Chapter 9
GREENHOUSE GAS EMISSIONS

9.1 Introduction

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. They are emitted by both natural (biogenic) and man-made (anthropogenic) sources. The Intergovernmental Panel on Climate Change (IPCC) has identified the following principal GHGs:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride

A GHG's potency or ability to trap heat in the atmosphere is expressed in terms of its global warming potential (GWP). By convention, CO_2 is assigned a GWP of 1. All other GHGs are compared to CO_2. For example, according to the 1996 IPCC Second Assessment Report (SAR), CH_4 has a GWP of 21, which means that it is 21 times more powerful than CO_2 at trapping heat in the atmosphere. N_2O has a GWP of 310[1]. GHG emissions are reported in terms of CO_2-equivalents (CO_2e) because they are compared to CO_2. When several GHGs are emitted from the same source, the total CO_2e is calculated by multiplying the mass emissions of each GHG by its respective GWP and adding all the products.

IPCC data suggests that the earth's temperature is influenced by the accumulation of GHGs in the atmosphere. Man-made GHG emissions associated with fossil fuel combustion have elevated the concentration of GHGs in the atmosphere above natural levels. According to the IPCC, the atmospheric concentration of CO_2 has increased from pre-industrial levels of 280 parts per million (ppm) to 379 ppm in 2005. The increase in man-made GHG emissions in that time has apparently contributed to higher global temperatures near the earth's surface over the same time period. This suggested relationship between the increased concentration of GHGs in the atmosphere and global temperatures has led to both legislation and regulations requiring reductions in GHG emissions.

Regulatory agencies, such as the Bay Area Air Quality Management District (BAAQMD), have made a clear distinction between biogenic CO_2 emissions, which result from the decay of living cells, and man-made CO_2 emissions, which occur when fossil fuels are burned. The BAAQMD has excluded CO_2 emissions from wastewater treatment processes from its fee rule and from its California Environmental Quality Act (CEQA) significance thresholds because these emissions are part of the short-term carbon cycle. The CO_2 emissions that result from the combustion of biologically derived digester gas are also reported separately from anthropogenic emissions in the annual inventories for the United States (U.S.) Environmental Protection Agency (EPA) and the California Air Resources Board (CARB).

[1] The United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines for national inventories were updated in 2006, but continue to require the use of GWPs from the IPCC Second Assessment Report (SAR) (IPCC 1996), see: http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf

It is important to note that climate change is a global impact, particularly as it relates to man-made GHG emissions. It is the cumulative effect of all GHG sources across the planet that can cause any appreciable impact to earth's climate. An individual project, by itself, would not generate enough GHG emissions to significantly influence global climate change (AEP 2007). As a consequence, there is no federal threshold for determining a significant impact from GHG emissions. The state of California has not adopted a significance threshold, but does require project proponents to quantify and disclose GHG emissions as part of CEQA. The South Coast Air Quality Management District (SCAQMD), in turn, has adopted significance thresholds for purposes of CEQA.

In this environmental impact report/environmental impact statement (EIR/EIS), the Sanitation Districts of Los Angeles County (Sanitation Districts) have quantified the GHG emissions from both the program and project, and have compared these emissions to adopted significance thresholds to determine if there are any significant impacts.

It should also be noted that the Sanitation Districts have contributed to GHG reductions by pioneering and implementing green technologies that recover energy from waste and provide treated wastewater for beneficial reuse. These programs displace fossil fuels that would otherwise be burned to produce power or import fresh water from other regions. These technological achievements are an outcome of the Sanitation Districts' mission to protect public health and environment through cost-effective wastewater and solid waste management, and in doing so convert waste into resources such as recycled water, renewable energy, and recycled materials. In 2010, the Sanitation Districts produced 800,000 megawatt-hours (MWh) of green power, offsetting 230,000 metric tons of CO_2e. This is enough renewable energy to power 120,000 homes. In fiscal year, 2009/2010, the Sanitation Districts beneficially reused 97,000 acre-feet of treated wastewater. The power avoided by not importing this amount of fresh water is about 260,000 MWh, offsetting 76,000 metric tons of CO_2e. While these green programs are not part of the Clearwater Program, they emphasize the Sanitation Districts' commitment to environmental stewardship.

As discussed in Section 3.6.1, a Preliminary Screening Analysis (Appendix 1-A) was performed to determine impacts associated with the construction and operation of program and project elements by resource area. During preliminary screening, each element was determined to have either no impact, a less than significant impact, or a potentially significant impact. Those elements determined to be potentially significant were further analyzed in this EIR/EIS. This EIR/EIS analysis discloses the final impact determination for those elements deemed potentially significant in the Preliminary Screening Analysis. The location of the GHG analysis for each program element is summarized by alternative in Table 9-1.

Table 9-1. Impact Analysis Location of Program Elements by Alternative

	Alternative						Analysis Location	
Program Element	**1**	**2**	**3**	**4**	**5[a]**	**6[b]**	**PSA**	**EIR/EIS**
Conveyance System								
Conveyance Improvements	X	X	X	X	X	N/A	C,O	-
SJCWRP								
Plant Expansion	X	X	X	X	X	N/A	-	C,O
Process Optimization	X	X	X	X	N/A	N/A	-	C,O
WRP Effluent Management	X	X	X	X	X	N/A	O	-

Table 9-1 (Continued)

	Alternative						Analysis Location	
Program Element	**1**	**2**	**3**	**4**	**5[a]**	**6[b]**	**PSA**	**EIR/EIS**
POWRP								
Process Optimization	X	X	X	X	N/A	N/A	-	C,O
WRP Effluent Management	X	X	X	X	X	N/A	O	-
LCWRP								
Process Optimization	X	X	X	X	N/A	N/A	-	C,O
WRP Effluent Management	X	X	X	X	X	N/A	O	-
LBWRP								
Process Optimization	X	X	X	X	N/A	N/A	-	C,O
WRP Effluent Management	X	X	X	X	X	N/A	O	-
WNWRP								
WRP Effluent Management	X	X	X	X	X	N/A	O	-
JWPCP								
Solids Processing	X	X	X	X	X	N/A	-	C,O
Biosolids Management	X	X	X	X	X	N/A	-	O
JWPCP Effluent Management	X	X	X	X	N/A	N/A	Evaluated at the project-level. See Table 9-2.	

WRP effluent management and biosolids management do not include construction.
[a] See Section 9.5.5 for a discussion of the No-Project Alternative.
[b] See Section 9.5.6 for a discussion of the No-Federal-Action Alternative.
PSA = Preliminary Screening Analysis
C = construction
O = operation
N/A = not applicable

As discussed in Section 3.2.2, Joint Water Pollution Control Plant (JWPCP) effluent management was the one program element that was carried forward as a project. The location of the GHG impact analysis for each project element is summarized by alternative in Table 9-2.

Table 9-2. Impact Analysis Location of Project Elements by Alternative

	Alternative						Analysis Location	
Project Element	**1**	**2**	**3**	**4**	**5[a]**	**6[b]**	**PSA**	**EIR/EIS**
Tunnel Alignment								
Wilmington to SP Shelf (onshore)	X				N/A	N/A	-	C,O
Wilmington to SP Shelf (offshore)	X				N/A	N/A	-	C,O
Wilmington to PV Shelf (onshore)		X			N/A	N/A	-	C,O
Wilmington to PV Shelf (offshore)		X			N/A	N/A	-	C,O
Figueroa/Gaffey to PV Shelf (onshore)			X		N/A	N/A	-	C,O
Figueroa/Gaffey to PV Shelf (offshore)			X		N/A	N/A	-	C,O
Figueroa/Western to Royal Palms (onshore)				X	N/A	N/A	-	C,O
Shaft Sites								
JWPCP East	X	X			N/A	N/A	-	C,O
JWPCP West			X	X	N/A	N/A	-	C,O

Table 9-2 (Continued)

	Alternative						Analysis Location	
Project Element	**1**	**2**	**3**	**4**	**5[a]**	**6[b]**	**PSA**	**EIR/EIS**
TraPac	X	X			N/A	N/A	-	C,O
LAXT	X	X			N/A	N/A	-	C,O
Southwest Marine	X	X			N/A	N/A	-	C,O
Angels Gate			X		N/A	N/A	-	C,O
Royal Palms				X	N/A	N/A	-	C,O
Riser/Diffuser Areas								
SP Shelf	X				N/A	N/A	-	C,O
PV Shelf		X	X		N/A	N/A	-	C,O
Existing Ocean Outfalls	X	X	X	X	N/A	N/A	-	C,O

[a] See Section 9.5.5 for a discussion of the No-Project Alternative.
[b] See Section 9.5.6 for a discussion of the No-Federal-Action Alternative.
PSA = Preliminary Screening Analysis
C = construction
O = operation
N/A = not applicable

9.2 Environmental Setting

9.2.1 Regional Setting

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase in global temperatures or change in global climate. This, in turn, has numerous indirect effects on the environment and humans.

