4.6 GLOBAL CLIMATE CHANGE

This section evaluates potential greenhouse gas (GHG) emissions impacts on global climate change associated with the proposed Belmont Pool Revitalization Project (proposed Project) and identifies mitigation measures recommended for potentially significant impacts. The following analysis is based on the GHG calculations conducted for the proposed Project that are provided in Appendix B.

Scoping Process

The City of Long Beach (City) distributed the first Notice of Preparation (NOP) for the Draft Environmental Impact Report (EIR) from April 18 to May 17, 2013. The City received three comment letters in response to the original NOP. No comments related to Greenhouse Gas emissions or Global Climate Change were received in response to the original NOP circulated for the proposed Project. Due to revisions in the Project Description, the City re-issued the NOP for the Draft EIR between April 9, 2014, and May 8, 2014. The City received five comment letters in response to the re-issued NOP during the public review period. No Greenhouse Gas emissions or Global Climate Change issues were raised in those comment letters.

4.6.1 Methodology

The recommended approach for GHG analysis included in the State of California Governor's Office of Planning and Research (OPR) June 2008 Technical Advisory is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact to below a level of significance.[1] The June 2008 Technical Advisory provides some additional direction regarding planning documents as follows:

> *"CEQA can be a more effective tool for GHG emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation…. For local government lead agencies, adoption of general plan policies and certification of general plan EIRs that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews" (June 2008 Technical Advisory, pages 7-8).*

Preliminary guidance from OPR[2] and recent letters from the Attorney General[3] critical of California Environmental Quality Act (CEQA) documents that have taken different approaches

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

2 Ibid.

3 California Department of Justice. Website: http://oag.ca.gov/environment/ceqa/letters (accessed March 2016).

indicate that Lead Agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities.

The South Coast Air Quality Management District (SCAQMD) has also issued recommendations regarding the methodology to be used to analyze greenhouse gas impacts in environmental documents prepared pursuant to the California Environmental Quality Act (CEQA). In October 2008, SCAQMD released a *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* that suggested a tiered approach to project analysis. Figure 4.6.1 illustrates the tiered approach based on both the SCAQMD and the California Air Resources Board (ARB) suggested screening thresholds, used for this analysis.

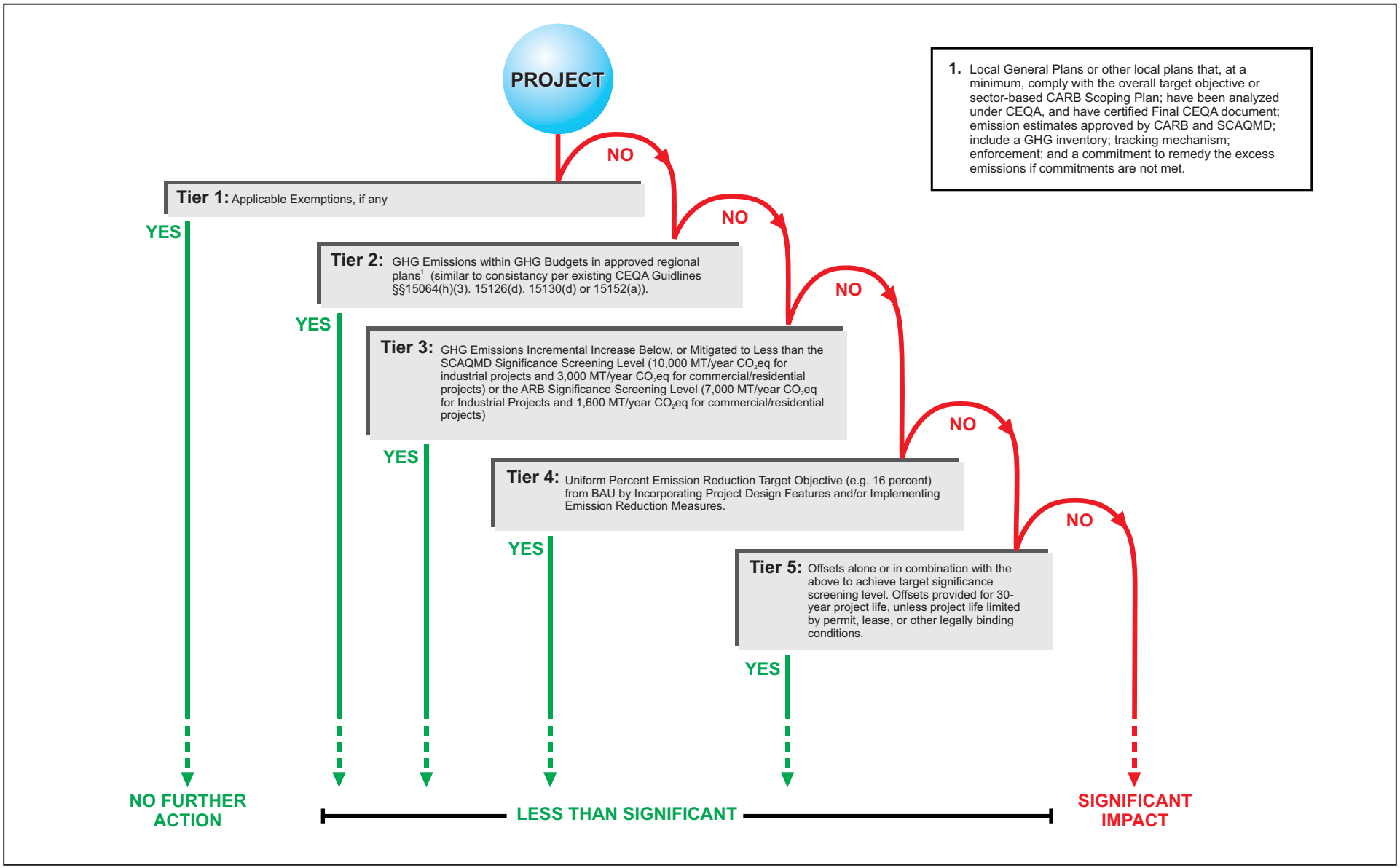
According to the tiered approach, if a project is exempt from CEQA, Tier 1 would be the most appropriate tier, and the project effects related to GHG emissions/global climate change (GCC) would be less than significant and the analysis would be complete. If the project is not exempt and there is a local GHG reduction plan in place, then Tier 2 would be the most appropriate tier. If the project is consistent with that plan, then the project effects related to GHG emissions/GCC would be less than significant and the analysis would be complete. If the project is not consistent with the plan, then the project would have a significant impact related to GHG emissions/GCC and the analysis would be complete. If there is no local GHG reduction plan, Tier 3 is used to screen smaller projects. Both the SCAQMD and the ARB screening thresholds categorize projects into two categories, "industrial" and "commercial/residential." If the project emissions are less than the applicable numerical threshold (refer to Figure 4.6.1), then the project effects related to GHG emissions/GCC would be less than significant, and the analysis would be complete. If the project exceeds the numerical threshold, then the project should be analyzed using Tier 4.

