis assumes that additional waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting to meet the statewide goal of 75 percent waste diversion. The remainder of the waste not diverted is assumed to be disposed of at a landfill. GHG emissions associated with non-landfill diverted waste streams are not considered because it is generally assumed that these diversions do not result in any appreciable amounts of GHG emissions when operated effectively. Estimated GHG emissions resulting from solid waste disposal for the Baseline and Project are shown in Appendix E (see Table 4.6-18a).

The CARB 2020 NAT scenario assumes a solid waste diversion from the landfills consistent with what was occurring prior to the passing of AB 32. This was assumed as 41 percent, the waste

diversion rate reported for the year 2006. Project 2020 and NAT 2020 solid waste GHG emissions are shown in Appendix E (see Table 4.6-18b).

4.3.4 EXISTING CONDITIONS

BASELINE GREENHOUSE GAS EMISSIONS

Baseline GHG emissions were calculated using the methodologies described in Section 4.3.3, using actual data when available and are shown in Table 4.3-1. The baseline inventory incorporated data for actual airport operations including aircraft, vehicle, equipment, fuel use, utility usage from July 2012 through June 2013. As shown in Table 4.3-1, GHG emissions for baseline/existing conditions were estimated to be 217,162 $MTCO_2e$/year. These emissions are approximately 0.05 percent of the approximate 448 million tonnes of CO_2e emitted in California in 2011 and approximately 6.6 percent of the GHG emissions attributed to intrastate aviation.

TABLE 4.3-1
BASELINE/EXISTING CONDITIONS GHG EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)
Utilities		
Natural Gas (Non-CoGen)		248
Electricity (Non-CoGen, Terminal)		838
Electricity (Non-CoGen, Non-Terminal)		630
Water		7
Waste		597
Stationary Sources		
CoGen	Natural gas	18,722
Other Stationary Sources	Gasoline	0.2
	Diesel	36
Mobile Sources		
Traffic		94,312
Parking lots		2,831
Airside	Gasoline	297
	Diesel	81
GSE and Aircraft		
GSE	Gasoline	306
	Diesel	641
Aircraft		97,616
Total Annual Emissions		**217,162**

$MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground service equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.4-1, Environ 2014.

EXISTING EMISSIONS REDUCTION STRATEGIES

The Airport Cooperative Research Program's ("ACRP") Report 56, *Handbook for Considering Practical Greenhouse Gas Emission Reduction Strategies for Airports* is a handbook and decision support tool that assists airport operators in identifying, evaluating, prioritizing, and implementing practical, low-cost strategies to reduce and manage greenhouse gas (GHG) emissions. The ACRP report identifies strategies in 12 categories. Many of these strategies are currently implemented at JWA, as shown in Table 4.1-6 in Section 4.1, Air Quality. Strategies determined to be inapplicable and/or infeasible for JWA are listed in Table A-2 of Appendix E, the GHG Technical Report; the table includes explanations of inapplicability and/or infeasibility.

4.3.5 THRESHOLDS OF SIGNIFICANCE

To preface, there are no widely established or readily accepted thresholds of significance for GHG emissions for airport-related projects. Additionally, a quantitative threshold of significance for GHG emissions was not identified in the amendments to the State CEQA Guidelines that became effective in March 2010. Rather, these amendments affirmed the discretion of lead agencies to establish their own significance thresholds, provided such thresholds are supported by substantial evidence.

Specifically, Section 15064.4 of the State CEQA Guidelines discusses the significance evaluation for GHG emissions. Section 15064.4(a) recognizes that the "determination of the significance calls for a careful judgment" by the lead agency that is coupled with lead agency discretion to determine whether to (1) use a model or methodology, and/or (2) rely on a qualitative analysis or performance-based thresholds. Section 15064.4(b) further states that a lead agency should consider the following, non-exclusive list of factors when assessing the significance of GHG emissions:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;

2. The extent to which project emissions exceed a threshold of significance that the lead agency determines applies to the project; and

3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

In accordance with the County's Environmental Analysis Checklist and Appendix G of the State CEQA Guidelines, the Project would result in a significant GHG emissions impact if it would:

Threshold 4.3-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (comparable to State CEQA Guidelines, Section 15064.4[b][1–2]).

Threshold 4.3-2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (comparable to State CEQA Guidelines, Section 15064.4[b][3]).

The analysis under Threshold 4.3-1 discloses the extent to which the Proposed Project and its alternatives increase GHG emission levels relative to existing GHG emission levels.

The Threshold 4.3-1 analysis also assesses the significance of the Project's GHG emissions based on consistency with AB 32 by comparing the Proposed Project's and alternatives' GHG emissions as proposed to the Proposed Project's and alternatives' emissions if the Project were built using a BAU or NAT approach in terms of design, methodology, and technology. If the difference between the Project's emissions as proposed and the Project's emissions under a CARB 2020 NAT scenario is at least the difference that has been determined by CARB as necessary to meet AB 32's goals in the Scoping Plan, then the Project can be determined to be consistent with AB 32 and thus not significant for purposes of CEQA. This analysis conservatively utilizes the original, 28.5 percent reduction from a CARB 2020 NAT scenario as identified in the 2008 Scoping Plan as the point of comparison for purposes of assessing the Project's significance under the BAU methodology, even though CARB subsequently determined that a lower reduction from BAU may be sufficient for purposes of achieving the mandates of AB 32.