Some climate changes that have already been observed include shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees (IPCC 2001). Longer-term environmental impacts of global warming may include a rise in sea level, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems with potential losses of species, and a significant reduction in the winter snow pack. Some estimates show a 30 to 90 percent reduction in snow pack in the Sierra Nevada mountain range. Current data suggest that in the next 25 years, in every season of the year, the state of California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. More specifically, the California Climate Change Center (Luers et al. 2006) predicts that California could witness the following events:

- Temperature rises between 3 to 10.5ºF
- 6 to 20 inches or more of sea level rise
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- 10 to 55 percent increase in the risk of wildfires

9.2.2 Program Setting

The Clearwater Program is discussed in Chapter 1. Certain program elements would impact the following wastewater treatment plants within the Joint Outfall System (JOS):

- San Jose Creek Water Reclamation Plant (SJCWRP)
- Pomona Water Reclamation Plant (POWRP)
- Los Coyotes Water Reclamation Plant (LCWRP)
- Long Beach Water Reclamation Plant (LBWRP)
- Joint Water Pollution Control Plant (JWPCP)

These facilities are described in Chapters 2 and 3. GHG emissions would be generated at these facilities primarily as a result of the combustion of fossil fuels in stationary equipment used to support wastewater treatment plant operations (water reclamation plants [WRPs] only), nitrification/denitrification processes (SJCWRP only), the combustion of digester gas for energy recovery and the production of steam (JWPCP only), the truck hauling of biosolids to remote sites for beneficial uses (JWPCP only), and indirectly[2] from electricity consumption.

9.2.3 Project Setting

The existing ocean discharge system does not contribute to GHG emissions because it is a conveyance system that utilizes primarily gravity flow.

9.3 Regulatory Setting

9.3.1 Federal

Federal regulations requiring reporting or reduction of GHG emissions are in various stages of development or implementation. In the 2007 U.S. Supreme Court case *Massachusetts v. EPA*, the court ruled that CO_2 and other GHGs are air pollutants that could be regulated by the EPA. Subsequent to the court case, the EPA Administrator signed a document making two significant findings with regard to GHG emissions, thereby allowing the EPA to proceed with rulemaking. The ultimate implementation of the federal GHG regulations may be preempted by congressional action.

The President's Council on Environmental Quality (CEQ) issued draft guidance on how GHG emissions should be handled under the National Environmental Policy Act (NEPA). Based on this guidance, federal agencies such as the U.S. Army Corps of Engineers (Corps) will not make an impact determination under NEPA for GHG emissions but, instead, use a reference point above which they are required to consider any additional environmental review. Consequently, the anticipated emissions for each project alternative would be disclosed relative to the NEPA baseline without expressing a judgment as to their significance.

[2] Direct emissions are those emitted from sources owned or controlled by a specific entity or action. For example, fuel combustion during construction activities results in direct emissions. Indirect emissions are those that result from a participant's actions but are produced from sources owned or controlled by another entity, including electricity produced at a remote power plant.

As indicated in Chapter 3, the program-level elements of the Clearwater Program are not part of the NEPA scope of analysis, but their impacts would be disclosed in the EIR/EIS. The project-level elements are within the NEPA scope of analysis.

The following summarizes recent federal regulations and policies related to climate change and GHGs.

9.3.1.1 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under the Clean Air Act

On December 7, 2009, the EPA Administrator signed two significant findings regarding GHGs under Section 202(a) of the Clean Air Act (CAA):

- Endangerment Finding. The EPA found that the current and projected concentrations of the six key GHGs in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding. The EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

This action provided the legal basis for the EPA to proceed with GHG rulemaking.

9.3.1.2 U.S. Environmental Protection Agency Tailoring Rule for Greenhouse Gas Emissions

On May 13, 2010, the EPA issued the "tailoring" rule for GHG emissions, which targets the largest GHG emitters. Starting January 2, 2011, the largest GHG emitters will be subject to the CAA construction and operating permit requirements. Facilities already subject to New Source Review permits for other pollutants will be required to include GHGs in their permits if they increase their emissions by 75,000 tons of CO_2e per year. On July 1, 2011, the EPA will extend the requirements to new construction projects that emit at least 100,000 tons of GHGs and existing facilities that increase their emissions by 75,000 tons per year, even if they do not exceed thresholds for pollutants. GHG emissions will be accounted for in Title V operating permits if the source emits 100,000 tons of CO_2e per year or more.

The EPA GHG guidance for this rule explains that new and modified facilities will be required to implement Best Available Control Technology (BACT) to control GHGs. There is still considerable uncertainty as to what controls must be installed. A BACT is a case-by-case analysis that considers technological feasibility, environmental effectiveness, and cost effectiveness of the control technology at the particular facility.

The Clearwater Program does not create a new large stationary GHG emissions source, so it will not be subject to the Tailoring Rule's BACT review or Title V permitting.

9.3.1.3 U.S. Environmental Protection Agency and National Highway Traffic Safety Administration National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a new national program to reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S. The EPA and NHTSA finalized a joint rule that established a national program consisting of new standards for model years 2012 through 2016 light-duty

vehicles that would reduce GHG emissions and improve fuel economy. The EPA finalized the national GHG emissions standards under the CAA, and the NHTSA finalized the Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act.

9.3.1.4 U.S. Environmental Protection Agency and National Highway Traffic Safety Administration National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Medium and Heavy Duty Engines and Vehicles

On August 9, 2011, the EPA and the NHTSA announced a new national program to reduce GHG emissions and improve fuel economy for new medium and heavy duty engines and vehicles sold in the U.S. The EPA and NHTSA finalized a joint rule that established a national program consisting of new standards for engines with model years 2014 through 2018. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of vehicles built for the 2014 to 2018 model years.

9.3.1.5 Council on Environmental Quality Draft Guidance on Consideration of Effects of Climate Change and Greenhouse Gas Emissions Under NEPA

In February 2010, the CEQ released a guidance memorandum on the ways in which federal agencies can improve their evaluation and disclosure of GHG emissions under NEPA for proposed federal actions. The guidance identified a reference point of 25,000 metric tons per year (mty) for direct CO_2e GHG emissions as an indicator that further NEPA review may be warranted. This reference point, however, is not intended to be used as a threshold for determining a significant impact or effect on the environment due to GHG emissions. The guidance also does not propose a reference point for indirect GHG emissions.

9.3.2 State

The U.S. Supreme Court's ruling in the 2007 case *Massachusetts v. EPA* held that the EPA has authority to regulate GHG emissions from new vehicles under the CAA. In 2007, State Attorney General Jerry Brown indicated that the ruling "made it clear" that California has a right to regulate GHGs. Consequently, GHG emissions can be regulated in the state of California and the associated emission reduction plans can be enforced through existing air quality laws.

9.3.2.1 Office of Planning and Research CEQA Guidelines on Greenhouse Gases

The Governor's Office of Planning and Research (OPR) developed amendments to the State CEQA Guidelines for addressing GHG emissions. These amendments became effective on March 18, 2010, when the Office of Administrative Law approved them. OPR did not define or set a CEQA threshold in which GHG emissions would be considered significant. Instead the lead agency would assess the significance of impacts from GHG emissions on the environment by considering a threshold that applies to the project and evaluate feasible mitigation measures.

In the South Coast Air Basin (SCAB), the SCAQMD has set a significance threshold for purposes of CEQA. The SCAQMD threshold will be used for evaluating the program and project elements of the Clearwater Program.

9.3.2.2 May 2008 Attorney General Greenhouse Gas CEQA Guidance Memo

The California State Attorney General's office released a CEQA guidance memo related to GHG analysis and mitigation measures (California State Attorney General's Office 2008). The memo provides examples of mitigation measures that could be used in a diverse range of projects. The measures identified in the memo have been considered in this EIR/EIS.

9.3.2.3 AB 32 – California Global Warming Solutions Act of 2006

AB 32 sets a statewide goal to reduce GHG emissions to 1990 levels by 2020. This act instructs CARB to adopt regulations that reduce emissions from significant sources of GHGs, and establish a mandatory GHG reporting and verification program by January 1, 2008.

Wastewater processes are not considered a significant GHG emissions source. Additionally wastewater-related CO_2 emissions are biogenic in nature, not man-made. Consequently, wastewater treatment operations with anthropogenic emissions below 25,000 mty of CO_2e are categorically excluded in the state's emerging GHG cap and trade regulation, and are not included in the AB 32 Scoping Plan's Early Reduction Measures. Additionally, biogenic CO_2 emissions from wastewater treatment operations are not reported as direct, anthropogenic emissions under the state's Mandatory Reporting Rule.

9.3.2.4 AB 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley), enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by 18 percent in 2020 and 27 percent in 2030 (CARB 2004).

9.3.2.5 Low Carbon Fuel Standard

In January 2007, by Executive Order, Governor Arnold Schwarzenegger established a low carbon fuel standard (LCFS) for transportation fuels sold in the state of California, where the initial goal is to reduce the carbon intensity of California's passenger vehicle fuels by at least 10 percent by 2020. In December 2011, the U.S. District Court issued an injunction halting enforcement of the rule until the litigation reaches a conclusion. The LCFS standard was not quantified in the analysis. Landfill gas, which is similar in nature to digester gas, qualifies as a low carbon fuel because of its very small carbon footprint.

9.3.2.6 Renewable Portfolio Standard Senate Bills (SB) 1078 and 107, and Executive Order S-14-08

Senate Bills 1078/107 and Executive Order S-14-08 - Renewable Portfolio Standard Senate Bills (SB) 1078 and 107, California's Renewable Portfolio Standard, obligates investor-owned utilities, energy service providers, and community choice aggregations to procure an additional 1 percent of retail sales per year from eligible renewable sources until 20 percent is reached, no later than 2010. The California Public Utilities Commission and California Energy Commission are jointly responsible for implementing the program. Executive Order S-14-08 sets forth a longer range target of procuring 33 percent of retail sales by 2020. Compliance of electrical utilities with Renewable Portfolio Standard would result in a lower emissions factor for California electricity in the future. Emission reductions that could result due to SB 1078 are not quantified in the analysis.