If the project emissions would meet the applicable Tier 4 performance goal, then the project would have less than significant impacts related to GHG emissions/GCC, and the analysis would be complete. If the project exceeds the Tier 4 threshold, then the project would have a significant impact related to GHG emissions/GCC and the analysis would be complete.

Tier 5 is not a threshold, but rather specifies that a project include all feasible on- and off-site measures to reduce GHG emissions, as well as financially support independent projects that have a net reduction in GHG emissions.

4.6.2 Existing Environmental Setting

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended time period. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. "Global climate change" refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer).



LSA

FIGURE 4.6.1

Belmont Pool Revitalization Project

Tiered Decision Approach to GHG Methodology and Significance Thresholds

SOURCE: Adapted from SCAQMD's Draft Guidance Document - Interim CEQA Greenhouse Gas (GHG) Significance Threshold, October 2008.

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GCC may result from natural factors (e.g., changes in the sun's intensity), natural processes within the climate system (e.g., changes in ocean circulation), or human activities (e.g., the burning of fossil fuels, land clearing, or agriculture). The primary observed effect of GCC has been a rise in the average global tropospheric[1] temperature of 0.36 degree Fahrenheit (°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, and changes in wind patterns or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Sacramento Delta.

Global surface temperatures have risen by 1.33°F ±0.32°F over the last 100 years (1906–2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[2] The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3–10.5°F by the end of the century.[3] The prevailing scientific opinion on GCC is that "most of the warming observed over the last 60 years is attributable to human activities."[4] Increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the greenhouse effect.[5]

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced GCC include:[6]

- CO_2
- Methane (CH_4)
- Nitrous oxide (N_2O)

1 The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

2 Intergovernmental Panel on Climate Change (IPCC), 2013. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.*

3 California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California*. July.

4 IPCC, *Climate Change 2013: The Physical Science Basis*. Website: http://www.ipcc.ch (accessed March 2016).

5 The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse allows heat from sunlight in and reduces the amount of heat that escapes, greenhouse gases (GHG) like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; therefore, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

6 The GHGs listed are consistent with the definition in Assembly Bill 32 (Government Code 38505), as discussed later in this section.

- Hydrofluorocarbons (HFCs)
- Perfluorocarbons **(**PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, which some scientists believe can cause global warming. While GHGs produced by human activities include naturally occurring GHGs such as CO_2, CH_4, and N_2O, some gases, such as HFCs, PFCs, and SF_6, are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to the GHGs that remain in the atmosphere for significant periods of time, contributing to GCC in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this GCC evaluation, the term "GHGs" will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in terms of global warming potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of metric tons (MT)[1] of "CO_2 equivalents" (CO_2e). Table 4.6.A shows the GWP for each type of GHG. For example, SF_6 is 23,900 times more potent at contributing to global warming than CO_2.

Table 4.6.A: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide (CO_2)	~100	1
Methane (CH_4)	12	28
Nitrous Oxide (N_2O)	121	265
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoromethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: Environmental Protection Agency (2016).
HFC = hydrofluorocarbons
PFC = perfluorocarbons

[1] A metric ton is equivalent to approximately 1.1 tons.

The following discussion summarizes the characteristics of the six primary GHGs.

Carbon Dioxide. In the atmosphere, carbon generally exists in its oxidized form as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals, and plants; volcanic outgassing; decomposition of organic matter; and evaporation from the oceans. Human-caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance, and when concentrations of CO_2 are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO_2 to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO_2; consequently, the gas is building up in the atmosphere. The concentration of CO_2 in the atmosphere has risen approximately 30 percent since the late 1800s.[1]

The transportation sector remained the largest source of GHG emissions in 2013, representing 37 percent of the State's GHG emission inventory. The largest emissions category within the transportation sector is on-road, which consists of passenger vehicles (cars, motorcycles, and light-duty trucks) and heavy-duty trucks and buses. Emissions from on-road sources constitute over 92 percent of the transportation sector total. Industry and electricity generation were California's second- and third-largest categories of GHG emissions, respectively.

Methane. CH_4 is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, and natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).[2] Agricultural processes such as manure management and rice cultivation are also significant sources of human-made CH_4 in California. CH_4 accounted for approximately 8 percent of gross climate change emissions (CO_2e) in California in 2012.[3] It is estimated that over 60 percent of global methane emissions are related to human-related activities.[4] As with CO_2, the major removal process of atmospheric CH_4—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH_4 concentrations in the atmosphere are increasing.

1 California Environmental Protection Agency (CalEPA). 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature.* March.

2 California Air Resources Board (ARB), GHG Inventory Data – 2000 to 2013. Website: http://www.arb.ca.gov/cc/inventory/data/data.htm (accessed March 2016).

3 Ibid.

4 IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

Nitrous Oxide. N_2O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. N_2O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride. HFCs are primarily used as substitutes for ozone (O_3) depleting substances regulated under the Montreal Protocol.[1] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. However, there are no known project-related emissions of these three GHGs; therefore, these substances are not discussed further in this analysis.

Effects of Global Climate Change. Effects from GCC may arise from temperature increases, climate-sensitive diseases, extreme weather events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems. Heat-related problems include heat rash and heat stroke. In addition, climate-sensitive diseases may increase, such as those spread by mosquitoes and other disease-carrying insects. Such diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.

Additionally, according to the 2006 California Climate Action Team (CAT) Report,[2] the following climate change effects, which are based on trends established by the United Nations Intergovernmental Panel on Climate Change (IPCC), can be expected in California over the course of the next century:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures.[3]

[1] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

[2] CalEPA. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March.

[3] Ibid.

