

Greenhouse Gases

This section describes the regulatory background and existing conditions related to GHG emissions. It discusses the estimated GHG emissions of the proposed Project, the potential impacts of the emissions, and mitigation to reduce impacts as applicable.

8.1 Existing Setting

Various gases in the earth's atmosphere play an important role in moderating the earth's surface temperature. Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs are transparent to solar radiation but are effective in absorbing infrared radiation. Consequently, radiation that would otherwise escape back into space is retained, resulting in a warming of the earth's atmosphere. This phenomenon is known as the greenhouse effect.

GHGs include both naturally occurring and anthropogenic gases that trap heat in the earth's atmosphere. GHGs include, but are not limited to, CO₂, methane, nitrous oxide, hydrochlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although there is disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, much of the scientific community now agrees that there is a direct link between increased emissions of GHGs and long-term global temperatures and other climate-related effects.

The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century attributable to an increase in GHG concentrations from human activities. The climatic changes associated with this global warming, such as sea level rise, drought, and extreme weather events, are predicted to produce economic and social consequences across the globe. This section describes the existing conditions and regulatory background for GHG emissions.

Different GHGs are described using CO₂-equivalent (CO₂e) as a common unit. For any type and quantity of GHG, CO₂e indicates the amount of CO₂ that would have the equivalent global warming impact.

In the United States, the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (e.g., passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest category of GHG-emitting sources. In 2015, the most recent year for which data are provided, the annual California statewide GHG emissions were 440.4 million metric tons of CO₂e. The transportation sector accounts for about 39 percent of the statewide GHG emissions inventory. The industrial sector accounts for about 23 percent of the total statewide GHG emissions inventory. The dominant GHG emitted is CO₂, primarily from fossil fuel combustion (approximately 84 percent of the total inventory) (ARB, 2018).

According to BAAQMD, GHG emissions in 2011 were 86.6 million metric tons of CO₂e, approximately 39.7 percent of which was from the transportation sector and 14 percent was from electricity use/cogeneration. The dominant GHG emitted was CO₂, primarily from fossil fuel combustion (BAAQMD, 2015).

The City updated its 2005 GHG inventory in its Climate Action Plan (CAP) (Pacific Municipal Consultants, 2015). In 2005, the City's community-wide GHG emissions totaled 804,290 metric tons of carbon dioxide equivalent (MTCO₂e) for the sectors as shown in **Table 8-1**. The sector with the largest portion of emissions was on-road transportation, which produced 464,070 MTCO₂e, or 58 percent of all community emissions. The next largest sector, commercial/industrial built environment, produced

144,790 MTCO₂e, or 18 percent of the total. Water and wastewater (3,030 MTCO₂e) each comprised less than 1 percent of total emissions.

Table 8-1. San Mateo 2005 Community-Wide GHG Emissions
Underground Flow Equalization System Project, Environmental Impact Report

Sector	MTCO ₂ e	Percentage
On-road transportation	464,070	58
Commercial/industrial built environment	144,790	18
Residential built environment	136,790	17
Solid waste generation	26,960	3
Off-road equipment	11,690	1
Landfill	7,020	1%
Point sources	6,070	1
Caltrain	3,870	Less than 1
Water and wastewater	3,030	Less than 1
Total	804,290	100

Source: Pacific Municipal Consultants, 2015.

The City's GHG inventory of 2010 indicates that the GHG emissions were 9 percent below 2005 levels. The three largest sources of emissions (on-road transportation, commercial/industrial built environment, and residential built environment) all had lower emissions in 2010 than in 2005, along with the landfill and solid waste generation sectors. Emission levels increased in four remaining sectors, most noticeably in the off-road equipment sector, although the relatively small size of these sources meant that they had only a limited impact on communitywide emissions. The relative distribution of emissions within the sectors did not change in a meaningful way from 2005 to 2010 (Pacific Municipal Consultants, 2015).

8.2 Regulatory Framework

8.2.1 Federal Plans, Policies, and Regulations

Various programs and regulations exist at the federal level to improve vehicle fuel economy, increase energy efficiency, and reduce GHG emissions.

EPA authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs must meet the definition of air pollutants under the existing CAA and be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, EPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six GHGs constitute a threat to public health and welfare. Thus, it was the Supreme Court's interpretation of the existing Act and EPA's assessment of the scientific evidence that formed the basis for EPA's regulatory actions.

EPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010 (Center for Climate and Energy Solutions, 2014). The EPA and the NHTSA are taking coordinated steps to enable the production of a new generation of "clean" vehicles with reduced GHG emissions and improved fuel

efficiency for on-road vehicles and engines. The next steps include developing the first GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and save 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012 through 2016).

On August 28, 2012, EPA and NHTSA issued a joint final rulemaking to extend the national program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model years 2017 through 2025 standards, projections are that approximately 4 billion barrels of oil would be saved and 2 billion metric tons of GHG emissions would be eliminated.

The complementary EPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards would cut GHG emissions and domestic oil use significantly. The agencies estimate that the combined standards would reduce CO₂ emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model years 2014 to 2018 heavy duty vehicles.

In 2014, EPA finalized Tier 3 Motor Vehicle Emission and Fuel Standards to reduce air pollution from passenger cars and trucks. In 2015, EPA and NHTSA proposed model years 2018 to 2027 GHG emissions and fuel economy standards for medium- and heavy-duty vehicles (EPA, 2018).

8.2.2 State Plans, Policies, and Regulations

With the passage of several pieces of legislation, including State Senate and Assembly Bills and Executive Orders (EOs), California launched an innovative and proactive approach to address GHG emissions and potential climate change-related impacts. California laws and EOs have been developed to define various aspects of GHG record keeping and implementation of GHG emission reduction measures, such as the California Renewables Portfolio Standard Program and the Low Carbon Fuel Standard. Other laws and plans, such as AB 32, SB 32, the Climate Change Scoping Plan, the Climate Change Adaptation Strategy, and CEQA guidance, define the regulatory setting for projects that emit GHGs in California, and describe regulatory agency goals for statewide GHG emissions reductions and climate change adaptation.

The legislation includes the following:

- AB 1493, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires ARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 model year.
- EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to (1) year 2000 levels by 2010, (2) year 1990 levels by the 2020, and (3) 80 percent below year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32.
- AB 32, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." In December 2008, ARB approved the initial Scoping Plan, which included a suite of measures to sharply cut GHG emissions. Key elements of the initial Scoping Plan included the following:
 - Expand and strengthen energy efficiency programs, including building and appliance standards.

- Increase electricity generation from renewable resources to at least 33 percent of the statewide electricity mix by 2020.
 - Establish targets for passenger vehicle-related GHG emissions for regions throughout California and pursue policies and incentives to achieve those targets. Included with this strategy is support for the development and implementation of a high-speed rail system to expand mobility choices and reduce GHG emissions.
 - Adopt and implement measures pursuant to existing State laws and policies, including California’s clean car standards and the Low Carbon Fuel Standard.
 - Develop a cap-and-trade program to ensure the target is met, while providing flexibility to California businesses to reduce emissions at low cost.
- In May 2014, ARB approved the first update to the Climate Change Scoping Plan (First Update). The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update highlights California’s progress toward meeting the “near-term” 2020 GHG emission reduction goals defined in the initial Scoping Plan. It also evaluates how to align the State’s “longer-term” GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.
 - EO S-20-06 (October 18, 2006): This EO establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency and State agencies regarding climate change.
 - EO S-01-07 (January 18, 2007): This EO set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by 2020.
 - SB 97, Chapter 185, 2007, Greenhouse Gas Emissions: SB 97 required the Governor’s Office of Planning and Research to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective March 18, 2010.
 - SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region must then develop a “Sustainable Communities Strategy” that integrates transportation, land use, and housing policies to plan for the achievement of the emissions target for their region.
 - SB 391, Chapter 585, 2009 California Transportation Plan: This bill requires the State’s long-range transportation plan to meet California’s climate change goals under AB 32.
 - Renewables Portfolio Standard (RPS): Established in 2002 under SB 1078, accelerated in 2006 under Senate Bill 107, and expanded in 2011 under SB 2, California’s RPS is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.
 - SB 605, Chapter 523, 2014, required ARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016.
 - On April 29, 2015, the governor issued EO B-30-15 establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. All State agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. ARB was directed to update the AB 32 Scoping Plan to reflect the 2030 target. The mid-term target would help frame the suite of policy measures, regulations,

planning efforts, and investments in clean technologies and infrastructure needed for ongoing emissions reductions, and laws to support these goals followed.