9.3.3 Regional

9.3.3.1 South Coast Air Quality Management District Interim CEQA Greenhouse Gas Thresholds

With no statewide CEQA significance threshold for GHG emissions, local public agencies within the SCAB requested guidance on how to determine if GHG impacts from a proposed project are significant from the SCAQMD. In December 2008, in response to these requests, the SCAQMD adopted a resolution approving the Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans, for situations in which the SCAQMD is the lead agency.

While the threshold was approved specifically for CEQA documents in which the SCAQMD is the lead agency, other lead agencies in the SCAB have used this threshold for determining the significance of GHG impacts of proposed projects. The Sanitation Districts will use the SCAQMD interim CEQA GHG significance threshold for this environmental impact report (EIR). As specified in the SCAQMD GHG CEQA guidance document, construction emissions are amortized over the life of the project, defined as 30 years.

SCAQMD adopted a tiered approach for determining the significance of GHG impacts for purposes of CEQA:

Tier 1. Consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. If the project does not qualify for an exemption, then it would move to the next tier. This tier does not apply to the Clearwater Program since an EIR/EIS has been prepared.

Tier 2. Consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan. If the project is consistent with the qualifying local GHG reduction plan, it is not significant for GHG emissions. In order for a GHG reduction plan to qualify, it must, at minimum, comply with AB 32 reduction goals, include emission estimates agreed upon by either CARB or the SCAQMD, have been analyzed under CEQA, and have a certified final CEQA document. Additionally, the GHG reduction plan must include a GHG emissions inventory tracking mechanism, a process to monitor progress in achieving GHG emission reduction targets, and a commitment to remedy the excess emissions if GHG reduction goals are not met (enforcement). If the project is not consistent with a qualifying local GHG reduction plan, there is no approved plan, or the GHG reduction plan does not include all the components described above, the project would move to the next tier. At this time, there are no qualifying local GHG reduction or general plans applicable to this EIR/EIS.

Tier 3. Establishes a stationary source screening significance threshold level of 10,000 mty. For the purposes of determining whether or not GHG emissions from affected projects are significant, SCAQMD specified that project emissions must include direct, indirect, and, to the extent information is available, life cycle emissions during construction and operation. Construction emissions would be amortized over the life of the project (defined as 30 years) added to the operational emissions, and compared to the applicable interim GHG significance threshold tier. If the project exceeds the GHG screening significance threshold and GHG emissions cannot be mitigated to less than the screening level, the project would move to the next tier. This will be used as the GHG significance threshold in this EIR/EIS.

Tier 4 (proposed but not approved). Consists of a decision tree approach that would allow the lead agency to choose one of three compliance options based on performance standards. The SCAQMD excluded Tier 4 for consideration by their board due to policy and legal concerns.

Tier 5. Implements offsite mitigation (GHG reduction projects) to reduce GHG emission impacts to less than the proposed screening level. If the project proponent is unable to implement offsite GHG reduction mitigation measures to reduce GHG emission impacts to less than the screening level, the GHG emissions from the project would be considered significant.

The SCAQMD expects Tier 3 to be the primary tier by which it will determine significance for projects where it is the lead agency.

9.3.3.2 South Coast Air Quality Management District 2007 Air Quality Management Plan

Every 3 years, the SCAQMD prepares an overall plan for bringing the SCAB into attainment with state and national ambient air quality standards for criteria pollutants. The SCAQMD Board adopted the most recent air quality management plan (AQMP) in June 2007.

The purpose of the AQMP is to reduce criteria pollutants, not GHGs. However, the AQMP considers GHG reductions to also result in a concurrent reduction of criteria pollutants associated with fossil fuel combustion. Consequently, the AQMP indicates that the reductions in criteria pollutant emission achieved through AB 32-related GHG programs will be applied toward the long-term criteria pollutant reduction targets for meeting the federal ozone standard.

The above SCAQMD strategy is reflected in long-term control measure No. 4 (LTM-04) of the 2007 AQMP, where the SCAQMD states it will apply GHG reductions achieved through state-implemented AB 32 programs toward the "concurrent" reduction in criteria pollutants. In Table 7-3 of the 2007 AQMP, the SCAQMD has assigned CARB as the lead implementing agency for LTM-04.

The 2007 AQMP also incorporated long-term population projections from the Southern California Association of Governments (SCAG) and the estimated emissions associated with such a population increase from all stationary, mobile, and area sources. The wastewater sector is included in these projections.

9.3.4 Local

No local agreements or regulations for GHG are in place at this time.

9.4 Environmental Impacts and Mitigation Measures

9.4.1 Methodology and Assumptions

GHG emissions associated with construction and operational activities were quantified and compared to the thresholds of significance described in Section 9.4.2 to determine if their impacts are significant. Because GHGs are not geographically bound pollutants, it is appropriate to consider the total combined program and project GHG emissions in determining significance. For purposes of analysis, construction emissions from both the program- and project-level elements were calculated based on the specific methodologies presented in Sections 9.4.1.1 and 9.4.1.2 and amortized over 30 years (SCAQMD 2008). In determining whether or not GHG emissions are significant, this analysis utilized SCAQMD's Tier 3 approach, which establishes a stationary source screening significance threshold level of 10,000 mty.

GHG emissions for project elements would derive from construction activities only because the project operation, which consists of the primarily passive flow of treated wastewater effluent to the existing or new ocean outfalls, would not generate air emissions. For program elements, the annual GHG emissions from operations were calculated based on the methodology in Section 9.4.1.1 and were added to the amortized program- and project-level construction values to obtain the total GHG emissions. The total unmitigated and mitigated GHG emissions were compared to the appropriate threshold of significance listed in Section 9.4.2.

It should be noted that amortizing over 30 years yields a conservative estimate with regard to GHG emissions because construction and operation activities could occur over a period that is longer than 30 years. Therefore, amortizing over the actual life would result in lower GHG emissions than those presented in this analysis.

The following general methodologies and assumptions were used in the GHG analysis:

- The emission estimates presented in this document were calculated using the latest available data, conservative assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available for this study.
- The numerical results presented in the tables of this report were rounded, often to the nearest whole number, for presentation purposes. As a result, the sum of tabular data in the tables could differ slightly from the reported totals.
- Mitigation measures were prescribed for those proposed activities that would exceed a significance criterion. Sources for mitigation measures included the California Air Pollution Controls Officers Association, the EPA, the SCAQMD, and the Office of the Attorney General. Only those mitigation measures that would result in quantifiable reductions were calculated. Potential emission reductions from other mitigation measures that are not readily quantifiable were prescribed but not quantified.
- GHG emissions are presented in metric tons of CO_2e.
- Biogenic CO_2 emissions are excluded.
- CH_4 and N_2O emissions were converted into CO_2e using their respective GWP (21 for CH_4 and 310 for N_2O) and presented in metric tons of CO_2e.
- Specific assumptions used in the analysis and calculations are presented in Appendix 9-A.

9.4.1.1 Methodology for Determining Program-Related Construction and Operational Emissions

The GHG impact analysis considers construction and operational impacts associated with the program. Construction of each program element would involve, but would not be limited to, the use of off road construction equipment, on-road employee vehicles, and heavy-duty haul trucks. These sources would generate GHG emissions in the form of exhaust from fuel combustion. Worker commute vehicles would also generate GHG emissions from vehicle exhaust. Construction emissions for each program element were quantified based on information provided by the Sanitation Districts and information found in similar construction projects. Applicable SCAQMD, CARB, and federal rules and/or emission factors were used to determine emission levels for engine exhausts and combustion equipment.

Operation of certain program elements would result in GHG emissions: N_2O emissions from the nitrification/denitrification process at the SJCWRP, indirect emissions from electrical consumption at the

WRPs, CH_4 and N_2O emissions from the combustion of digester gas, exhaust from biosolids hauling trucks from the JWPCP, and exhaust from the emergency generator at the SJCWRP. Operational activity data used to quantify GHG emissions associated with program-level operational activities was based on information provided by the Sanitation Districts.

San Jose Creek Water Reclamation Plant – Plant Expansion

Construction

Construction associated with expansion of the SJCWRP would include site preparation and treatment module installation. The SJCWRP expansion would likely occur between 2035 and 2040. Construction is estimated to take approximately 24 to 36 months to complete (see Chapter 3). Emissions associated with site preparation and treatment module installation were calculated using the URBEMIS2007 emissions model (URBEMIS 2007), which is a model recognized by the SCAQMD for estimating air emissions for a wide variety of land use projects. It was assumed that site preparation would take 3 months to complete, and tank installation would take 21 months to complete. Emissions would result from off-road construction equipment and from on-road travel associated with construction workers, material deliveries, and hauling trucks. Daily CO_2 emissions as calculated by URBEMIS were multiplied by the number of days to complete each phase. Total CO_2 emissions were taken as the sum of total CO_2 emissions from both phases of plant expansion. URBEMIS does not calculate CH_4 and N_2O emissions from construction activities. Therefore, CH_4 and N_2O emissions from construction activities associated with on-road and off-road sources were calculated based on the ratio of CH_4 and N_2O emission factors to the CO_2 emission factor found in the Climate Registry General Reporting Protocol (CR GRP) (CR 2011). Construction emissions were amortized over 30 years per SCAQMD's GHG CEQA significance thresholds methodology (SCAQMD 2008).

Operation

Electricity

Expansion of the SJCWRP would result in increased electrical consumption from the existing grid. Indirect GHG emissions associated with the purchase and use of electricity were calculated according to the methodology in the CR GRP (2011). The estimated increase in electricity consumption was provided by the Sanitation Districts. Emissions factors for CO_2, CH_4, and N_2O, in pounds per MWh, were obtained from the CR GRP for the year 2007 (CR 2011). Emission factors were assumed to remain constant through the planning horizon of 2050. Note that emission factors specified by the CR are conservative because the CR and this analysis do not quantify emission reductions due to compliance with SB 1078, as described in Section 9.3.2.6, which would result in a lower emissions factor for California electricity production in the future.