- Rise in global average sea level, primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets.[1]
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones.[2]
- Decline of the Sierra snowpack, which accounts for approximately half of the surface water storage in California by 70 percent to as much as 90 percent over the next 100 years.[3]
- Increase in the number of days conducive to O_3 formation by 25–85 percent (depending on the future temperature scenario) in high O_3 areas of Los Angeles and the San Joaquin Valley by the end of the 21st century.[4]
- High potential for erosion of California's coastlines and seawater intrusion into the Delta and levee systems due to the rise in sea level.[5]

A summary of these potential effects are identified in Table 4.6.B, Potential Impacts of Global Warming and Expected Consequences for California. Rising ocean levels, more intense coastal storms, and warmer water temperatures may increasingly threaten the Los Angeles coastal region. As previously described, global surface temperatures have increased by .33°F ±0.32°F over the last 100 years (1906–2005), with temperatures anticipated to rise in California by 3 to 10.5°F by the end of the century. Under this higher warming scenario, it is anticipated that ocean levels will rise 17 to 66 inches in Los Angeles by 2100.[6]

Rising sea levels may affect the natural environment in the coming decades by eroding beaches, converting wetlands to open water, exacerbating coastal flooding, and increasing the salinity of estuaries and freshwater aquifers. Coastal headlands and beaches are expected to erode at a faster pace in response to future sea level rise. The California Coastal Commission estimates that 450,000 acres of wetlands exist along the California coast,[7] but additional work is needed to evaluate the extent to which these wetlands would be degraded over time, or to what extent new wetland habitat would be created if those lands are protected from further development.

1 CalEPA. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.
2 IPCC, *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, February 2007.
3 Ibid.
4 Ibid.
5 Ibid.
6 CCC Sea Level Rise Policy Guidance, Appendix A: Sea Level Rise Science and Projections for Future Change, adopted August 12, 2015.
7 CCC Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone. Website: http://www.coastal.ca.gov/wetrev/wetch4.html (accessed February 2015).

Table 4.6.B: Potential Impacts of Global Warming and Expected Consequences for California

Potential Water Resource Impacts	Anticipated Consequences Statewide
Reduction of the State's average annual snowpack	• Specifically, the decline of the Sierra snowpack, would lead to a loss in half of the surface water storage in California by 70 to 90% over the next 100 years • Potential loss of 5 million acre-feet or more of average annual water storage in the State's snowpack • Increased challenges for reservoir management and balancing the competing concerns of flood protection and water supply • Higher surface evaporation rates with a corresponding increase in tropospheric water vapor
Rise in average sea level	• Potential economic impacts related to coastal tourism, commercial fisheries, coastal agriculture, and ports • Increased risk of flooding, coastal erosion along the State's coastline, seawater intrusion into the Delta and levee systems
Changes in weather	• Changes in precipitation, ocean salinity, wind patterns • Increased likelihood for extreme weather events, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones
Changes in the timing, intensity, location, amount, and variability of precipitation	• Potential increased storm intensity and increased potential for flooding • Possible increased potential for droughts • Long-term changes in vegetation and increased incidence of wildfires • Changes in the intensity and timing of runoff • Possible increased incidence of flooding and increased sedimentation • Sea level rise and inundation of coastal marshes and estuaries • Increased salinity intrusion into the Sacramento-San Joaquin River Delta (Delta) • Increased potential for Delta levee failure • Increased potential for salinity intrusion into coastal aquifers (groundwater) • Increased potential for flooding near the mouths of rivers due to backwater effects
Increased water temperatures	• Increased environmental water demand for temperature control • Possible increased problems with foreign invasive species in aquatic ecosystems • Potential adverse changes in water quality, including the reduction of dissolved oxygen levels • Possible critical effects on listed and endangered aquatic species

Table 4.6.B: Potential Impacts of Global Warming and Expected Consequences for California

Potential Water Resource Impacts	Anticipated Consequences Statewide
Changes in urban and agricultural water demand	• Changes in demand patterns and evapotranspiration
Increase in the number of days conducive to O3 formation	• Increased temperatures • Potential health effects, including adverse impacts to respiratory systems

Source: Environmental Water Account Draft Supplemental EIS/EIR to the Environmental Water Account Final EIS/EIR, October 2007, US Department of the Interior, Bureau of Reclamation Mid-Pacific Region, Sacramento, California.
EIR = Environmental Impact Report
EIS = Environmental Impact Statement
O_3 = ozone

Cumulatively, the effects of sea level rise may be combined with other potential long-term factors such as changes in sediment input and nutrient runoff. The cumulative impacts of physical and biological change due to sea level rise on the quality and quantity of coastal habitats are not well understood.[1]

Sea level along the US west coast is affected by a number of factors, including climate patterns such as El Niño, effects from the melting of modern and ancient ice sheets, and geologic processes such as plate tectonics. Regional projections for California, Oregon, and Washington show a sharp distinction at Cape Mendocino in northern California. South of that point, sea-level rise is expected to be very close to global projections. Projections are lower north of Cape Mendocino because the land is being pushed upward as the ocean plate moves under the continental plate along the Cascadia Subduction Zone.

According to the National Research Council's (NRC) June 2012 report on *Sea Level Rise for the Coasts of California, Oregon, and Washington*, sea level rise will cause many harmful economic, ecological, physical and social impacts but incorporating sea level rise impacts into agency decisions can help mitigate some of these potential impacts. A *Wave Uprush Study* (Moffatt & Nichols, October 2014) was prepared for the site, which among other things, analyzed the proposed Project's vulnerability to rising sea levels. According to the *Wave Uprush Study*, the following ranges of sea level rise were utilized in analyzing potential impacts related to sea level rise. Accordingly, Table 4.6.C presents the sea level rise projections based on the NRC report on sea level rise.

[1] Climate Change Science Program (CCSP) 4.1 January 15, 2009, 1 of 784 Final Report, United States CCSP, Synthesis and Assessment Product 4.1. Coastal Sensitivity to Seal Level Rise: A Focus on the Mid-Atlantic Region. Lead Agency: US Environmental Protection Agency, Other Key Participating Agencies: US Geological Survey, National Oceanic and Atmospheric Administration. Contributing Agencies: Department of Transportation.

Table 4.6.C: Sea-Level Rise Projections at the Project Site

Time Period	Sea Level Rise
2014	0 ft
2060	0.5 to 2.6 ft
2100	1.4 to 5.5 ft

Source: Moffat & Nichol, *Wave Uprush Study* (October 2014).
cm = centimeters
ft = foot/feet

Rising sea levels may also affect the built environment, including coastal development such as buildings, roads, and infrastructure. The project site is a relatively flat, low-lying, developed coastal site that may be directly affected by the change in sea level resulting from GCC. The elevation of the project site is essentially at sea level (0.5 to 4.0 ft above mean sea level [amsl]), and therefore, the rising of the ocean levels could result in on-site flood conditions.