- SB 350, Chapter 547, 2015, establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030.
- SB 1383, Chapter 395, 2016, signed by the governor on September 19, 2016, requires ARB, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The new law also requires reductions of organic waste at landfills to 50 percent below 2014 standards by 2020, and to 75 percent below 2014 by 2025. These latter targets are aggregate statewide and need not be met by each jurisdiction.
- In 2016, the California Legislature voted to extend the State's GHG emission reduction targets, while simultaneously passing an ARB reform bill. SB 32 (Chapter 249, 2016), the California Global Warming Solutions Action of 2006: Emissions Limit, establishes a new target for GHG emissions reductions in the State at 40 percent of 1990 levels by 2030. This new target passed exactly one decade after AB 32, which required ARB to work to reduce California's statewide GHG emissions to 1990 levels by 2020. SB 32 was tied to AB 197 (Chapter 250, 2016), a measure to increase legislative oversight of ARB, creating a Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature concerning the State's programs, policies, and investments related to climate change. The bills became effective on January 1, 2017.
- On January 20, 2017, ARB released "The 2017 Climate Change Scoping Plan Update, the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target" (ARB, 2017a). The proposed framework includes the following elements:
 - 50 percent renewable energy
 - 50 percent reduction in statewide vehicular petroleum use
 - Doubling of energy efficiency in existing buildings
 - Carbon sequestration in California's land base
 - Aggressive reductions in short-lived climate pollutants, such as black carbon, fluorinated gases, and methane
- EO S-13-08 (2008) required the California Natural Resources Agency to prepare the State's strategy to organize State government adaptation programs. The 2009 California Climate Adaptation Strategy report summarized the best-known science on climate change impacts in the State (in the areas of public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture; forestry, and transportation and energy infrastructure) to assess vulnerability, and outlined possible solutions that could be implemented within and across State agencies to promote resiliency. In 2014, the California Natural Resources Agency issued an updated plan titled Safeguarding California: Reducing Climate Risk. In 2016, the California Natural Resources Agency released Safeguarding California: Implementation Action Plans in accordance with EO B-30-15, including an in-depth evaluation for the Water Sector (California Natural Resources Agency, 2016).
- During preparation of a 2017 update to the Safeguarding California Plan, the California Natural Resources Agency released a high-level policy document showing preliminary recommendations for the State's plan to protect California's people, natural resources, and built environment from climate change. To safeguard California's built environment, recommendations related to water management include flood preparation, groundwater management for drought resiliency, supply

diversification, water use efficiency, improvement of water storage capacity, climate considerations in water management decisions, protection and restoration of water resources and the ecosystems dependent on them, and other measures to improve California’s climate change resilience.

- In considering when to disclose projected quantitative GHG emissions, California has not established a significance threshold for cumulative emissions from temporary mobile sources such as construction equipment. AB 32 established 25,000 metric tons/year as the threshold for mandatory emissions reporting for stationary sources, but this threshold does not apply to mobile sources.
- The California Air Pollution Control Officers Association (CAPCOA) has issued Guidance Documents on Addressing GHGs under CEQA (2008) and Quantifying GHG Mitigation Measures (2010).

8.2.3 Local Climate Action Plans, Policies, and Regulations

San Mateo’s CAP is a comprehensive strategy to reduce GHG emissions and streamline the environmental review of GHG emissions of future development projects in the City (Pacific Municipal Consultants, 2015). The CAP identifies a strategy, reduction measures, and implementation actions the City will use to achieve the GHG emissions reduction target of 15 percent below 2005 emissions levels by 2020.

8.3 Assessment Methods and Thresholds of Significance

BAAQMD has developed specific GHG guidelines for compliance with CEQA (BAAQMD, 2017), which provide criteria on how to assess and mitigate Project-related GHG impacts.

Under CEQA, GHG emissions impacts may occur if the proposed Project would result any of the following:

- GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs

BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. However, the BAAQMD’s CEQA Guidelines suggest that the lead agency quantify and disclose GHG emissions that would occur during construction and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting applicable GHG reduction goals.

In May 2017, BAAQMD adopted CEQA thresholds of significance for operational-related GHG emissions. The BAAQMD thresholds for operational GHG emissions that are applicable to the proposed Project are as follows: compliance with a qualified GHG Reduction Strategy; or annual emissions less than 1,100 metric tons/year of CO₂e (BAAQMD, 2017).