Also, note that while the SCAQMD adopted a 10,000 $MTCO_2e$/yr interim CEQA GHG significance threshold for industrial stationary source projects on which it is the lead agency, this threshold is not applicable to airports because the great majority of GHG emissions associated with the airport operations are not associated with stationary sources, but rather aircraft and mobile sources. Similarly, the draft SCAQMD thresholds for residential and commercial projects are not applicable to airports.

4.3.6 IMPACT ANALYSIS

THRESHOLD EVALUATION

Threshold 4.3-1 Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Existing Conditions Analysis

This analysis discloses the extent to which the Proposed Project and its alternatives increase GHG emission levels relative to the emission levels associated with existing operations at JWA.

As shown below, reductions in non-CoGen electricity emissions are anticipated due to the increased amount of renewable generation in the SCE inventory. Reductions in GSE emissions are expected due to increased electrification of the GSE. Reductions in solid waste emissions are anticipated due to increased diversion of waste from landfills.

Proposed Project

The calculated GHG emissions for the Proposed Project are shown in Table 4.3-2, Proposed Project Greenhouse Gas Emissions. As shown in the table, Phase 1 GHG emissions would exceed existing emissions by 33,229 $MTCO_2e$/year; Phase 2 GHG emissions would exceed existing emissions by 47,661 $MTCO_2e$/year; and Phase 3 GHG emissions would exceed existing emissions by 59,774 $MTCO_2e$/year.

TABLE 4.3-2
PROPOSED PROJECT GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)		
		Phase 1	**Phase 2**	**Phase 3**
Utilities				
Natural Gas		44	71	90
Electricity (Non-CoGen)		0	-171	-171
Water		1	1	1
Waste		106	-270	-251
Stationary Sources				
CoGen	Natural gas	934	1,507	1,907
Other Stationary Sources	Gasoline	0	0	0
	Diesel	2	7	7
Mobile Sources				
Traffic		15,621	21,766	26,838
Parking lots		148	353	1,167
Airside	Gasoline	19	56	56
	Diesel	5	15	15
Aircraft and GSE				
GSE	Gasoline	-19	-41	-83
	Diesel	-39	-86	-175
Aircraft		16,405	24,453	30,373
Total Annual Emissions		**33,229**	**47,661**	**59,774**
Baseline Emissions		**217,162**	**217,162**	**217,162**
Total Project Plus Baseline Emissions		**250,391**	**264,823**	**276,936**

GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.6-19, Environ 2014.

Impact Conclusion: *The Proposed Project would result in an increase in GHG emissions as compared to the existing conditions. However, there is no scientific or regulatory consensus regarding what particular quantity of GHG emissions would result in a substantial adverse change to the physical conditions resulting in global climate change. Further, no agency with regulatory authority and expertise (such as CARB or SCAQMD) has adopted numeric GHG thresholds for airports for purposes of CEQA. Therefore, the estimated increases of GHG emissions over the existing GHG emissions are not a meaningful or reliable indicator of the Proposed Project's significance. The impact therefore is speculative on a global scale.*

Alternative A

The calculated GHG emissions for Alternative A are shown in Table 4.3-3, Alternative A Greenhouse Gas Emissions. As shown in the table, Phase 1 GHG emissions would exceed existing

emissions by 32,089 $MTCO_2e$ per year; Phase 2 GHG emissions would exceed existing emissions by 39,590 $MTCO_2e$/year and Phase 3 GHG emissions would exceed existing emissions by 63,102 $MTCO_2e$/year.

TABLE 4.3-3
ALTERNATIVE A GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)		
		Phase 1	**Phase 2**	**Phase 3**
Utilities				
Natural Gas		44	69	92
Electricity (Non-CoGen)		0	-171	-171
Water		1	1	1
Waste		106	-261	-257
Stationary Sources				
CoGen	Natural gas	981	1,609	2,119
Other Stationary Sources	Gasoline	0	0	0
	Diesel	3	8	9
Mobile Sources				
Traffic		15,463	18,283	29,015
Parking lots		148	341	1,195
Airside	Gasoline	23	71	79
	Diesel	6	19	22
Aircraft and GSE				
GSE	Gasoline	-18	-38	-48
	Diesel	-37	-79	-100
Aircraft		15,367	19,737	31,144
Total Annual Emissions		**32,089**	**39,590**	**63,102**
Baseline Emissions		**217,162**	**217,162**	**217,162**
Total Project Plus Baseline Emissions		**249,251**	**256,752**	**280,264**

GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.6-20, Environ 2014.

Impact Conclusion: *Alternative A would result in an increase in GHG emissions as compared to the existing conditions. However, there is no scientific or regulatory consensus regarding what particular quantity of GHG emissions would result in a substantial adverse change to the physical conditions resulting in global climate change. Further, no agency with regulatory authority and expertise (such as CARB or SCAQMD) has adopted numeric GHG thresholds for airports for purposes of CEQA. Therefore, the estimated increases of GHG emissions over the existing GHG emissions are not a meaningful or reliable indicator of Alternative A's significance. The impact therefore is speculative on a global scale.*

Alternative B

The calculated GHG emissions for Alternative B are shown in Table 4.3-4, Alternative B Greenhouse Gas Emissions. As shown in the table, Phase 1 GHG emissions would exceed existing emissions by 32,444 $MTCO_2e$/year; Phase 2 GHG emissions would exceed existing emissions by 67,554 $MTCO_2e$/year; and Phase 3 GHG emissions would exceed existing emissions by 101,570 $MTCO_2e$/year.