Emissions Sources and Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing GCC. This section summarizes the latest information on global, national, California, and local GHG emission inventories. However, because GHGs persist for a long time in the atmosphere (see Table 4.6.A), accumulate over time, and are generally well-mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

Global Emissions. Worldwide emissions of greenhouse gases in 2012 totaled 29 billion MT of CO_2e per year.[1] Global estimates are based on country inventories developed as part of the programs of the United Nations Framework Convention on Climate Change (UNFCCC).

United States Emissions. In 2014, the United States emitted approximately 6.9 billion MT of CO_2e, down from 7.4 billion MT in 2009. Of the six major sectors nationwide—the electric power industry, transportation, industry, agriculture, commercial, and residential—the electric power industry and transportation sectors combined accounted for approximately 70 percent of the GHG emissions; the majority of the electric power industry and all of the transportation emissions were generated from direct fossil fuel combustion. In 2014, the total United States GHG emissions were approximately 9 percent less than 2005 levels.[2]

1 United Nations. *Greenhouse Gas Emissions*. Website: http://unstats.un.org/unsd/environment/air_greenhouse_emissions.htm (accessed March 2016).

2 United States Environmental Protection Agency (EPA). *Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014*. Website: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html (accessed March 2016).

State of California Emissions. According to ARB emission inventory estimates, the State emitted approximately 459 million metric tons (MMT) of CO_2e emissions in 2013. This is a decrease of 1.5 MMT of CO_2e from 2012 and a 7 percent decrease since 2004.[1]

The ARB estimates that transportation was the source of approximately 37 percent of the State's GHG emissions in 2013, followed by electricity generation (both in-State and out-of-State) at 20 percent and industrial sources at 20 percent. The remaining sources of GHG emissions were residential and commercial activities at 9 percent, agriculture at 8 percent, high-GWP gases at 4 percent, and recycling and waste at 2 percent.[2]

The ARB is responsible for developing the State GHG Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State and supports the AB 32 Climate Change Program. The ARB's current GHG emission inventory covers the years 2000–2013 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands).[3]

The ARB staff has projected statewide unregulated GHG emissions for 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, at 509 MMT of CO_2e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 30 percent and 32 percent of total CO_2e emissions, respectively.

Regional Emissions. Existing GHG emissions for the Southern California Association of Governments (SCAG) region were calculated for construction sources, mobile sources, natural gas consumption, and electricity generation. GHG emissions for 2010 were estimated to be approximately 224.6 MMT of CO_2e. Transportation and energy (i.e., electricity use and natural gas consumption) accounted for approximately 47 and 52 percent of emissions, respectively. Construction activity accounted for approximately 1 percent of the GHG emissions.

4.6.3 Regulatory Setting

Federal Policies and Regulations. The United States has historically had a voluntary approach to reducing GHG emissions. However, on December 7, 2009, the EPA issued an "endangerment finding" under the CAA, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to greenhouse gas pollution.[4] These findings provided the basis for adopting new national regulations to mandate GHG emission

1 ARB. 2015. California Greenhouse Gas Emission Inventory – 2015 Edition. Website: http://www.arb.ca.gov/cc/inventory/data/data.htm.
2 Ibid.
3 ARB. 2015. California Greenhouse Gas Inventory Data - 2015 Edition. Website: http://www.arb.ca.gov/cc/inventory/data/data.htm (accessed March 2016).
4 EPA. 2009. *Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act.* August 9. Website: http://www.epa.gov/climatechange/endangerment (accessed April 2015).

reductions under the federal CAA. The EPA's endangerment finding paved the way for federal regulation of GHGs.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012–2016 light-duty vehicles that would reduce GHG emissions and improve fuel economy. The EPA and NHTSA issued a Supplemental Notice of Intent[1] announcing plans to propose stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The agencies proposed standards projected to achieve 163 grams of CO_2 per mile in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. California has announced its support of this national program.[2] The final rule was adopted in October 2012, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.[3] The GHG benefit of federal vehicle standards is not directly quantified in this report because the more stringent California vehicle standards discussed later in this section are quantified in the report.

In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the EPA and the NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles from model years 2014–2018 (EPA 2011).[4] The EPA and the 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 EPA, this program will reduce GHG emissions and fuel consumption for affected vehicles by 9 percent to 23 percent. This EIR conservatively did not incorporate the GHG benefit of this federal standard.

State Policies, Regulations, and Standards.

2010 Climate Action Team Report – California Climate Action Milestones. In 1988, Assembly Bill (AB) 4420 directed the California Energy Commission (CEC) to report on "how global warming trends may affect California's energy supply and demand, economy, environment, agriculture, and water supplies" and offer "recommendations for avoiding, reducing and addressing the impacts." This marked the first statutory direction to a California State agency to address climate change.

1 United States Government Publishing Office (GPO). 2011. Federal Register, Vol. 76, No. 153, Proposed Rules, 2017–2025 Model Year Light-Duty Vehicle GHG Emissions and CAFE Standards: Supplemental Notice of Intent. August 9. Website: http://gpo.gov/fdsys/pkg/FR-2011-08-09/pdf/2011-19905.pdf.

2 EPA. 2011a. Commitment Letter to National Program, July 28, 2011. Website: http://www.epa.gov/otaq/climate/letters/carb-commitment-ltr.pdf (accessed September 2015).

3 National Highway Traffic Safety Administration (NHTSA). 2012. Corporate Average Fuel Economy Standards, Passenger Cars and Light Trucks, Model Years 2017-2025, Final Environmental Impact Statement, July 2012. Website: http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FINAL_EIS.pdf (accessed September 2015).

4 EPA. 2011b. Office of Transportation and Air Quality, EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium-and Heavy-Duty Vehicles. August. Website: http://www.epa.gov/otaq/climate/documents/420f11031.pdf.

The California Climate Action Registry was created to encourage voluntary reporting and early reductions of GHG emissions with the adoption of Senate Bill (SB) 1771 in 2000. The CEC was directed to assist by developing metrics and identifying and qualifying third-party organizations to provide technical assistance and advice to GHG emission reporters. The next year, SB 527 amended SB 1771 to emphasize third-party verification.