Generator

Expansion of the SJCWRP would necessitate the use of an additional emergency generator on site. GHG emissions from generator exhaust were calculated using EPA emission factor data for a Tier 4 (final) diesel generator set (DieselNet 2011). The emergency generator would not be required at the SJCWRP until after the plant is expanded, which is not likely until approximately 2035. As a conservative estimate, it is assumed that the generator will be tested 50 hours per year, which is the maximum allowed by SCAQMD Rule 1470. In actuality, generators such as this one are operated far less than 50 hours per year.

Nitrification/Denitrification

Expansion of the SJCWRP would result in increased nitrification and denitrification of wastewater, which serves to remove nitrogen prior to discharging treated effluent into receiving waters. GHG emissions

from nitrification and denitrification activities are in the form of N_2O, and emissions were calculated using the methodology presented in EPA GHG Inventory (EPA 2010) and population numbers projected by the Sanitation Districts based on SCAG estimates.

San Jose Creek Water Reclamation Plant, Pomona Water Reclamation Plant, Los Coyotes Water Reclamation Plant, Long Beach Water Reclamation Plant – Process Optimization

Construction

Process optimization would occur at four water reclamation plants: the SJCWRP, POWRP, LCWRP, and LBWRP. Construction emissions associated with two phases, site preparation and process optimization, were estimated using the URBEMIS2007 model. GHG emissions would result from off-road construction equipment exhaust and from on-road vehicle exhaust associated with construction workers, material deliveries, and hauling trucks. It is estimated that construction activities associated with process optimization would begin in 2018 and take between 2 and 3 years to complete at the SJCWRP, and between 1 and 2 years to complete at the POWRP, LCWRP, and LBWRP sites. The number of days for each phase was based on a ratio of expected construction length (2 to 3 years at the SJCWRP, and 1 to 2 years at the other WRPs). Daily CO_2 emissions as calculated by URBEMIS2007 were multiplied by the number of days necessary to complete each phase. Total CO_2 emissions were taken as the sum of CO_2 emissions from each phase at each WRP. URBEMIS2007 does not calculate CH_4 and N_2O emissions from construction vehicle exhaust. Therefore, CH_4 and N_2O emissions from construction vehicle exhaust were calculated based on the ratio of CH_4 and N_2O emission factors to the CO_2 emission factor found in the CR GRP (CR 2011). Construction emissions were amortized over 30 years and added to operational emissions.

Operations

Process optimization would likely result in a decreased or unchanged electrical consumption, but other factors such as pump station configuration would need to be evaluated in detail in order to quantify any net reduction in electrical demand. Consequently, a slight increase in electrical consumption is assumed for the pumping of approximately 2 to 3 million gallons (MG) of wastewater into storage tanks at the POWRP, 3 to 5 MG at the LBWRP, 4 to 8 MG at the LCWRP, and 15 to 35 MG at the SJCWRP. It was assumed that additional electricity would be purchased from the existing electrical grid. Indirect GHG emissions associated with the purchase and use of electricity were calculated according to the methodology in the CR GRP (2011). The Sanitation Districts provided estimates for the anticipated increase in electrical consumption. The emission factors for CO_2, CH_4, and N_2O, in pounds per MWh, were obtained from the CR GRP (CR 2011) and were assumed to remain constant through the planning horizon of 2050.

Joint Water Pollution Control Plant – Solids Processing

Construction

Construction associated with solids processing would consist of installing six new digesters at the JWPCP. Construction would occur at any time between 2018 and 2050. Construction emissions associated with solids processing were estimated using the URBEMIS2007 model. Construction activities would include site excavation and digester tank installation. GHG emissions would result from off-road construction equipment exhaust and from on-road vehicles associated with construction workers, material deliveries, and hauling trucks. The type and numbers of construction equipment were estimated based on project specifics provided by the Sanitation Districts and information from SCAQMD's sample construction scenarios (SCAQMD 2005). Daily CO_2 emissions as calculated by URBEMIS2007 were multiplied by the number of days necessary to complete each phase. Total CO_2 emissions were taken as the sum of all CO_2 emissions from construction activities at the JWPCP. URBEMIS2007 does not

calculate CH_4 and N_2O emissions from construction vehicle activities (exhaust). Emissions of CH_4 and N_2O from construction vehicle exhaust were calculated based on the ratio of CH_4 and N_2O emission factors to the CO_2 emission factor found in the CR GRP (CR 2011). Construction emissions were amortized over 30 years and added to operational emissions.

Operation

Combustion of Digester Gas

Increased solids processing at the JWPCP would result in increased production of digester gas, which would be combusted in existing flares, existing boilers, or additional boilers. Due to the uncertainty of whether the existing flares, existing boilers, or future boilers would be used to combust the additional digester gas, the analysis assumed the worst-case emission factors representative of flare and boiler technologies. The projected increase in digester gas was linearly based on the expected increase in solids handling at the JWPCP by 2050. As previously indicated, the CO_2 emissions associated with the combustion of the biologically derived digester gas are not counted. CH_4 and N_2O emissions were calculated based on site-specific source test emission factors provided by the Sanitation Districts and multiplied by the projected increase in digester gas.

Joint Water Pollution Control Plant – Biosolids Management

Construction

No construction elements are associated with biosolids management as defined in this analysis.

Operations

The increase in solids processing at the JWPCP would result in additional truck trips to disposal locations within the region (see Chapter 3, Table 3-7). Emissions associated with biosolids hauling in 2008 were used to define the CEQA baseline. It is estimated that there would be an additional 20 truckloads per day over the baseline. In 2008, biosolids were hauled to various disposal locations, both within the SCAB and other nearby air basins (see Chapter 2, Table 2-6). In the future, biosolids would be hauled to the same or comparable locations with the exception of the Puente Hills Landfill and Westlake Farms (see Chapter 3, Table 3-7). Puente Hills Landfill, located approximately 30 miles east of the JWPCP, will close in 2013. The Westlake Farms Composting Facility, located approximately 200 miles from the JWPCP, is scheduled to be operational in 2013.

Annual GHG emissions from biosolids hauling for analysis years 2020, 2030, and 2040 were calculated by multiplying haul truck vehicle miles traveled (VMT) by GHG emission factors. VMT was calculated as the product of the average distance to a biosolids management location and the number of truck trips per year (based on 55 truckloads per day at baseline and 75 truckloads per day by 2050). The average distance was determined by weighting the distance to each location by the amount of biosolids transported to that location. The gradual increase of biosolids generated at the facility would result in a corresponding gradual increase of haul truck trips.

The CO_2e emissions from on-road, heavy-duty haul trucks were calculated using emission factors generated by the EMFAC2007 model. The on-road mobile source emission factor was representative for a truck fleet in the Los Angeles County area (CARB 2006a). Emissions of CH_4 and N_2O from on-road, heavy-duty diesel trucks were calculated using emission factors found in the CR GRP (2011).

9.4.1.2 Methodology for Determining Project-Related Construction Emissions

The GHG impact analysis considers construction impacts associated with the project, as discussed in this section. During operations, the project would consist of a new or modified ocean discharge system to convey secondary effluent from the JWPCP to the ocean primarily by gravity, which would not generate GHGs. Therefore, only construction emissions are calculated in the project assessment. Construction activities for the project would involve, but not be limited to, the use of off-road construction equipment, cranes, on-road trucks, tugboats, barges, and heavy duty haul trucks. Petroleum fuel combustion associated with these sources would result in GHG emissions.

Construction emissions were quantified by using equipment usage and construction scheduling data provided by the Sanitation Districts. Emission factors from CARB's OFFROAD2007, EMFAC2007, and CR GRP were identified for each type of equipment, heavy-duty trucks, and marine vessels. Emission factors for the tunnel locomotive were obtained through a manufacturer.

GHG emissions were first calculated for individual construction activities (e.g., shaft construction, offshore and onshore tunneling, riser and diffuser construction, etc.). Annual emissions were determined by summing emissions from overlapping construction activities by year as indicated in the construction schedule (available in Appendix 9-A). Finally, following the SCAQMD's methodology for assessing GHG impacts, the total construction emissions were amortized over the life of the project, defined to be 30 years (SCAQMD 2008). It should be noted that the life of the project is expected to be longer than 30 years and amortizing over the actual life of the project would result in lower GHG emissions. As such, amortizing over 30 years yields a conservative estimate with regard to GHG emissions.

Harbor Craft

Tugboats would be used to guide barges during construction of the riser and diffuser as well as during the rehabilitation of the existing ocean outfalls. The CARB methodology for quantifying emissions from harbor craft (CARB 2007) was used in this analysis to quantify GHG emissions. Engine zero-hour emission factors for commercial harbor craft, engine useful life, and engine deterioration factors for typical harbor craft associated with project construction (CARB 2007) were used in the analysis along with the engine horsepower and activity schedule provided by the Sanitation Districts.

Off-Road Construction Equipment for All Project Elements

Emissions of CO_2, CH_4, and N_2O from diesel-powered construction equipment for both land-based equipment (e.g., cranes, loaders, etc.) and marine equipment (e.g., barge mounted equipment) were calculated using emission factors derived from the CARB OFFROAD 2007 Emissions Model (CARB 2006b). Using the Los Angeles County fleet information (see Appendix 5-B), the OFFROAD 2007 model was run for each construction year. Emission factors were calculated based on each type of equipment, horsepower rating of the equipment, and the corresponding equipment activity levels. Emissions of CO_2, CH_4, and N_2O from electrically powered construction equipment were calculated using emission factors found in the CR GRP (2011). Electric barge-mounted equipment was not considered feasible given the distance from shore.