TABLE 4.3-4
ALTERNATIVE B GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)		
		Phase 1	**Phase 2**	**Phase 3**
Utilities				
Natural Gas		44	78	108
Electricity (Non-CoGen)		0	-171	-141
Water		1	1	1
Waste		106	-297	-301
Stationary Sources				
CoGen	Natural gas	981	1,683	2,240
Other Stationary Sources	Gasoline	0	0	0
	Diesel	3	8	8
Mobile Sources				
Traffic		15,498	31,563	46,888
Parking lots		148	389	1,400
Airside	Gasoline	22	65	68
	Diesel	6	18	18
Aircraft and GSE				
GSE	Gasoline	-20	-47	-86
	Diesel	-42	-99	-180
Aircraft		15,698	34,364	51,548
Total Annual Emissions		**32,444**	**67,554**	**101,570**
Baseline Emissions		**217,162**	**217,162**	**217,162**
Total Project Plus Baseline Emissions		**249,606**	**284,716**	**318,732**

GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.6-21, Environ 2014.

Impact Conclusion: *Alternative B would result in an increase in GHG emissions as compared to the existing conditions. However, there is no scientific or regulatory consensus regarding what particular quantity of GHG emissions would result in a substantial adverse change to the physical conditions resulting in global climate change. Further, no agency with regulatory authority and expertise (such as CARB or SCAQMD) has adopted numeric GHG thresholds for airports for purposes of CEQA. Therefore, the estimated increases of GHG emissions over the existing GHG emissions are not a meaningful or reliable indicator of*

Alternative B's significance. The impact therefore is speculative on a global scale.

Alternative C

The calculated GHG emissions for Alternative C are shown in Table 4.3-5, Alternative C Greenhouse Gas Emissions. As shown in the table, Phase 1 GHG emissions would exceed existing emissions by 155,731 $MTCO_2e$/year; Phase 2 GHG emissions would exceed existing emissions by 146,100 $MTCO_2e$/year; and Phase 3 GHG emissions would exceed existing emissions by 145,992 $MTCO_2e$/year.

TABLE 4.3-5
ALTERNATIVE C GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)		
		Phase 1	**Phase 2**	**Phase 3**
Utilities				
Natural Gas		69	102	122
Electricity (Non-CoGen)		416	293	293
Water		2	1	2
Waste		167	-386	-339
Stationary Sources				
CoGen	Natural gas	1,097	1,769	2,240
Other Stationary Sources	Gasoline	0	0	0
	Diesel	6	16	16
Mobile Sources				
Traffic		73,840	63,991	62,342
Parking lots		231	506	1,577
Airside	Gasoline	50	134	134
	Diesel	14	37	37
Aircraft and GSE				
GSE	Gasoline	23	64	130
	Diesel	47	134	273
Aircraft		79,769	79,441	79,166
Total Annual Emissions		**155,731**	**146,100**	**145,992**
Baseline Emissions		**217,162**	**217,162**	**217,162**
Total Project Plus Baseline Emissions		**372,893**	**363,263**	**363,154**

GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.6-22, Environ 2014.

Impact Conclusion: *Alternative C would result in an increase in GHG emissions as compared to the existing conditions. However, there is no scientific or regulatory consensus regarding what particular quantity of GHG emissions would result in a substantial adverse change to the physical conditions resulting in global climate change. Further, no agency with regulatory authority and expertise (such as CARB or SCAQMD) has adopted numeric GHG thresholds for airports*

for purposes of CEQA. Therefore, the estimated increases of GHG emissions over the existing GHG emissions are not a meaningful or reliable indicator of Alternative Cs significance. The impact therefore is speculative on a global scale.

No Project Alternative

The calculated GHG emissions for the No Project Alternative are shown in Table 4.3-6, No Project Alternative Greenhouse Gas Emissions. As shown in the table, the No Project Alternative GHG emissions would exceed existing emissions by 33,229 $MTCO_2e$/year.

TABLE 4.3-6
NO PROJECT ALTERNATIVE GREENHOUSE GAS EMISSIONS

Source		GHG emissions (MT CO_2e/year)
Utilities		
Natural Gas (Non-CoGen)		44
Electricity (Non-CoGen)		0
Water		1
Waste		106
Stationary Sources		
CoGen	Natural gas	934
	Gasoline	0
Stationary Sources	Diesel	2
Mobile Sources		
Traffic		15,621
Parking lots		148
	Gasoline	19
Airside	Diesel	5
GSE and Aircraft		
	Gasoline	-19
GSE	Diesel	-39
Aircraft		16,405
Total Annual Emissions		**33,229**
Baseline Emissions		**217,162**
Total No Project Alternative Plus Baseline Emissions		**250,391**

GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 4.6-23, Environ 2014.

Impact Conclusion: *The No Project Alternative would result in an increase in GHG emissions as compared to the existing conditions. However, there is no scientific or regulatory consensus regarding what particular quantity of GHG emissions would result in a substantial adverse change to the physical conditions*

resulting in global climate change. Further, no agency with regulatory authority and expertise (such as CARB or SCAQMD) has adopted numeric GHG thresholds for airports for purposes of CEQA. Therefore, the estimated increases of GHG emissions over the existing GHG emissions are not a meaningful or reliable indicator of the No Project Alternative's significance. The impact therefore is speculative on a global scale.