SB 1711 also contained several additional requirements for the CEC, including updating the State's Greenhouse Gas Emissions Inventory from an existing 1998 report and continuing to update it every 5 years; acquiring, developing and distributing information on global climate change to agencies and businesses; establishing a State interagency task force to ensure policy coordination; and establishing a climate change advisory committee to make recommendations on the most equitable and efficient ways to implement climate change requirements. In 2006, AB 1803 transferred preparation of the inventory from the CEC to the ARB. The ARB updates the inventory annually.

AB 1493, authored by Assembly Member Fran Pavley in 2002, directed the ARB to adopt regulations to achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles. The so-called "Pavley" regulations, or Clean Car regulations, were approved by the ARB in 2004. The ARB submitted a request to the EPA to implement the regulations in December 2005. After several years of requests to the federal government and accompanying litigation, this waiver request was granted on June 30, 2009. The ARB has since combined the control of smog-causing pollutants and GHG emissions to develop a single coordinated package of standards known as Low Emission Vehicles III. It is expected that these regulations will reduce GHG emissions from California passenger vehicles by approximately 22 percent in 2012 and approximately 30 percent in 2016, all while improving fuel efficiency and reducing motorists' costs. AB 1493 also directed the California Climate Action Registry to adopt protocols for reporting reductions in GHG emissions from mobile sources prior to the operative date of the regulations.

SB 812 added forest management practices to the California Climate Action Registry members' reportable emissions actions. It also directed the Registry to adopt forestry procedures and protocols to monitor, estimate, calculate, report, and certify carbon stores and CO_2 emissions that resulted from the conservation and conservation-based management of forests in California.

The California Renewable Portfolio Standard (RPS) Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20 percent of its retail sales with renewable power by 2017, was established by SB 1078 in 2002. The RPS was accelerated to 20 percent by 2010 by SB 107 in 2006. The program was subsequently expanded by the renewable electricity standard approved by the ARB in September 2010, requiring all utilities to meet a 33 percent target by 2020. The renewable electricity standard is projected to reduce GHG emissions from the electricity sector by at least 12 MMT of CO_2e in 2020.

In December 2004, Governor Arnold Schwarzenegger signed Executive Order (EO) S-20-04, which set a goal of reducing energy use in State-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encouraged cities, counties, schools, and the private sector to take all cost-effective measures to reduce building electricity use. This action built upon the State's strong

history of energy efficiency efforts that have saved Californians and California businesses energy and money for decades. They are a cornerstone of GHG reduction efforts.

EO S-3-05 (June 2005) established GHG targets for the State, such as returning to year 2000 emission levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050. It directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate efforts to meet the targets with the heads of other State agencies. This group became the Climate Action Team (CAT).

California's Million Solar Roofs plan was boosted by the passage of SB 1 in 2006. The plan is estimated to result in 3,000 megawatts of new electricity-generating capacity and avoidance of 2.1 MMT of CO_2e emissions. The main components of the bill included expanding the program to more customers, requiring the State's municipal utilities to create their own solar rebate programs, and making solar panels a standard option on new homes.

The California Global Warming Solutions Act of 2006, best known by its bill number AB 32, created a first-in-the-country comprehensive program to achieve real, quantifiable, and cost-effective reductions in GHGs. The law set an economy-wide cap on California GHG emissions at 1990 levels by 2020. It directed the ARB to prepare, approve, and implement a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions. EO S-20-06, signed in October 2006, directed the Secretary for Environmental Protection to establish a Market Advisory Committee of national and international experts. The committee made recommendations to the ARB on the design of a market-based program for GHG emissions reduction. The ARB adopted the first Scoping Plan, describing a portfolio of measures to achieve the target, in December 2008. All of the major regulatory measures necessary for meeting the 2020 emissions target were adopted by December 2010.

The Governors of California, Arizona, New Mexico, Oregon, and Washington entered into a Memorandum of Understanding in February 2007, establishing the Western Climate Initiative. The Governors agreed to set a regional goal for emissions reductions consistent with state-by-state goals; develop a design for a regional market-based, multisector mechanism to achieve the goal; and participate in a multistate GHG registry. The initiative has since grown to include Montana, Utah, and the Canadian provinces of British Columbia, Manitoba, Ontario, and Québec.

California is implementing the world's first Low Carbon Fuel Standard for transportation fuels, pursuant to both EO S-01-07 (signed January 2007) and AB 32. The standard requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. This reduction is expected to reduce GHG emissions in 2020 by 17.6 MMT of CO_2e. Also in 2007, AB 118 created the Alternative and Renewable Fuel and Vehicle Technology Program. The CEC and the ARB administer the program. This act provides funding for alternative fuel and vehicle technology research, development, and deployment in order to attain the State's climate change goals, achieve the State's petroleum reduction objectives and clean air and GHG emission reduction standards, develop public-private partnerships, and ensure a secure and reliable fuel supply.

In addition to vehicle emissions regulations and the Low Carbon Fuel Standard, the third effort reducing GHG emissions from transportation is the reduction in the demand for personal vehicle

travel (i.e., vehicle miles traveled, or VMT). This measure was addressed in September 2008 through the Sustainable Communities and Climate Protection Act of 2008, or SB 375. The enactment of SB 375 initiated an important new regional land use planning process to mitigate GHG emissions by integrating and aligning planning for housing, land use, and transportation for California's 18 Metropolitan Planning Organizations (MPOs). The bill directed the ARB to set regional GHG emissions reduction targets for most areas of the State. It also contained important elements related to federally mandated Regional Transportation Plans (RTPs) and the alignment of State transportation and housing planning processes.

Also codified in 2008, SB 97 required the Governor's Office of Planning and Research (OPR) to develop GHG emissions criteria for use in determining project impacts under CEQA. These criteria were developed in 2009 and went into effect in 2010.

EO S-13-08 launched a major initiative for improving the State's adaptation to climate impacts from sea level rise, increased temperatures, shifting precipitation, and extreme weather events. It ordered a California Sea Level Rise Assessment Report to be requested from the National Academy of Sciences. It also ordered the development of a Climate Adaptation Strategy. The strategy, published in December 2009, assesses the State's vulnerability to climate change impacts and outlines possible solutions that can be implemented within and across State agencies to promote resiliency. The strategy focused on seven areas: public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forestry, and transportation and energy infrastructure.