GHG impacts were evaluated based on whether the GHG emissions may have a significant impact on the environment; more specifically, if the GHG emissions would hinder or delay California’s ability to meet the GHG reduction targets set in AB 32 and SB 32, or if the Project would hinder or delay the City’s GHG emission reduction goals in the CAP (Pacific Municipal Consultants, 2015).

8.4 Environmental Impacts

This section describes GHG and climate change impacts associated with construction and operation of the proposed Project. The analysis was based on the anticipated activities and associated GHG emission changes.

Impact 8-1. Would the proposed Project generate GHG emissions either directly or indirectly that may have a significant effect on the environment?

The GHG impacts for the Project were evaluated based on whether the GHG emissions would hinder or delay California’s ability to meet the GHG reduction targets set in applicable State plans and in the region’s climate action plan.

GHG emissions increases would occur during construction from the construction equipment and vehicles. During operation, direct emissions of GHG from the WWTP may increase. Underground Flow Equalization System operation would also increase the electricity usage due to the upgraded WWTP with its greater level of treatment facilities to pump wet weather flows and would result in indirect GHG emissions from power generation.

Although a quantitative threshold is not used, for information purposes, construction emissions of GHG were estimated. GHG emissions from the construction equipment and vehicles from the proposed Project construction were estimated using CalEEMod (California Air Pollution Control Officers Association, 2016). The same construction assumptions used for the air quality impact analysis were used for the GHG emission estimate.

Table 8-2 shows the total annual expected GHG emissions expected from construction of the proposed Project.

Table 8-2. Construction GHG Emissions

Underground Flow Equalization System Project, Environmental Impact Report

Construction Year	MTCO ₂ e per Year
Year 1	1,541
Year 2	1,823
Year 3	49

Note:

Emissions were modeled using CalEEMod.

GHG emissions from construction would be temporary. Implementation of BMPs listed in BAAQMD’s *Basic Construction Mitigation Measures*, such as minimizing idling times and maintaining equipment in good condition, would further reduce construction-related GHG emissions.

Operation of the proposed Project would result in direct GHG emissions from operation of the backup generator and maintenance vehicles, and indirect emissions associated with electricity usage. **Table 8-3** shows the expected direct GHG emissions from operation of the proposed Project.

Table 8-3. Operational GHG Emissions

Underground Flow Equalization System Project, Environmental Impact Report

	MTCO ₂ e per Year
Project Operations	16.3
BAAQMD Threshold	1,100
Exceeds threshold?	No

Note:

Emissions were modeled using CalEEMod.

As shown in **Table 8-3**, direct GHG emissions from operation would be negligible. Indirect GHG emissions would occur due to the additional power usage that would be required to pump wet weather flows from the temporary holding structure. Indirect GHG emissions may slightly increase from

operation of the proposed Project in comparison to existing condition. However, the Project would use the electricity from the California’s power grid. The new Renewables Portfolio Standard (RPS) signed under SB 2 in 2011 preempts ARB’s 33 percent Renewable Electricity Standard and applies to all electricity retailers in the State, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. As mandated by the new RPS, all these entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020. In 2015, SB 350 established targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030. Therefore, the electricity consumed by the Project from California’s power grid would be cleaner into the future, and the GHG emissions associated with Project electricity use would decrease over time.

In summary, the proposed Project would result in temporary GHG emissions from construction equipment and vehicles. Indirect operational emissions may increase because of the increased electricity needs, but operations would be consistent with the State and local GHG reduction strategies, the proposed Project would result in a less-than-significant GHG-related impacts.

Impact 8-2. Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The Project would be consistent with applicable federal, State, and local plans, policies, and regulations. The City of San Mateo’s CAP (Pacific Municipal Consultants, 2015) set local GHG emission reduction goals. Based on the City’s GHG emission inventory, the water and wastewater sectors combined contribute less than 1 percent of the total GHG inventory of the City. The proposed Project would fall under the classification of a wastewater project. Operation of the proposed Project would represent a negligible percent of the City’s GHG inventory. Therefore, the GHG emission changes associated with this Project would not affect or hinder the City’s ability to meet the plan’s GHG reduction goals.

Additionally, operation of the proposed Project would use electricity from the State’s power grid that complies with the RPS, SB 350, and AB 32 and SB 32 GHG reduction strategies and targets. Therefore, the Project’s GHG emissions would not hinder or otherwise conflict with the applicable plans, policies, or regulations to reduce GHG emissions.

8.5 Mitigation Measures

All impacts to GHGs would be less than significant and no mitigation measures are required.

8.6 References

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