Assembly Bill 32 Analysis

In accordance with Section 15064.4(b)(2–3) of the State CEQA Guidelines, and because the existing conditions analysis provided above did not yield a significance determination or conclusion supported by sound scientific, factual or regulatory underpinnings, this analysis considers: (1) whether the Project's emissions "exceed a threshold of significance that the lead agency determines applies" and (2) "the extent to which the [P]roject complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of [GHG] emissions". In assessing the Project's significance under these two criteria, reference is made to AB 32's mandate that the State return to its 1990 levels of GHG emissions by 2020, which numerically equates to a 28.5 percent reduction in GHG emissions according to CARB's Scoping Plan.

As previously described, the analysis compares the Proposed Project's and the alternatives' emissions as proposed to the Proposed Project's and the alternatives' emissions using a BAU or NAT approach. Stated a bit differently, the analysis compares the Proposed Project's and the alternatives' GHG emissions to the emissions that would occur without the regulatory requirements that have been promulgated to comply with AB 32.

The analysis for the Proposed Project and the Alternatives addresses Phase 3 emissions. However, to be consistent with AB 32, the analysis utilizes an evaluation year of 2020. Due to the differences in the emission factors for vehicles in the EMFAC model for different years of analysis, the Proposed Project's and the alternatives' estimated vehicle-related emissions (i.e., traffic, parking lots) for the AB 32 analysis are different than for the Existing Condition analysis. The Existing Conditions analysis assumes an evaluation year of 2026, consistent with the phasing.

Proposed Project

A summary of the Proposed Project 2020 and CARB 2020 NAT (or Business as Usual) scenario assumptions is included in Table 4.3-7. The differences between the two scenarios are that the Proposed Project includes the following: Renewable Portfolio Standard for offsite electrical generation; an increased diversion of solid waste; and reduced vehicle emissions resulting from regulatory requirements for cleaner cars and low-carbon fuels. The CARB 2020 NAT scenario includes default values for these parameters, which assume levels of renewable electricity and waste diversion and vehicle emissions without improvements resulting from regulatory requirements consistent with the assumptions made by CARB for the BAU scenario in the AB 32 Scoping Plan. The estimated GHG emissions for the Proposed Project and the CARB 2020 NAT scenarios are shown in Table 4.3-8. As shown in Table 4.3-8, the GHG emissions for the Proposed Project Phase 3 2020 are estimated to be 60,673 $MTCO_2e$/year; the GHG emissions for the CARB 2020 NAT scenario are estimated to be 71,489 $MTCO_2e$/year. Therefore, the Proposed Project GHG emissions would be 15 percent less than the CARB 2020 NAT scenario.

TABLE 4.3-7
SUMMARY OF 2020 PROPOSED PROJECT AND CARB 2020 NAT SCENARIO ASSUMPTIONS

Parameter	Proposed Project Phase 3 (2020)	CARB 2020 NAT Phase 3
MAP	12.5	12.5
ADDs	95	95
EDMS Inputs		
Airport	John Wayne Airport – Orange County	
Model Year	2020	2020
GSE Electrification	50% increase in electrification	
CalEEMod Inputs		
Model Year	2020	2020
CO_2 Utility Intensity Factors	RPS included (501.88)	Default (630.89)
Solid Waste Diversion Rate	75%	41% (Baseline Conditions)
Emission Factors	EMFAC 2011 annual average total fleet CO_2 emission rates with Pavley + LCFS for Orange County adjusted for Advanced Clean Cars	EMFAC 2011 annual average total fleet CO_2 emission rates for Orange County

CARB: California Air Resources Board; NAT: No Action Taken; MAP: million annual passengers; ADDs: average daily departures; EDMS: Emissions Dispersion and Modeling System; GSE: ground support equipment; CalEEMod: California Emissions Estimator Model; CO_2: carbon dioxide; RPS: Renewable Portfolio Standards; LCFS: Low Carbon Fuel Standard.

Source: *Greenhouse Gas Technical Report,* Table 5.2-1, Environ 2014.

TABLE 4.3-8
COMPARISON OF PROPOSED PROJECT PHASE 3 2020 TO 2020 NO ACTION TAKEN GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)	
		Proposed Project Phase 3 2020 Emissions	**CARB 2020 NAT Emissions**
Utilities			
Natural Gas (Non-CoGen)		90	90
Electricity (Non-CoGen)		-171	0
Water		1	3
Waste		-251	217
Stationary Sources			
CoGen	Natural gas	1,907	1,907
Stationary Sources	Gasoline	0	0
	Diesel	7	7
Mobile Sources			
Traffic		27,483	36,270
Parking lots		1,420	2,809
Airside	Gasoline	56	56
	Diesel	15	15
GSE and Aircraft			
GSE	Gasoline	-83	-83
	Diesel	-175	-175
Aircraft		30,373	30,373
Total Annual Emissions		**60,673**	**71,489**
Reduction from the CARB 2020 NAT Scenario		**15%**	

CARB: California Air Resources Board; NAT: No Action Taken; GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment

Source: *Greenhouse Gas Technical Report,* Table 5.2-2, Environ 2014.

Impact Conclusion: *The GHG emissions for the Proposed Project would be 15 percent less than the corresponding NAT GHG emissions, but would be less than the 28.5 percent reduction identified by CARB in the 2008 Scoping Plan to ensure consistency with AB 32's requirement to achieve 1990 emission levels by 2020. The impact would be significant.*

Alternative A

The estimated GHG emissions for the Alternative A and the CARB 2020 NAT scenarios are shown in Table 4.3-9. The differences between the two scenarios are the same as described for the Proposed Project. As shown in Table 4.3-9, the GHG emissions for Alternative A Phase 3 2020 are estimated to be 64,059 $MTCO_2e$/year; the GHG emissions for the CARB 2020 NAT scenario are

estimated to be 75,633 $MTCO_2e$/year. Therefore, the Alternative A GHG emissions would be 15 percent less than the CARB 2020 NAT scenario.