On October 28, 2010, ARB released its proposed cap-and-trade regulations, which would cover sources of approximately 85 percent of California's GHG emissions.[1] ARB's Board ordered ARB's Executive Director to prepare a final regulatory package for cap-and-trade on December 16, 2010.[2] On January 1, 2011, the ARB adopted GHG emissions limits and reduction measures by regulation. On January 1, 2015, cap-and-trade compliance obligations were phased in for suppliers of natural gas, reformulated gasoline blendstock for oxygenate blending, distillate fuel oils, and liquefied petroleum gas, requiring emissions that meet or exceed specified emissions thresholds.

On October 1, 2013, ARB released an update to the Scoping Plan for discussion purposes. On February 10, 2014, ARB released its proposed First Update to the Climate Change Scoping Plan ("Updated Scoping Plan").[3] Finally, on May 22, 2014, ARB approved the Updated Scoping Plan. It describes California's progress towards AB 32 goals, stating that "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32." Specifically, "if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts [MW] of renewable distributed

1 ARB. 2010a. Proposed Regulation to Implement the California Cap-and-Trade Program, December 16, 2010. Website: http://www.arb.ca.gov/regact/2010/capandtrade10/capandtrade10.htm (accessed September 2015).

2 ARB. 2010b. California Cap-and-Trade Program, Resolution 10-42, December 16, 2010. Website: http://www.arb.ca.gov/regact/2010/capandtrade10/res1042.pdf (accessed September 2015).

3 ARB. 2014b. First Update to the Climate Change Scoping Plan: Building on the Framework. Pursuant to AB 32, the California Global Warming Solutions Act of 2006. May. Website: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others), it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80 percent below 1990 levels by 2050."[1]

In addition, the Updated Scoping Plan further reduced the GHG emissions reduction target. It recalculated 1990 GHG emissions levels using the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4).[2] Using the AR4 GWP, the 427 MMT of CO_2e 1990 emissions levels and 2020 GHG emissions limits would be slightly higher, at 431 MMT of CO_2e.[3] Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the Functional Environmental Document and updated 1990 emissions levels identified in the Updated Scoping Plan, achieving the 1990 emission level would require a reduction of 78 MMT of CO_2e, which equates to a reduction of approximately 15.3 percent to achieve in 2020 emissions levels in the business-as-usual condition.[4] Thus, the Updated Scoping Plan essentially establishes a 15.3 percent reduction from the business-as-usual threshold of significance for measuring potential GHG impacts.

On April 29, 2015, Governor Edmund G. Brown, Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the 2015 United Nations Climate Change Conference in Paris. The executive order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050 and directs the ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of MMT of CO_2e. The executive order also requires the State's climate adaptation plan to be updated every 3 years and for the State to continue its climate change research program, among other provisions. As with EO S-3-05, this executive order is not legally enforceable against local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is currently in process in the State Legislature.

The initiatives, EOs, and statutes outlined above represent the major milestones in California's efforts to address climate change through coordinated action on climate research, GHG mitigation, and climate change adaptation. Numerous additional related efforts have been undertaken by State agencies and departments to address specific questions and programmatic needs. The CAT coordinates these efforts and others that compose the State's climate program. The rest of the report describes these efforts.

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1 ARB. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. Pursuant to AB 32, the California Global Warming Solutions Act of 2006. May. Website: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf (accessed March 2015).

2 The GWP of CH_4 was updated to 25 (from previously 21) and that of N_2O was updated to 298 (from previously 310).

3 Op. Cit. ARB. 2014.

4 ARB. 2011. Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document, released August 19, 2011. Website: http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf (accessed September 2015).

Local Policies and Regulations.

City of Long Beach Air Quality Element. In December of 1996, the City adopted the Air Quality Element (1996) as part of the City's General Plan. This element includes goals and polices related and intended to promote clean air within the City. The following goals and policies are applicable to the proposed Project:

Goal 7.0: Reduce emissions through reduced energy consumption.

Policy 7.1: Reduce energy consumption through conservation improvements and requirements.

Action 7.1.4: Encourage the incorporation of energy conservation features in the design of all new construction.

Action 7.1.7: Support efforts to reduce GHGs emissions that diminish the stratospheric ozone layer.

City of Long Beach Sustainable City Action Plan. The City adopted the Long Beach Sustainable City Action Plan on February 2, 2019. This plan serves as a guide for planners and decision-makers in the City to implement measurable goals and actions established for the purpose of creating a more sustainable City. The following sustainability goals and actions relevant to the proposed Project are:

Goal 5: Reduce community electricity use by 15 percent by 2020.

Action: Encourage the use of energy efficient products including efficient lighting, energy monitoring systems, cool and green roofs, insulation and efficient HVAC systems.

Goal 6: Reduce community natural gas use by 10 percent by 2020.

Action: Require that private development projects incorporate Green Building Requirements for Private Development and encourage development projects to exceed Title 24 standards.

4.6.4 Impact Significance Criteria

The following thresholds of significance criteria are based on Appendix G of the *State CEQA Guidelines*. Based on these thresholds, implementation of the proposed Project would have a significant adverse impact related to global climate change if it would:

Threshold 4.6.1: **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or**

Threshold 4.6.2: **Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.**

The *State CEQA Guidelines* leave the determination of significance to the reasonable discretion of the lead agency and encourage lead agencies to develop and publish thresholds of significance for use in determining the significance of environmental effects in CEQA documents. As discussed above, neither SCAQMD nor the City of Long Beach has yet established specific quantitative significance thresholds for GHG emissions for residential or commerical projects. Therefore, consistent with the SCAQMD's tiered approach described in Section 4.6.1, above, the proposed Project will be analyzed using the Tier 3 screening thresholds, as follows:

- 10,000 MT of CO_2e per year for industrial projects
- 3,000 MT of CO_2e per year for commercial/residential projects

Until more guidance is provided from federal or State agencies, the City defers to the recommended screening significance criteria level for commercial/residential projects to be 3,000 MT of CO_2e per year. However, given the frequency of changes in regulations over GHG emissions, this standard should be recognized as interim and will likely change over time as further guidance is provided by federal or State regulatory agencies.

CEQA Baseline. At the time the NOP was issued, the Project site contained both the Belmont Pool facilities and the outdoor temporary pool (opened in December 2013 to provide swimming facilities while the permanent facility was under construction). Although the site contained the former Belmont Pool building at the time of the NOP, the facility was subsequently demolished in February 2015 to alleviate an imminent public safety threat due to the seismically unsafe condition of the building.