On-Road Trucks Used During Construction for All Project Elements

Emissions of CO_2 from on-road, heavy-duty diesel trucks during construction were calculated using emission factors generated by the EMFAC2007 model. The on-road mobile source emission factor was representative of a truck fleet in Los Angeles County (CARB 2006a). Emissions of CH_4 and N_2O from on-road, heavy-duty diesel trucks during construction were calculated using emission factors found in the CR GRP (2011).

Assumptions regarding on-road trucks during construction are as follows:

- Trucks hauling debris or fill materials would travel a distance of 60 miles per trip (URBEMIS 2007).
- Non-incidental onsite truck idling times would be limited to 5 minutes for all truck trips per CARB's Heavy Duty Vehicle Idling Emissions Reduction Program (CARB 2005a).

Worker Commute Trips During Construction Activities for All Project Elements

Emissions from worker trips during construction were calculated using the EMFAC 2007 and CR GRP emission factors in conjunction with construction worker information supplied by the Sanitation Districts. The Sanitation Districts' construction estimates provided detailed information about the number of construction workers and man-hours required for each project element. Details on worker commute trips, including trip length and number of trips, are presented in Appendix 9-A.

9.4.1.3 Baseline

CEQA Baseline

The CEQA baseline for the Clearwater Program is described in Section 1.7.4.1. CEQA Guidelines require that an EIR include a description of the physical environmental conditions in the vicinity of a proposed project that exist at the time the notice of preparation is published, which is presented in Section 2.2.4. These environmental conditions would constitute the baseline physical conditions by which the CEQA lead agency determines whether an impact is significant. For this EIR/EIS, the CEQA baseline for determining the significance of potential impacts of the Clearwater Program is 2008.

The CEQA baseline for construction activities is zero emissions because construction activities would result in new emissions. The CEQA baseline for the operational activities and alternatives includes GHG emissions generated at the SJCWRP and the JWPCP, indirect emissions from electricity purchases, as well as emissions currently generated as a result of hauling of biosolids from the JWPCP site to various biosolids management locations. Emissions identified in the CEQA baseline constitute those emissions sources that would be affected by the program elements. For example, electricity purchases associated with plant operations at the WRPs other than the SJCWRP would not increase because the program would not increase plant capacity at the LBWRP, LCWRP, or POWRP. However, because it is conservatively assumed that there would be a slight increase in electrical consumption at the WRPs due to a new pump station for the flow equalization tanks under the program, the indirect emissions associated with flow equalization were included in the CEQA baseline. The average daily operational emissions associated with the CEQA baseline are presented in Table 9-3. Note that because of the substantial amount of daily truck trips and travel distances, biosolids hauling constitutes the majority of the baseline emissions.

Table 9-3. Operational Emissions – CEQA Baseline

Program/Project Element	CO_2e Emissions (metric tons per year)
Program-Specific Elements[a]	
SJCWRP Nitrification/Denitrification	2,374
WRPs Purchased Electricity	612
JWPCP Combustion of Digester Gas[b]	95
JWPCP Biosolids Hauling	8,897
Total	11,978
Project-Specific Elements[c]	0

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions from electricity consumption are the emissions that result from electricity purchased from the grid only. At the SJCWRP, 4.8 of the 5.4 MW were produced from landfill gas at the Puente Hills Landfill and are not included in the analysis.

[b] Biogenic CO_2e emissions are excluded for the reasons stated previously.

[c] Project operations are not quantified in the analysis because they are primarily passive activities that would not generate GHG emissions.

Sources: EPA 2010; CARB 2006a

NEPA No-Federal-Action Baseline

The NEPA baseline for the Clearwater Program is described in Section 1.7.4.2. The NEPA baseline is not bound to a "no growth" scenario. The NEPA baseline is the No-Federal-Action Alternative (Alternative 6), which is defined as activities that would occur absent federal action. Absent federal action, only the program elements (including SJCWRP plant expansion, WRP process optimization, JWPCP solids processing, and JWPCP biosolids management) would occur. Therefore, the NEPA baseline would be equivalent to emissions under the program elements. Additionally, because the NEPA baseline reflects operational program elements, the NEPA baseline would vary in each analysis year as program elements are implemented. The NEPA baseline for construction and operation is presented in Table 9-4.

Table 9-4. NEPA Baseline CO_2e Emissions (metric tons per year)

	2020	2030	2040	2050
Construction[a]	274	274	274	274
Operations				
SJCWRP Nitrification/ Denitrification	2,545	2,689	2,832	2,975
SJCWRP Generator	N/A	N/A	40	40
WRPs Purchased Electricity	849	1,048	1,246	1,444
JWPCP Combustion of Digester Gas	101	106	112	117
JWPCP Biosolids Hauling	13,576	14,628	15,738	16,805
Total	17,346	18,745	20,240	21,654

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

Construction and operational emissions are calculated per emissions methodology in Section 9.4.1.1.

[a] Construction CO_2e is the amortized value of total mitigated construction GHGs (8,216 metric tons) averaged over 30 years.

N/A = not applicable

9.4.2 Thresholds of Significance

The program and/or project would pose a significant impact if it exceeds any of the following thresholds for GHG emissions:

GHG-1. Generates GHG emissions that would have a significant impact on the environment.

GHG-2. Conflicts with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Program and project elements were analyzed by threshold in the Preliminary Screening Analysis (Appendix 1-A) to identify potentially significant impacts on GHGs before mitigation. Table 9-5 identifies which elements were brought forward for further analysis by threshold in this EIR/EIS for Alternatives 1 through 4. If applicable, Table 9-5 also identifies thresholds evaluated in this EIR/EIS if an emergency discharge into various water courses were to occur under the No-Project or No-Federal Action Alternatives, as described in Sections 3.4.1.5 and 3.4.1.6.

Table 9-5. Thresholds Evaluated

		Threshold	
	Alt.	**GHG-1**	**GHG-2**
Program Element			
SJCWRP Plant Expansion	1–5	X	X
SJCWRP Process Optimization	1–4	X	X
POWRP Process Optimization	1–4	X	X
LCWRP Process Optimization	1–4	X	X
LBWRP Process Optimization	1–4	X	X
JWPCP Solids Processing	1–5	X	X
JWPCP Biosolids Management	1–5	X	X
Project Element			
Wilmington to SP Shelf (onshore tunnel)[a]	1,2	X	X
Wilmington to SP Shelf (offshore tunnel)	1	X	X
Wilmington to PV Shelf (onshore tunnel)[a]	1,2	X	X
Wilmington to PV Shelf (offshore tunnel)	2	X	X
Figueroa/Gaffey to PV Shelf (onshore tunnel)	3	X	X
Figueroa/Gaffey to PV Shelf (offshore tunnel)	3	X	X
Figueroa/Western to Royal Palms (onshore tunnel)	4	X	X
JWPCP East Shaft Site	1,2	X	X
TraPac Shaft Site	1,2	X	X
LAXT Shaft Site	1,2	X	X
Southwest Marine Shaft Site	1,2	X	X
JWPCP West Shaft Site	3,4	X	X
Angels Gate Shaft Site	3	X	X
Royal Palms Shaft Site	4	X	X
SP Shelf Riser/Diffuser Area	1	X	X
PV Shelf Riser/Diffuser Area	2,3	X	X
Existing Ocean Outfalls Riser/Diffuser Area	1–4	X	X

[a] The onshore tunnel alignment for the Wilmington to SP Shelf is the same as the onshore tunnel alignment for the Wilmington to PV Shelf.
Alt. = alternative

9.4.3 Alternative 1

9.4.3.1 Program and Project

Impact GHG-1 and Impact GHG-2 are evaluated on a regional level and analyzed for the combined emissions of construction and operation activities that would occur for the program and project.

Impact GHG-1. Would Alternative 1 generate GHG emissions that would have a significant impact on the environment?

Construction and Operation

CEQA Analysis

Construction and operation emissions for Alternative 1 are shown in Table 9-6.

Table 9-6. Alternative 1 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,825
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,284
2016–2017	TraPac Shaft Site	5,828
2015–2016	LAXT Shaft Site	7,281
2016–2022	Offshore Tunnel Alignment (TBM2)[a]	242,419
2015–2016	Southwest Marine Shaft Site	5,841
2019–2021	SP Shelf Riser	3,166
2021–2022	SP Shelf Diffuser	4,430
2021–2022	Existing Ocean Outfalls	503
Total Project Construction		334,576
30-Year Amortized Project Construction Emissions (mty)		11,153
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117

Table 9-6 (Continued)

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 1 Annual Emissions		32,806
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		20,829
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a; 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

As shown in Table 9-6, construction of Alternative 1 (Program) would occur between 2018 and 2050. Construction activities would generate GHG emissions from direct emission sources, including mobile and stationary construction equipment exhaust, delivery and haul truck exhaust, and employee vehicle exhaust, as discussed in Section 9.4.1.1.

Construction of Alternative 1 (Project) would occur over a 96-month construction period, starting in the first quarter of 2015 and concluding in the fourth quarter of 2022. Construction activities would generate GHG emissions from the tunnel locomotive, mobile and stationary construction equipment exhaust and electricity consumption, tugboat and small boat exhaust, delivery and haul truck exhaust, and employee vehicle exhaust.

Since construction equipment and fleet vehicles would likely be more fuel efficient over time, if construction were delayed, emissions would be less than those quantified in this analysis. The construction equipment fleet mix and duration for each construction stage is detailed in the construction spreadsheets provided in Appendix 9-A.