TABLE 4.3-9
COMPARISON OF ALTERNATIVE A PHASE 3 2020 TO 2020 NO ACTION TAKEN GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)	
		Alternative A Phase 3 2020 Emissions	**Alternative A CARB 2020 NAT Emissions**
Utilities			
Natural Gas (Non-CoGen)		92	92
Electricity (Non-CoGen)		-171	0
Water		1	3
Waste		-257	223
Stationary Sources			
CoGen	Natural gas	2,119	2,119
Stationary Sources	Gasoline	0	0
	Diesel	9	9
Mobile Sources			
Traffic		29,713	39,213
Parking lots		1,455	2,876
Airside	Gasoline	79	79
	Diesel	22	22
Aircraft and GSE			
GSE	Gasoline	-48	-48
	Diesel	-100	-100
Aircraft		31,144	31,144
Total Annual Emissions		**64,059**	**75,633**
Reduction from the CARB 2020 NAT Scenario		**15%**	

CARB: California Air Resources Board; NAT: No Action Taken; GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment

Source: *Greenhouse Gas Technical Report,* Table 5.2-3, Environ 2014.

Impact Conclusion: *The GHG emissions for Alternative A would be 15 percent less than the corresponding NAT GHG emissions, but would be less than the 28.5 percent reduction identified by CARB in the 2008 Scoping Plan to ensure consistency with AB 32's requirement to achieve 1990 emission levels by 2020. The impact would be significant.*

Alternative B

The estimated GHG emissions for the Alternative B and the CARB 2020 NAT scenarios are shown in Table 4.3-10. The differences between the two scenarios are the same as described for the

Proposed Project. As shown in Table 4.3-10, the GHG emissions for Alternative B Phase 3 2020 are estimated to be 103,002 $MTCO_2e$/year; the GHG emissions for the CARB 2020 NAT scenario are estimated to be 120,763 $MTCO_2e$/year. Therefore, the Alternative B GHG emissions would be 15 percent less than the CARB 2020 NAT scenario.

TABLE 4.3-10
COMPARISON OF ALTERNATIVE B PHASE 3 2020 TO 2020 NO ACTION TAKEN GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)	
		Alternative B Phase 3 2020	**Alternative B CARB 2020 NAT**
Utilities			
Natural Gas (Non-CoGen)		108	108
Electricity (Non-CoGen)		-141	38
Water		1	3
Waste		-301	261
Stationary Sources			
CoGen	Natural gas	2,240	2,240
Stationary Sources	Gasoline	0	0
	Diesel	8	8
Mobile Sources			
Traffic		48,015	63,367
Parking lots		1,705	3,371
Airside	Gasoline	68	68
	Diesel	18	18
Aircraft and GSE			
GSE	Gasoline	-86	-86
	Diesel	-180	-180
Aircraft		51,548	51,548
Total Annual Emissions		**103,002**	**120,763**
Reduction from the CARB 2020 NAT Scenario		**15%**	

CARB: California Air Resources Board; NAT: No Action Taken; GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment

Source: *Greenhouse Gas Technical Report,* Table 5.2-4, Environ 2014.

Impact Conclusion: *The GHG emissions for Alternative B would be 15 percent less than the corresponding NAT GHG emissions, but would be less than the 28.5 percent reduction identified by CARB in the 2008 Scoping Plan to ensure consistency with AB 32's requirement to achieve 1990 emission levels by 2020. The impact would be significant.*

Alternative C

The estimated GHG emissions for the Alternative C and the CARB 2020 NAT scenarios are shown in Table 4.3-11. The differences between the two scenarios are the same as described for the Proposed Project. As shown in Table 4.3-11, the GHG emissions for Alternative C Phase 3 2020 are estimated to be 147,834 $MTCO_2e$/year; the GHG emissions for the CARB 2020 NAT scenario are estimated to be 171,050 $MTCO_2e$/year. Therefore, the Alternative C GHG emissions would be 14 percent less than the CARB 2020 NAT scenario.

TABLE 4.3-11
COMPARISON OF ALTERNATIVE C PHASE 3 2020 TO 2020 NO ACTION TAKEN GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)	
		Alternative C Phase 3 2020	**Alternative C CARB 2020 NAT**
Utilities			
Natural Gas (Non-CoGen)		122	122
Electricity (Non-CoGen)		293	584
Water		2	4
Waste		-339	294
Stationary Sources			
CoGen	Natural gas	2,240	2,240
Stationary Sources	Gasoline	0	0
	Diesel	16	16
Mobile Sources			
Traffic		63,841	84,253
Parking lots		1,920	3,798
Airside	Gasoline	134	134
	Diesel	37	37
Aircraft and GSE			
GSE	Gasoline	130	130
	Diesel	273	273
Aircraft		79,166	79,166
Total Annual Emissions		**147,834**	**171,050**
Reduction from the CARB 2020 NAT Scenario		**14%**	

CARB: California Air Resources Board; NAT: No Action Taken; GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 5.2-5, Environ 2014.