The inclusion of the former pool building in the assessment of global climate change impacts is appropriate because the former facility was present on the site for approximately 45 years and represents the historic uses of the site, and the historic GHG conditions of the site. The substantial evidence of recent historical use supports the determination that utilization of the Belmont Pool building as the baseline for global climate change impacts is appropriate.

4.6.5 Project Impacts

Construction and operation of the proposed Project would generate GHG emissions, with most energy consumption (and associated generation of GHG emissions) occurring during the proposed Project's operation (as opposed to its construction). Typically, more than 80 percent of the total energy consumption takes place during the use of buildings, and less than 20 percent is consumed during construction.[1]

GHG emissions generated by the proposed Project would predominantly consist of CO_2. In comparison to criteria air pollutants such as O_3 and particulate matter less than 10 microns in diameter (PM_{10}), CO_2 emissions persist in the atmosphere for a substantially longer period of time.

[1] United Nations Environment Programme (UNEP). 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

Construction. During construction of the proposed Project, GHGs would be emitted through the operation of construction equipment and from worker and vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

Per SCAQMD guidance, due to the long-term nature of the GHGs in the atmosphere, instead of determining significance of construction emissions alone, the total construction emissions are amortized over 30 years (an estimate of the life of the project) and included in the operations analysis provided in the next section, Operation.

Operation. Long-term operation of the proposed Project would generate GHG emissions from area and mobile sources and indirect emissions from stationary sources associated with energy consumption. As discussed in Chapter 3.0, Project Description, the proposed Project would be built to meet Leadership in Energy and Environmental Design (LEED) Gold certification standards. Although not all proposed design features have been selected, the City has committed to implement the following pool components to assist in reaching the LEED certification by reducing water and energy consumption:

- **Aquatic-Specific Variable Frequency Drives on Pumps.** The aquatic-specific pumps are in constant communication with the filtration system and chemical controller to provide the optimum electrical frequency to the pump, constantly maintaining the pump at its premium efficiency and reducing energy consumption by as much as 30 percent.
- **Filtration.** Regenerative Media System: A single tank utilizing a Regenerative Media Filter System (RMF) can accommodate the same filter area as five or six traditional high-rate sand filters, creating a significant reduction in required mechanical room space. A typical RMF system may reduce a pool's water consumption by up to 97 percent.
- **High Efficiency Direct Fire Heating**. Improvements in burner design as they relate to the integrated heat exchanger have resulted in results that achieve 95 to 97 percent heater efficiency over conventional burner designs.
- **Underwater Pool Lights**. Utilizing light-emitting diode (LED) pool light would save energy costs and extend the life of a light bulb by 10 times.
- **Pool Blankets**. Using pool blankets reduces water evaporation, chemical use, and energy use. Pool blankets may reduce operating costs from water, heat, and chemical losses by as much as 50 percent if used every evening for 8–10 hour periods and may result in annual water savings of approximately 809,000 gallons for the proposed Project.

The proposed Project would increase the size of the on-site pools and the potential number of swim events that could occur concurrently. Mobile-source emissions of GHGs would include Project-generated vehicle trips associated with on-site facilities and visitors/deliveries to the Project site. Area-source emissions would be associated with activities such as landscaping and

maintenance of proposed land uses, natural gas for heating, and other sources. Increases in stationary source emissions would also occur at off-site utility providers as a result of demand for electricity, natural gas, and water by the proposed uses. As shown in Table 4.6.D, the proposed Project would produce an estimated 1,600 MT of CO_2e per year above the existing condition. This does not include any credits for the LEED-certification project features that would reduce energy use and, therefore, reduce GHG emissions from the project.

Table 4.6.D: Long-Term Regional GHG Emissions

Source	Total Regional Pollutant Emissions (MT/yr)					
	Bio-CO_2	**NBio-CO_2**	**Total-CO_2**	**CH_4**	**N_2O**	**CO_2e**
Construction Emissions Amortized over 30 years	0	23	23	0.0044	0	23
Operational Emissions						
Area	0	0.0033	0.0033	0.00001	0	0.0035
Energy	0	380	380	0.014	0.0047	380
Mobile	0	2,100	2,100	0.079	0	2,100
Waste	150	0	150	8.8	0	330
Water	2.5	44	46	0.26	0.0065	54
Total Project Emissions	150	2,500	2,700	9.2	0.011	2,900
Existing Site Emissions	75	1,200	1,200	4.6	0.0052	1,300
Net Project Emissions	75	1,300	1,500	4.6	0.0058	1,600

Source: LSA Associates, Inc. (March 2016).
Bio-CO_2 = biologically generated CO_2
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
MT/yr = metric tons per year
N_2O = nitrous oxide
NBio-CO_2 = non-biologically generated CO_2

In comparing the proposed Project to the tiered draft interim GHG significance criteria, it is not exempt as described in Tier 1. As previously stated, the City has a Sustainable Action Plan aimed at reducing GHG emissions in the City. Although the Project would be consistent with applicable goals and policies in this plan, the City's goal of reducing GHG emissions by 15 percent (or 10 tons of CO_2 per capita) by 2020 would not be applicable to the proposed Project as it specifically targets the City's general facilities and operations. Therefore, this plan is not an applicable GHG reduction plan, per Tier 2. The Tier 3 screening significance criteria level utilizes two categorizes for proposed projects, "industrial" and "commercial/residential."

Due to the restaurant component, variable attendance, and intermittent events at the proposed Project, the "commercial/residential" category was used for this analysis. The Tier 3 screening significance criteria level for commercial/residential projects is 3,000 MT of CO_2e per year. As shown in Table 4.6.D, the proposed Project would produce approximately 1,600 MT of CO_2e per year above the existing condition and would not exceed this criterion. Even with the existing site emissions, the proposed Project would produce approximately 2,900 MT of CO_2e per year, which would not exceed this criterion. Therefore, operational emissions would be below the screening threshold of 3,000 MT of CO_2e per year for commercial/residential projects, and Project operations would be considered to have a less than significant impact related to GHG emissions. No mitigation is required.

Conflict with an Applicable GHG Reduction Plan, Policy, or Regulation. The GHG emissions reduction goals in AB 32 are scoped to manage total statewide GHG emissions of approximately 496.95 MMT of CO_2e per year. The proposed Project is estimated to produce approximately 1,600 MT of CO_2e per year over existing conditions, representing approximately 0.002 MMT of CO_2e per year of the State's reduction goals. Therefore, the proposed Project is not considered to result in GHG emission levels that would substantially conflict with implementation of the GHG reduction goals under AB 32, EO S-03-05, or other State regulations.