Operation of Alternative 1 (Program) has the potential to create GHG impacts from various sources: N_2O and CH_4 emissions from increased combustion of digester gas, N_2O emissions from increased nitrification/denitrification at the SJCWRP, increased indirect electrical consumption at the WRPs, additional biosolids truck hauling from the JWPCP, and the additional emergency generator at the SJCWRP. Alternative 1 (Program) operational emissions at full buildout are presented in Table 9-6. Operation of Alternative 1 (Project) would consist of a new ocean discharge system to convey secondary effluent from the JWPCP to the ocean primarily by gravity, which would not generate GHGs. Therefore, project operations would not contribute to GHG emissions.

As shown in Table 9-6, impacts would be significant for GHG emissions for Alternative 1.

NEPA Analysis

In accordance with Section 1.4.2, the program elements are excluded from the NEPA scope of analysis. The NEPA baseline is equivalent to all activities that would occur absent federal action and as such is equivalent to emissions under the program elements. Therefore, subtracting the NEPA baseline from total Alternative 1 emissions would result in a NEPA increment that would always be equivalent to project construction emissions, as shown in Table 9-7. Because the project construction emissions are

represented by a 30-year constant average, the NEPA increment would always be constant for each analysis year.

Table 9-7. Alternative 1 Under NEPA Construction Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,825
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,284
2016–2017	TraPac Shaft Site	5,828
2015–2016	LAXT Shaft Site	7,281
2016–2022	Offshore Tunnel Alignment (TBM2)[a]	242,419
2015–2016	Southwest Marine Shaft Site	5,841
2019–2021	SP Shelf Riser	3,166
2021–2022	SP Shelf Diffuser	4,430
2021–2022	Existing Ocean Outfalls	503
Total Project Construction		334,576
30-Year Amortized Project Construction Emissions (mty)		11,153
Total Alternative 1 Annual Emissions		32,806
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		11,153
NEPA Reference Point[a] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

In accordance with CEQ guidance, the Corps will not utilize the SCAQMD's interim CEQA significance threshold, propose a new GHG standard, or make a NEPA impact determination for GHG emissions estimated to occur from the project alternatives. Rather, in compliance with the NEPA implementing regulations and CEQ guidance, the anticipated emissions for each alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance.

The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

GHG emissions under NEPA would be below the 25,000 mty CO_2e reference point per CEQ guidelines, as shown in Table 9-7. Because project operations would consist of the primarily passive flow of treated wastewater effluent, GHG emissions would not be generated during operations.

CEQA Impact Determination

The combination of emissions during construction and operation of Alternative 1 would generate GHG emissions that would have a significant impact on the environment. Impacts under CEQA would be significant before mitigation.

Mitigation

Some mitigation measures that reduce criteria pollutants may also reduce GHG emissions. Therefore, implementation of the following mitigation measures, including those defined in Chapter 5, may reduce GHG emissions. However, because GHG reductions from implementing these mitigation measures are difficult to quantify, no GHG reductions are assumed. It should also be noted that, although a particulate matter trap is part of certain air quality mitigation measures, it will not reduce CO_2 emissions.

Program

Mitigation Measure (MM) GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap.

MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap.

MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable.

Project

In addition to implementation of MM GHG-1a, MM GHG-1b, and MM GHG-1c, the following mitigation measures would also be applied to Alternative 1 (Project).

MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles.

MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive.

MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible.

MM GHG-1g. Use lighter-colored pavement during construction, where feasible.

MM GHG-1h. Recycle construction debris to the maximum extent feasible.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-8. Residual impacts would be significant and unavoidable.

Table 9-8. Alternative 1 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,823
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,283
2016–2017	TraPac Shaft Site	5,825
2015–2016	LAXT Shaft Site	7,278
2016–2022	Offshore Tunnel Alignment (TBM2)[a]	242,414
2015–2016	Southwest Marine Shaft Site	5,839
2019–2021	SP Shelf Riser	3,166
2021–2022	SP Shelf Diffuser	4,427
2021–2022	Existing Ocean Outfalls	503
Total Project Construction		334,558
30-Year Amortized Project Construction Emissions (mty)		11,152
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 1 Annual Emissions		32,806
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		20,828
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

NEPA Impact Determination

In compliance with the NEPA implementing regulations and CEQ guidance, anticipated emissions for Alternative 1 are disclosed relative to the NEPA baseline (see discussion under NEPA analysis) without expressing a judgment as to their significance. Therefore, there is no NEPA impact determination.

Mitigation

Although the GHG emissions were below the CEQ reference point, the same mitigation measures used under CEQA were evaluated under NEPA.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-9. In compliance with the NEPA implementing regulations and CEQ guidance, the anticipated emissions for each alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance. Therefore, there is no residual impact determination.

Table 9-9. Alternative 1 Under NEPA Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,823
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,283
2016–2017	TraPac Shaft Site	5,825
2015–2016	LAXT Shaft Site	7,278
2016–2022	Offshore Tunnel Alignment (TBM2)[a]	242,414
2015–2016	Southwest Marine Shaft Site	5,839
2019–2021	SP Shelf Riser	3,166
2021–2022	SP Shelf Diffuser	4,427
2021–2022	Existing Ocean Outfalls	503
Total Project Construction		334,558
30-Year Amortized Project Construction Emissions (mty)		11,152
Total Alternative 1 Annual Emissions		32,806
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		11,152
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

Impact GHG-2. Would Alternative 1 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?

Construction

CEQA Analysis

The state of California has adopted laws and policies directed at regulating and reducing GHG emissions (see Section 9.3). The 2007 AQMP prepared by the SCAQMD for the purpose of bringing the SCAB into attainment with the federal ozone standard will also have the concurrent benefit of reducing GHG emissions. Consequently, compliance with the laws and policies detailed in Section 9.3 and the 2007

AQMP would ensure that construction of Alternative 1 would not result in a significant GHG impact. Impacts would be less than significant.

NEPA Analysis

The NEPA analysis is not applicable to Impact GHG-2 because there is no federal policy or plan adopted to reduce GHG emissions.

Operation

CEQA Analysis

The SCAQMD used the SCAG population forecasts in developing the 2007 AQMP to estimate future emissions from all sources. The same SCAG data served as the basis for the JOS service area population estimates through the year 2050. A geographic information system model was then used to derive wastewater flow projections from the population data. Wastewater flow projections were used to quantify GHG emissions for this alternative. Therefore, the emissions generated by the Sanitation Districts operations are accounted for in the attainment strategies included in the 2007 AQMP. Alternative 1 is intended to accommodate the SCAG-projected population growth, which is accounted for in the 2007 AQMP. Consequently, Alternative 1 would be consistent with the applicable plan for reducing GHG emissions.

In addition, AB 32 aims to reduce statewide GHG emissions to 1990 levels by 2020. This act instructs CARB to adopt regulations that reduce emissions from significant sources of GHGs, and establish a mandatory GHG reporting and verification program by January 1, 2008. Alternative 1 would utilize stationary and mobile engines compliant with state and federal emission requirements, would adhere to control measures adopted by the state of California and federal government at the time of construction, and would, therefore, comply with the goals of AB 32. Impacts would be less than significant.

NEPA Analysis

The NEPA analysis is not applicable to Impact GHG-2 because there is no federal policy or plan adopted to reduce GHG emissions.

CEQA Impact Determination

Construction and operation of Alternative 1 would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Impacts under CEQA would be less than significant.

Mitigation

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

NEPA Impact Determination

There is currently no federal plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Furthermore, the Corps is not subject to California state laws and policies directed at regulating and reducing GHG emissions. Therefore, GHG-2 is not applicable to NEPA.

Mitigation

Not applicable.

Residual Impacts
Not applicable.

9.4.3.2 Impact Summary – Alternative 1

Impacts on GHGs for Alternative 1 are summarized in Table 9-10. The proposed mitigation, where feasible, and the significance of the impact before and following mitigation are also listed in the table.

Table 9-10. Impact Summary – Alternative 1

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-1. Would Alternative 1 generate GHG emissions that would have a significant impact on the environment?		
CEQA Significant Impact During Construction and Operation	**Program** MM GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **Project** MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d) MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles. MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive. MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible.	CEQA Significant and Unavoidable Impact During Construction and Operation

Table 9-10 (Continued)

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
	MM GHG-1g. Use lighter-colored pavement during construction, where feasible. MM GHG-1h. Recycle construction debris to the maximum extent feasible.	
NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point	N/A	NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point
Impact GHG-2. Would Alternative 1 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?		
CEQA Less Than Significant Impact During Construction	No mitigation is required.	CEQA Less Than Significant Impact During Construction
NEPA N/A During Construction	N/A	NEPA N/A During Construction
CEQA Less Than Significant Impact During Operation	No mitigation is required.	CEQA Less Than Significant Impact During Operation
NEPA N/A During Operation	N/A	NEPA N/A During Operation

9.4.4 Alternative 2

Alternative 2 (Program) is the same as Alternative 1 (Program). The impacts for the onshore tunnel; the JWPCP East, TraPac (Trans Pacific Container Service Corporation), LAXT (Los Angeles Export Terminal), and Southwest Marine shaft sites; and the existing ocean outfalls for Alternative 2 (Project) would be the same as for Alternative 1 (Project).

9.4.4.1 Program and Project

Impact GHG-1 and Impact GHG-2 are evaluated on a regional level and analyzed for the combined emissions of construction and operation activities that would occur for the program and project.

Impact GHG-1. Would Alternative 2 generate GHG emissions that would have a significant impact on the environment?

Construction and Operation

CEQA Analysis

Construction and operation emissions for Alternative 2 are shown in Table 9-11.