Impact Conclusion: *The GHG emissions for Alternative C would be 14 percent less than the corresponding NAT GHG emissions, but would be less than the 28.5 percent reduction identified by CARB in the 2008 Scoping Plan to ensure consistency with AB 32's requirement to achieve 1990 emission levels by 2020. The impact would be significant.*

No Project Alternative

The estimated GHG emissions for the No Project Alternative and the CARB 2020 NAT scenarios are shown in Table 4.3-12. The differences between the two scenarios are the same as described for the Proposed Project. As shown in Table 4.3-12, the GHG emissions for the No Project Alternative 2020 are estimated to be 43,425 $MTCO_2e$/year; the GHG emissions for the CARB 2020 NAT scenario are estimated to be 49,520 $MTCO_2e$/year. Therefore, the No Project Alternative GHG emissions would be 12 percent less than the CARB 2020 NAT scenario.

TABLE 4.3-12
COMPARISON OF THE NO PROJECT ALTERNATIVE 2020 TO 2020 NO ACTION TAKEN GREENHOUSE GAS EMISSIONS

Source		GHG Emissions ($MTCO_2e$/year)	
		No Project Alternative 2020	**No Project CARB 2020 NAT**
Utilities			
Natural Gas (Non-CoGen)		78	78
Electricity (Non-CoGen)		-171	0
Water		1	2
Waste		-217	188
Stationary Sources			
CoGen	Natural gas	1,817	1,817
Stationary Sources	Gasoline	0	0
	Diesel	6	6
Mobile Sources			
Traffic		13,506	17,824
Parking lots		1,227	2,427
Airside	Gasoline	50	50
	Diesel	14	14
Aircraft and GSE			
GSE	Gasoline	-20	-20
	Diesel	-42	-42
Aircraft		27,176	27,176
Total Annual Emissions		**43,425**	**49,520**
Reduction from the CARB 2020 NAT Scenario		**12%**	

CARB: California Air Resources Board; NAT: No Action Taken; GHG: greenhouse gas; $MTCO_2e$/year: metric tonnes carbon dioxide equivalent per year; CoGen: cogeneration facility; GSE: ground support equipment.

Source: *Greenhouse Gas Technical Report,* Table 5.2-6, Environ 2014.

Impact Conclusion: *The GHG emissions for the No Project Alternative would be 12 percent less than the corresponding NAT GHG emissions, but would be less than the 28.5 percent reduction identified by CARB in the 2008 Scoping Plan to ensure*

consistency with AB 32's requirement to achieve 1990 emission levels by 2020. The impact would be significant.

Threshold 4.3-2 Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Proposed Project and All Alternatives

Executive Order S-3-05 and AB 32 are the primary State policies adopted for the purpose of reducing GHG emissions. Statewide regulations adopted in furtherance of those State policies, such as GHG emissions standards for vehicles, the LCFS, and increasingly more efficient Title 24 building requirements and green building standards, are being implemented at the statewide level. In addition to establishing targets for GHG emission reductions for 2010 and 2020, which have been the primary focus of AB 32 and many other State policies, Executive Order S-3-05 establishes a target to reduce GHG emissions to 80 percent below 1990 levels by 2050.

Accounting for a population growth from 35,840,000 people in 2004 to approximately 55,000,000 people in 2050, the emissions per capita would have to be only 12 percent of what they were in 2004. Renewable power requirements, the low carbon fuel standard, and vehicle emissions standards will all decrease GHG emissions. Clearly, energy efficiency and reduced vehicle miles traveled will play important roles in achieving this aggressive goal, but the decarbonization of fuel will also be necessary.

The California Energy Commission (CEC) published "State Alternative Fuels Plan" in which it noted the existence of "challenging but plausible ways to meet 2050 [transportation] goals." The main finding from this analysis is that reducing today's average per capita driving miles by about 5 percent (or back to 1990 levels), in addition to the decarbonization strategies listed below, would achieve S-03-05 goals of 80 percent below 1990 levels. The CEC report indicated that the following set of measures could be combined to produce this result:

- Lowering the energy needed for personal transportation by tripling the energy efficiency of on-road vehicles in 2050 with:
    a. Conventional gas, diesel, and flexible fuel vehicles (FFVs) averaging more than 40 miles per gallon (mpg).
    b. Hybrid gas, diesel, and FFVs averaging almost 60 miles per gallon.
    c. All electric and plug-in hybrid electric vehicles (PHEVs) averaging well over 100 miles per gallon (on a gallons of gasoline equivalents (GGE) basis) on the electricity cycle.
    d. Fuel cell vehicles (FCVs) averaging over 80 miles per gallon (on a GGE basis).
- Moderating growth in per capita driving, reducing today's average per capita driving miles by about 5 percent or back to 1990 levels.
- Changing the energy sources for transportation fuels from the current 96 percent petroleum-based to approximately:
    a. 30 percent from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.

b. 30 percent from transportation biofuels.

c. 40 percent from a mix of electricity and hydrogen.

- Producing transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result in, on average, at least 80 percent lower life cycle GHG emissions than conventional fuels.
- Encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

Studies have shown that in order to meet the 2050 target, aggressive technologies in the transportation and energy sectors, such as electrification and maturation of technologies still in development, such as advanced batteries and more efficient biofuels will be required. Another study indicates that even with these emerging technologies, the 2050 goal will not be met, due to the population growth to 55 million by 2050. More technologies and policy development is needed to achieve the 2050 target.

Due to the wholesale shifts in energy technology required and more aggressive regulations needed both of which are not currently in place, analyzing a project's impacts relative to the 2050 target is speculative for purposes of CEQA.