Therefore, the proposed Project would have a less than significant impact related to potential conflicts with regulations outlined in the California Green Buildings Standard Code and GHG emissions reduction goals in AB 32. No mitigation is required.

4.6.6 Cumulative Impacts

As defined in Section 15130 of the *State CEQA Guidelines*, cumulative impacts are the incremental effects of an individual project when viewed in connection with the effects of past, current, and probable future projects within the cumulative impact area for land use.

Although the proposed Project is expected to emit GHGs, the emission of GHGs by any single project into the atmosphere is not itself necessarily an adverse environmental effect. Rather, it is the increased accumulation of GHGs from more than one project and many sources in the atmosphere that may result in GCC. The resultant consequences of that climate change, including sea level rise, could cause adverse environmental effects. A project's GHG emissions typically would be very small in comparison to State or global GHG emissions and, consequently, they would, in isolation, have no significant direct impact on climate change. Due to the complex physical, chemical, and atmospheric mechanisms involved in GCC, it is speculative to identify the specific impact, if any, to GCC from one project's incremental increase in global GHG emissions. As such, a project's GHG emissions and the resulting significance of potential impacts are more properly assessed on a cumulative basis. The project-specific analysis conducted above is essentially already a cumulative analysis, because it takes into consideration statewide GHG reduction targets and demonstrates that the proposed Project would be consistent with those targets.

The State has mandated a goal of reducing statewide emissions to 1990 levels by 2020, even though statewide population and commerce is predicted to continue to expand. In order to achieve this goal, the ARB is in the process of establishing and implementing regulations to reduce statewide GHG emissions. However, currently there are no applicable significance thresholds, specific reduction targets, and no approved policy or guidance to assist in determining significance at the cumulative level. Additionally, there is currently no generally accepted methodology to determine whether GHG emissions associated with a specific project represent new emissions or existing, displaced emissions.

The California Attorney General's Office has taken an active role in addressing climate change via the *State CEQA Guidelines*, including, but not limited to, submitting comment letters on draft CEQA documents; filing CEQA lawsuits; and entering into related settlement agreements. Additionally, the Attorney General's Office has created and routinely updates a Fact Sheet listing project design features to reduce GHG emissions. The Attorney General's Office created this Fact

Sheet primarily for the benefit of local agencies processing CEQA documents, acknowledging that "local agencies will help to move the State away from "business-as-usual" and toward a low-carbon future."[1] The Fact Sheet explains that the listed "measures can be included as design features of a project," but emphasizes that they "should not be considered in isolation, but as part of a larger set of measures that, working together, will reduce GHG emissions and the effects of global warming."

The proposed Project emphasizes energy efficiency and water conservation and would be consistent with AB 32's goals for 2020, the proposed Project would not generate GHG emissions that exceed any applicable threshold of significance, and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. As a result, the proposed Project's climate change impacts with regard to GHG emissions would not be considered cumulatively considerable because they would not contribute to GHG emissions that exceed AB 32's statewide goals.

According to the *Wave Uprush Study* for the proposed Project, wave run-up for the high 2060 and 2100 sea level rise scenarios (2.6 ft and 5.5 ft increase in sea level, respectively), would reach up to 8.2 ft and 10.4 ft (or greater) at the Project site. However, because the main pool deck would be elevated 17 ft amsl, the pool deck would be set 8.8 ft and 6.6 ft above the projected high water level in 2060 and 2100, respectively. The lower level of the building (pool equipment and storage) and associated parking areas would be below the projected water line under both scenarios; however, these areas would not be open for public use, and therefore, would not subject visitors to the Project site to significant cumulative impacts related to sea level rise. Furthermore, additional GHG reduction strategies implemented at the State, national, and international levels could reduce sea-level rise. Therefore, the proposed Project would not be adversely impacted by sea level rise due to climate change.

The *Wave Uprush Study* analyzed potential impacts at the Project site from sea level rise and a 100-year storm for a range of scenarios resulting from the potential changes to the Long Beach Breakwater. The first alternative (BW1) assumed no changes to the existing breakwater and is the basis for the following discussion. According to the *Wave Uprush Study* for the proposed Project, wave run-up for the high 2060 and 2100 sea level rise scenarios (a 2.6 ft and 5.5 ft increase in sea level, respectively), would result in a run up elevation up to 8.2 ft and 10.4 ft (or greater) at the Project site. Without preventative measures, the upper 2100 sea level rise estimate would not only inundate much of the pool facility, but much of the Long Beach Peninsula and Belmont Shore as well. This 2100 condition is not a result of the Project but rather the result of the projected worst-case sea level rise and erosion conditions. It should be noted that the modeled scenario does not account for shore protection measures such as beach nourishment, storm berm construction, winter sand dikes, or other shore protection structures that would be implemented over the long period of time that erosion and sea level rise were occurring. These measures are not required by, or a responsibility of the proposed Project, as the Project does not exacerbate these conditions. Furthermore, because the main pool deck would be elevated 17 ft amsl, the pool deck would be set 8.8 ft and 6.6 ft above the projected high water levels in 2060 and 2100, respectively. The lower level of the building (pool equipment and storage) and associated parking areas would be

[1] State of California Attorney General's Office Fact Sheet. 2008. *The California Environmental Quality Act Addressing Global Warming Impacts at the Local Agency Level*. December.

below the projected water line under both scenarios; however, these areas would not be open for public use, and therefore, would not subject visitors to the Project site to significant cumulative impacts related to sea level rise. Furthermore, additional GHG reduction strategies implemented at the State, national, and international levels could reduce sea-level rise between now and the year 2100. Therefore, the proposed Project would not be adversely impacted by sea level rise due to climate change, and no mitigation is required.

4.6.7 Level of Significance Prior to Mitigation

The proposed Project would emit GHGs during Project construction; however, these impacts would not substantially contribute to the overall GHG in the environment due to the relatively short construction periods and the relative contribution to the Project's overall lifetime emissions.

By implementing conservation and sustainability features, the proposed Project would result in GHG emissions lower than the accepted significance criterion level. Therefore, GHG emissions and the Project's contribution to global climate change are considered to be less than significant, and no mitigation would be required.

4.6.8 Mitigation Measures

No mitigation is required.

4.6.9 Level of Significance after Mitigation

The proposed Project would not result in potential significant impacts related to GHGs, and no mitigation is required. There are no significant unavoidable adverse impacts of the proposed Project related to Greenhouse Gas emissions and Global Climate Change.

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