Table 9-11. Alternative 2 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,825
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,284
2016–2017	TraPac Shaft Site	5,828
2015–2016	LAXT Shaft Site	7,281
2016–2021	Offshore Tunnel Alignment (TBM2)[a]	186,358
2015–2016	Southwest Marine Shaft Site	5,841
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,428
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		278,519
30-Year Amortized Project Construction Emissions (mty)		9,284
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 2 Annual Emissions		30,938
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		18,960
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

As shown in Table 9-11, construction of Alternative 2 (Project) would occur over a 78-month construction period, starting in the first quarter of 2015 and concluding in the second quarter of 2021. Construction activities would generate GHG emissions from the tunnel locomotive, mobile and stationary construction equipment exhaust and electricity consumption, tugboat and small boat exhaust, delivery and haul truck exhaust, and employee vehicle exhaust. Operation of Alternative 2 (Project) would consist of

the primarily passive flow of treated wastewater effluent, which would not generate GHGs. Therefore, project operations would not contribute to GHG emissions. Impacts would be significant for GHG emissions for Alternative 2.

Because construction equipment and fleet vehicles would likely be more fuel efficient over time, if construction were delayed, emissions would be less than those quantified in this analysis. The construction equipment fleet mix and duration for each construction stage is detailed in the construction spreadsheets provided in Appendix 9-A.

NEPA Analysis

See the NEPA analysis under Alternative 1 for a discussion of CEQ guidance and NEPA implementing regulations. GHG emissions under NEPA would be below the 25,000 mty CO_2e reference point per CEQ guidelines, as shown in Table 9-12. Because project operations would consist of the primarily passive flow of treated wastewater effluent, GHG emissions would not be generated during operations.

Table 9-12. Alternative 2 (Project) Under NEPA Construction Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,825
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,284
2016–2017	TraPac Shaft Site	5,828
2015–2016	LAXT Shaft Site	7,281
2016–2021	Offshore Tunnel Alignment (TBM2)[a]	186,358
2015–2016	Southwest Marine Shaft Site	5,841
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,428
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		278,519
30-Year Amortized Project Construction Emissions (mty)		9,284
Total Alternative 2 Annual Emissions		30,938
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		9,284
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

CEQA Impact Determination

The combination of emissions during construction and operation of Alternative 2 would generate GHG emissions that would have a significant impact on the environment. Impacts under CEQA would be significant before mitigation.

Mitigation

Some mitigation measures that reduce criteria pollutants may also reduce GHG emissions. Therefore, implementation of the following mitigation measures, including those defined in Chapter 5, may reduce GHG emissions. However, because GHG reductions from implementing these mitigation measures are difficult to quantify, no GHG reductions are assumed.

Program

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), and MM GHG-1c (same as MM AQ-2d).

Project

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), MM GHG-1c (same as MM AQ-2d), MM GHG-1d (same as MM AQ-2f), MM GHG-1e (same as MM AQ-2g), MM GHG-1f, MM GHG-1g, and MM GHG-1h.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-13. Residual impacts would be significant and unavoidable.

Table 9-13. Alternative 2 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,823
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,250
2016–2017	TraPac Shaft Site	5,825
2015–2016	LAXT Shaft Site	7,278
2016–2021	Offshore Tunnel Alignment (TBM2)[a]	186,253
2015–2016	Southwest Marine Shaft Site	5,839
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,426
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		278,368
30-Year Amortized Project Construction Emissions (mty)		9,279

Table 9-13 (Continued)

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 2 Annual Emissions		30,933
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		18,955
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

NEPA Impact Determination

In compliance with the NEPA implementing regulations and CEQ guidance, anticipated emissions for Alternative 2 are disclosed relative to the NEPA baseline (see discussion under NEPA analysis) without expressing a judgment as to their significance. Therefore, there is no NEPA impact determination.

Mitigation

Although the GHG emissions were below the CEQ reference point, the same mitigation measures used under CEQA were evaluated under NEPA.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-14. In compliance with the NEPA implementing regulations and CEQ guidance, the anticipated emissions for each alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance. Therefore, there is no residual impact determination.

Table 9-14. Alternative 2 Under NEPA Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP East Shaft Site	5,823
2016–2018	Onshore Tunnel Alignment (TBM1)[a]	59,250
2016–2017	TraPac Shaft Site	5,825
2015–2016	LAXT Shaft Site	7,278
2016–2021	Offshore Tunnel Alignment (TBM2)[a]	186,253
2015–2016	Southwest Marine Shaft Site	5,839
2018–2020	PV Shelf Riser	3,167

Table 9-14 (Continued)

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
2020–2021	PV Shelf Diffuser	4,426
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		278,368
30-Year Amortized Project Construction Emissions (mty)		9,279
Total Alternative 2 Annual Emissions		30,933
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		9,279
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

Impact GHG-2. Would Alternative 2 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?

GHG emission impacts are analyzed on a regional basis. Consequently, the impacts under Impact GHG-2 would be common to all alternatives. Refer to the discussion for this impact under Alternative 1. Plan under Impact GHG-2 does not refer to Tier 2 of the SCAQMD GHG CEQA Significance Threshold.

9.4.4.2 Impact Summary – Alternative 2

Impacts on GHGs for Alternative 2 are summarized in Table 9-15. The proposed mitigation, where feasible, and the significance of the impact before and following mitigation are also listed in the table.

Table 9-15. Impact Summary – Alternative 2

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-1. Would Alternative 2 generate GHG emissions that would have a significant impact on the environment?		
CEQA Significant Impact During Construction and Operation	**Program** MM GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **Project** MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d) MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles. MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive. MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible. MM GHG-1g. Use lighter-colored pavement during construction, where feasible. MM GHG-1h. Recycle construction debris to the maximum extent feasible.	CEQA Significant and Unavoidable Impact During Construction and Operation
NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point	N/A	NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point

Table 9-15 (Continued)

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-2. Would Alternative 2 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?		
CEQA Less Than Significant Impact During Construction	No mitigation is required.	CEQA Less Than Significant Impact During Construction
NEPA N/A During Construction	N/A	NEPA N/A During Construction
CEQA Less Than Significant Impact During Operation	No mitigation is required.	CEQA Less Than Significant Impact During Operation
NEPA N/A During Operation	N/A	NEPA N/A During Operation

9.4.5 Alternative 3

Alternative 3 (Program) is the same as Alternative 1 (Program). The impacts for the construction of the riser and diffuser area on the PV Shelf for Alternative 3 (Project) would be the same as for Alternative 2 (Project). The impacts for the rehabilitation of the existing ocean outfalls would be the same as for Alternative 1 (Project).

9.4.5.1 Program and Project

Impact GHG-1 and Impact GHG-2 are evaluated on a regional level and analyzed for the combined emissions of construction and operation activities that would occur for the program and project.

Impact GHG-1. Would Alternative 3 generate GHG emissions that would have a significant impact on the environment?

Construction and Operation

CEQA Analysis

Construction and operation emissions for Alternative 3 are shown in Table 9-16.

Table 9-16. Alternative 3 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons/year)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274

Table 9-16 (Continued)

Time Period	Element/Phase	Total CO_2e Emissions (metric tons/year)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,825
2016–2021	Onshore/Offshore Tunnel Alignment (TBM1)[a]	148,413
2019–2019	Angels Gate Shaft Site	4,385
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,428
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		166,725
30-Year Amortized Project Construction Emissions (mty)		5,558
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation		21,380
Total Alternative 3 Annual Emissions		27,211
CEQA Baseline[b] (mty)		12,017
CEQA Increment (mty)		14,698
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

As shown in Table 9-16, construction of Alternative 3 (Project) would occur over a 78-month construction period, starting in the first quarter of 2015 and concluding in the second quarter of 2021. Construction activities would generate GHG emissions from the tunnel locomotive, mobile and stationary construction equipment exhaust and electricity consumption, tugboat and small boat exhaust, delivery and haul truck exhaust, and employee vehicle exhaust. Operation of Alternative 3 (Project) would consist of the primarily passive flow of treated wastewater effluent, which would not generate GHGs. Therefore, project operations would not contribute to GHG emissions. As shown in Table 9-16, impacts would be significant for GHG emissions for Alternative 3.

Because construction equipment and fleet vehicles would likely be more fuel efficient over time, if construction were delayed, emissions would be less than those quantified in this analysis. The construction equipment fleet mix and duration for each construction stage is detailed in the construction spreadsheets provided in Appendix 9-A.

NEPA Analysis

See the NEPA analysis under Alternative 1 for a discussion of CEQ guidance and NEPA implementing regulations. GHG emissions under NEPA would be below the 25,000 mty CO_2e reference point per CEQ guidelines, as shown in Table 9-17. Because project operations would consist of a new ocean discharge

system to convey secondary effluent from the JWPCP to the ocean primarily by gravity, GHG emissions would not be generated during operations.

Table 9-17. Alternative 3 Under NEPA Construction Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,825
2016–2021	Onshore/Offshore Tunnel Alignment (TBM1)[a]	148,413
2019–2019	Angels Gate Shaft Site	4,385
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,428
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		166,725
30-Year Amortized Project Construction Emissions (mty)		5,558
Total Alternative 3 Annual Emissions		27,211
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		5,557
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

CEQA Impact Determination

The combination of emissions during construction and operation of Alternative 3 would generate GHG emissions that would have a significant impact on the environment. Impacts under CEQA would be significant before mitigation.

Mitigation

Some mitigation measures that reduce criteria pollutants may also reduce GHG emissions. Therefore, implementation of the following mitigation measures, including those defined in Chapter 5, may reduce GHG emissions. However, because GHG reductions from implementing these mitigation measures are difficult to quantify, no GHG reductions are assumed.