The County of Orange has not yet adopted a Climate Action Plan, and no regulatory agency with GHG expertise and jurisdiction (e.g., CARB or SCAQMD) has adopted GHG limits or requirements applicable to the airport sector. Thus, the Project would not conflict with State, regional, or local plans, policies, or regulations adopted for the purpose of reducing GHGs.

Impact Conclusion: *Neither the Proposed Project nor any of the alternatives would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases. There would be a less than significant impact.*

4.3.7 MITIGATION PROGRAM

As discussed in the Threshold 4.3-1 AB 32 analysis, the Proposed Project's GHG emissions would result in a significant environmental impact. As discussed in Section 4.3.4, the ACRP's Report 56, *Handbook for Considering Practical Greenhouse Gas Emission Reduction Strategies for Airports* provides an inventory of practical, low-cost strategies to reduce and manage GHG emissions. Strategies currently implemented at JWA are shown in Section 4.1, Table 4.1-6. Another group of strategies was determined to be inapplicable and/or infeasible for JWA. These strategies are listed in Table A-2 of Appendix E, the GHG Technical Report; the table includes explanations of inapplicability and/or infeasibility.

The County of Orange has identified additional, feasible mitigation measures that would be implemented by JWA in order to mitigate the Project's GHG-related impacts were identified. Of the 15 mitigation measures identified, only the GHG emissions reduction attributable to the GSE electrification mitigation measure, AQ/GHG-5(i) was quantified in this impact analysis. This limited quantification is conservative and appropriate in light of the uncertainty regarding the specific emission reduction benefits attributable to many of the mitigation measures. Further, because of the County of Orange's inability to directly regulate or improve tailpipe emissions from aircraft and other mobile sources, which are subject to federal and State regulations, even

with adoption and implementation of these mitigation measures, GHG-related impacts would be significant and unavoidable. (Note: for each mitigation measure's corresponding ACRP Strategy, please see Table 1.1-1 of Appendix E).

AQ/GHG-1 Upon Project approval, the County of Orange shall support single/reduced engine taxiing procedures authorized by the Federal Aviation Administration ("FAA") that achieve corresponding benefits in air quality and/or greenhouse gas ("GHG") emission reductions and do not result in adverse noise impacts.

AQ/GHG-2 Upon Project approval, the County of Orange shall support the efforts of the airport industry—including those of the FAA, commercial air carriers, and aircraft manufacturers —to develop air quality and Greenhouse Gas ("GHG") emission benchmarking databases that improve the understanding of the relative efficiencies of aviation operations by actively participating in aviation community networks and participating in the biannual Airports Council International – North America ("ACI-NA") Environmental Benchmark Survey.

AQ/GHG-3 Upon Project approval, the County of Orange shall continue to evaluate the effects of future Airport-related improvement projects cognizant of and informed by the resulting air quality and GHG emissions in accordance with the requirements of the California Environmental Quality Act ("CEQA").

AQ/GHG-4 By January 1, 2018, the County of Orange shall develop and adopt a Climate Action Plan for greenhouse gas emissions sources at the Airport under the County's control. The Climate Action Plan shall be consistent with the requirements of the Global Warming Solutions Act of 2006 ("AB 32") and the goals of Executive Order S-3-05.

In order to secure greenhouse gas emission reductions from sources under the County's control, the Climate Action Plan shall identify one or more of the following greenhouse gas reduction strategies, or combination thereof.

i. Maximizing the energy efficiency of existing Airport structures and facilities through retrofitting and redevelopment at the conclusion and/or expiration of their useful life;

ii. Tracking energy use at intervals no less than every 12 months in order to allow for the efficient optimization of energy use;

iii. Utilizing energy-efficient (light-emitting diode ["LED"] or equivalent) lighting on the airfield, within terminal buildings, and in connection with surface and parking lot security lighting;

iv. Installing window awnings, sunshades, or window tinting in appropriate areas;

v. Providing a minimum of 60 electric car charging stations consistent with AQ/GHG-11 below;

vi. Increasing the purchase and use of renewable energy;

vii. Requiring third parties, concurrent with the execution of new, renewed or amended lease or contractual agreements, to meet the

more stringent energy efficiency requirements required in AQ/GHG-5 below;

viii. Continuing to maximize use of hybrid or alternatively fueled on-site equipment, including equipment fueled by Clean Natural Gas ("CNG"), Liquified Natural Gas ("LNG"), or Biodiesel;

ix. Installing light colored "cool" roofs and cool pavements in any new development subsequently proposed at the Airport;

x. Purchasing carbon offset credits through an adopted program such as the California Air Pollution Control Officer's Association ("CAPCOA's") Greenhouse Gas Reduction Exchange ("Rx") Registry, of which the the South Coast Air Quality Management District ("SCAQMD") is a participating air district (www.ghgrx.org);

xi. Increasing solid waste reduction and recycling in accordance with AQ/GHG-10 below; and/or

xii. Collaborating with commercial air carriers to reduce ground-based aircraft engine greenhouse gas emissions through single engine taxiing ("SET") for purposes of taxi-in and taxi-out between the runway ends and terminal areas to the extent feasible and without compromising passenger safety and aircraft engine operational considerations.

The above list of greenhouse gas reduction strategies is non-exclusive and can be supplemented by any additional strategies subsequently identified by the County of Orange.

In order to ensure progress in implementation of the Climate Action Plan and its reduction objectives, the County of Orange shall conduct annual greenhouse gas emission inventories for all stationary sources and other sources over which JWA has control.

AQ/GHG-5 Upon Project approval, the County of Orange shall specify energy efficiency requirements and goals for equipment and appliances in contractual agreements, as applicable. At a minimum:

i. Concurrent with the execution of lease agreements, amendments, and/or renewals with commercial air carriers, the County of Orange shall set a Ground Support Equipment electrification requirement of a 15 percent increase above baseline by 2016, 35 percent above baseline by 2021, and 50 percent increase above baseline by 2026. (The baseline electrification conditions are established by reference to calendar year 2013.)

ii. Concurrent with the execution of lease agreements, amendments, and/or renewals with all applicable Airport tenants, the County of Orange shall require that any new equipment or appliances purchased by the tenant for the provision of services under its contract with JWA shall be ENERGY STAR rated or equivalent, to the extent such

equipment and appliances are commercially and technologically available.

iii. Concurrent with the execution of lease agreements, amendments, and/or renewals with all applicable Airport tenants, the County of Orange shall require that all tenants develop, implement and submit to the Airport—within six months of lease execution—a fleet-wide, anti-idling policy. At a minimum, the anti-idling policy shall include the requirement that vehicle engines shall be turned off when vehicles are not occupied, and that occupied vehicles be turned off after no more than a five-minute idling period.

AQ/GHG-6 Upon Project approval, the County of Orange shall install energy efficient equipment and controls for equipment being replaced as technologically available.

AQ/GHG-7 Upon Project approval, the County of Orange shall install variable speed drives and optimize the control of air handling unit pumps for equipment being replaced as technologically available.

AQ/GHG-8 Upon Project approval, and as technologically available, the County of Orange shall install energy efficient elevators and escalators as the existing ones require replacement.

AQ/GHG-9 By 2016, the County of Orange shall optimize the energy efficiency and control of the conveyor motors in the baggage handling system by adding more "photo eyes" to track bags and reduce the time that the system runs after a bag has gone through from 20 minutes to 10 minutes. The County of Orange also will replace the older electric conveyor drive motors in Terminals A and B with new, more efficient ones capable of variable frequency by 2016.

AQ/GHG-10 By 2016, the County of Orange shall develop an Integrated Solid Waste Management Plan ("ISWMP") that strives to achieve the policy goal of the State of California—set forth in Section 41780.01 of the *California Public Resources Code*—that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020, and annually thereafter. In furtherance of the State's policy goal, the ISWMP shall evaluate further improvements to the Airport's existing solid waste diversion rate through enhanced recycling and composting opportunities.

AQ/GHG-11 By 2016, the County of Orange shall install electric vehicle chargers in public parking structures A1, A2, B2 and C, the Main Street parking lot, and the employee parking lots. Chargers will be located close to the terminals to give preference to the electric vehicle users. By 2021, the County of Orange shall also provide preferential parking for vehicles powered by compressed natural gas and other low emission sources.

JWA's parking program ("PARCS") will be used to track the demand/use of the low emission vehicle spaces/chargers, and the County of Orange will re-evaluate the percentage/quantity of spaces required every two years. the

County of Orange will optimize the efficiency of the parking program and adjust it according to future demands for electric chargers and the other types of low-emission vehicles driven by the public.

AQ/GHG-12 Upon Project approval, the County of Orange shall support the expansion of public transit opportunities to the Airport by coordinating with the Orange County Transportation Association ("OCTA"), Irvine iShuttle, and MetroLink upon the request of the transit providers. Additionally, the County of Orange will continue to make available—on the Airport's website—current information about public transit options that can be utilized to access the Airport.

AQ/GHG-13 Upon Project approval, the County of Orange shall support bicycle use by Airport employees and the air traveling public by providing convenient, secure bicycle racks for use on the Airport's premises.

AQ/GHG-14 Upon Project approval, the County of Orange shall continue to support the use of alternatively fueled taxis and shuttles through the Request for Proposal process and in the contractual agreements (all taxis are currently CNG). JWA also shall support the use of alternatively fueled rental vehicles by providing electricity for chargers where practicable by 2020.

AQ/GHG-15 Upon Project approval, the County of Orange shall support the efforts of commercial air carriers to utilize paperless ticket technology by upgrading the current kiosks and Common Use Passenger Processing System ("CUPPS") system with new, more efficient technology as it becomes commercially available.

4.3.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Even with implementation of the mitigation measures identified above, impacts from the GHG emissions for the Proposed Project, Alternatives A, B, and C, and the No Project Alternative, would be significant and unavoidable.

Table 4.3-13 provides a summary of the findings of significance after implementation of the mitigation measures for each threshold for each alternative.

TABLE 4.3-13
SUMMARY OF GREENHOUSE GAS EMISSIONS IMPACTS

Threshold	Proposed Project	Alternative A	Alternative B	Alternative C	No Project Alternative
Threshold 4.3-1	**Existing Conditions** Speculative **AB 32 Analysis** Significant and unavoidable impact	**Existing Conditions** Speculative **AB 32 Analysis** Significant and unavoidable impact	**Existing Conditions** Speculative **AB 32 Analysis** Significant and unavoidable impact	**Existing Conditions** Speculative **AB 32 Analysis** Significant and unavoidable impact	**Existing Conditions** Speculative **AB 32 Analysis** Significant and unavoidable impact
Threshold 4.3-2	Less than significant impact	Less than significant impact	Less than significant impact	Less than significant impact	Less than significant impact

4.3.9 REFERENCES

Environ International Corporation. 2014 (April). *John Wayne Airport Settlement Agreement Amendment Greenhouse Gas Technical Report.* Irvine, CA: Environ (Appendix E).

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