Program

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), and MM GHG-1c (same as MM AQ-2d).

Project

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), MM GHG-1c (same as MM AQ-2d), MM GHG-1d (same as MM AQ-2f), MM GHG-1e (same as MM AQ-2g), MM GHG-1f, MM GHG-1g, and MM GHG-1h.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-18. Residual impacts would be significant and unavoidable.

Table 9-18. Alternative 3 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,823
2016–2021	Onshore/Offshore Tunnel Alignment (TBM1)[a]	148,329
2019–2019	Angels Gate Shaft Site	4,383
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,426
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		166,635
30-Year Amortized Project Construction Emissions (mty)		5,554
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Electricity Purchased (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 3 Annual Emissions		27,208
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		15,231
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

NEPA Impact Determination

In compliance with the NEPA implementing regulations and CEQ guidance, anticipated emissions for Alternative 3 are disclosed relative to the NEPA baseline (see discussion under NEPA analysis) without expressing a judgment as to their significance. Therefore, there is no NEPA impact determination.

Mitigation

Although the GHG emissions were below the CEQ reference point, the same mitigation measures used under CEQA were evaluated under NEPA.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-19. In compliance with the NEPA implementing regulations and CEQ guidance, the anticipated emissions for each alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance. Therefore, there is no residual impact determination.

Table 9-19. Alternative 3 Under NEPA Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,823
2016–2021	Onshore/Offshore Tunnel Alignment (TBM1)[a]	148,329
2019–2019	Angels Gate Shaft Site	4,383
2018–2020	PV Shelf Riser	3,167
2020–2021	PV Shelf Diffuser	4,426
2020–2020	Existing Ocean Outfalls	507
Total Project Construction		166,635
30-Year Amortized Project Construction Emissions (mty)		5,554
Total Alternative 3 Annual Emissions		27,208
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		5,554
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

Impact GHG-2. Would Alternative 3 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?

GHG emission impacts are analyzed on a regional basis. Consequently, the impacts under Impact GHG-2 would be common to all alternatives. Refer to the discussion for this impact under Alternative 1. Plan under Impact GHG-2 does not refer to Tier 2 of the SCAQMD GHG CEQA Significance Threshold.

9.4.5.2 Impact Summary – Alternative 3

Impacts on GHGs for Alternative 3 are summarized in Table 9-20. The proposed mitigation, where feasible, and the significance of the impact before and following mitigation are also listed in the table.

Table 9-20. Impact Summary - Alternative 3

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-1. Would Alternative 3 generate GHG emissions that may have a significant impact on the environment?		
CEQA Significant Impact During Construction and Operation	**Program** MM GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **Project** MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d) MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles. MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive. MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible. MM GHG-1g. Use lighter-colored pavement during construction, where feasible. MM GHG-1h. Recycle construction debris to the maximum extent feasible.	CEQA Significant and Unavoidable Impact During Construction and Operation
NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point	N/A	NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point

Table 9-20 (Continued)

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-2. Would Alternative 3 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?		
CEQA Less Than Significant Impact During Construction	No mitigation is required.	CEQA Less Than Significant Impact During Construction
NEPA N/A During Construction	N/A	NEPA N/A During Construction
CEQA Less Than Significant Impact During Operation	No mitigation is required.	CEQA Less Than Significant Impact During Operation
NEPA N/A During Operation	N/A	NEPA N/A During Operation

9.4.6 Alternative 4 (Recommended Alternative)

Alternative 4 (Program) is the same as Alternative 1 (Program). The impacts for the construction of the JWPCP West shaft site for Alternative 4 (Project) would be the same as for Alternative 3 (Project), except tunnel construction would occur over a period of 4 years instead of 5 years. The construction impacts for rehabilitation of the existing ocean outfalls for Alternative 4 would be the same as for Alternative 1 (Project).

9.4.6.1 Program and Project

Impact GHG-1 and Impact GHG-2 are evaluated on a regional level and analyzed for the combined emissions of construction and operation activities that would occur for the program and project.

Impact GHG-1. Would Alternative 4 generate GHG emissions that would have a significant impact on the environment?

Construction and Operation

CEQA Analysis

Construction and operation emissions for Alternative 4 are shown in Table 9-21.

Table 9-21. Alternative 4 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274

Table 9-21 (Continued)

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,825
2016–2020	Onshore Tunnel Alignment (TBM1)[a]	118,731
2019–2021	Royal Palms Shaft Site	4,385
2019–2020	Existing Ocean Outfalls	507
Total Project Construction		129,447
30-Year Amortized Project Construction Emissions (mty)		4,315
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 4 Annual Emissions		25,969
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		13,991
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

As shown in Table 9-21, construction of Alternative 4 (Project) would occur over a 78-month construction period, starting in the first quarter of 2015 and concluding in the second quarter of 2021. Construction activities would generate GHG emissions from the tunnel locomotive, mobile and stationary construction equipment exhaust and electricity consumption, tugboat and small boat exhaust, delivery and haul truck exhaust, and employee vehicle exhaust. Operation of Alternative 4 (Project) would consist of the primarily passive flow of treated wastewater effluent, which would not generate GHGs. Therefore, project operations would not contribute to GHG emissions. As shown in Table 9-21, impacts would be significant for GHG emissions for Alternative 4.

Because construction equipment and fleet vehicles would likely be more fuel efficient over time, if construction were delayed, emissions would be less than those quantified in this analysis. The construction equipment fleet mix and duration for each construction stage is detailed in the construction spreadsheets provided in Appendix 9-A.

NEPA Analysis

See the NEPA analysis under Alternative 1 for a discussion of CEQ guidance and NEPA implementing regulations. GHG emissions under NEPA would be below the 25,000 mty CO_2e reference point per CEQ guidelines, as shown in Table 9-22. Because project operations would consist of a modified ocean discharge system to convey secondary effluent from the JWPCP to the ocean primarily by gravity, GHG emissions would not be generated during operations.

Table 9-22. Alternative 4 Under NEPA Construction Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,825
2016–2020	Onshore Tunnel Alignment (TBM1)[a]	118,731
2019–2021	Royal Palms Shaft Site	4,385
2019–2020	Existing Ocean Outfalls	507
Total Project Construction		129,447
30-Year Amortized Project Construction Emissions (mty)		4,315
Total Alternative 4 Annual Emissions		25,969
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		4,315
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

CEQA Impact Determination

The combination of emissions during construction and operation of Alternative 4 would generate GHG emissions that would have a significant impact on the environment. Impacts under CEQA would be significant before mitigation.

Mitigation

Some mitigation measures that reduce criteria pollutants may also reduce GHG emissions. Therefore, implementation of the following mitigation measures, including those defined in Chapter 5, may reduce GHG emissions. However, because GHG reductions from implementing these mitigation measures are difficult to quantify, no GHG reductions are assumed.

Program

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), and MM GHG-1c (same as MM AQ-2d).

Project

Implement MM GHG-1a (same as MM AQ-2a), MM GHG-1b (same as MM AQ-2b), MM GHG-1c (same as MM AQ-2d), MM GHG-1d (same as MM AQ-2f), MM GHG-1e (same as MM AQ-2g), MM GHG-1f, MM GHG-1g, and MM GHG-1h.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-23. Residual impacts would be significant and unavoidable.

Table 9-23. Alternative 4 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2018–2019	POWRP Process Optimization	1,161
2018–2019	LBWRP Process Optimization	1,476
2018–2019	LCWRP Process Optimization	1,487
2018–2020	SJCWRP Process Optimization	2,255
2035–2040	SJCWRP Plant Expansion	417
2018–2050	JWPCP Solids Processing	1,421
Total Program Construction		8,216
30-Year Amortized Program Construction Emissions (mty)		274
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,823
2016–2020	Onshore Tunnel Alignment (TBM1)[a]	118,663
2019–2020	Existing Ocean Outfalls	507
2019–2021	Royal Palms Shaft Site	4,383
Total Project Construction		129,377
30-Year Amortized Project Construction Emissions (mty)		4,313
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Purchased Electricity (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805
Total Program Operation Annual Emissions		21,380
Total Alternative 4 Annual Emissions		25,966
CEQA Baseline[b] (mty)		11,978
CEQA Increment (mty)		13,989
CEQA Threshold (mty)		10,000
CEQA Significant?		Yes

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

NEPA Impact Determination

In compliance with the NEPA implementing regulations and CEQ guidance, anticipated emissions for Alternative 4 are disclosed relative to the NEPA baseline (see discussion under NEPA analysis) without expressing a judgment as to their significance. Therefore, there is no NEPA impact determination.

Mitigation

Although the GHG emissions were below the CEQ reference point, the same mitigation measures used under CEQA were evaluated under NEPA.

Residual Impacts

GHG emissions following mitigation are presented in Table 9-24. In compliance with the NEPA implementing regulations and CEQ guidance, the anticipated emissions for each alternative are disclosed relative to the NEPA baseline without expressing a judgment as to their significance. Therefore, there is no residual impact determination.

Table 9-24. Alternative 4 Under NEPA Annual Greenhouse Gas Emissions With Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Project Construction	
2015–2015	JWPCP West Shaft Site	5,823
2016–2020	Onshore Tunnel Alignment (TBM1)[a]	118,663
2019–2021	Royal Palms Shaft Site	4,383
2019–2020	Existing Ocean Outfalls	507
Total Project Construction		129,377
30-Year Amortized Project Construction Emissions (mty)		4,313
Total Alternative 4 Annual Emissions		25,966
NEPA Baseline (mty)		21,654
NEPA Increment (mty)		4,313
NEPA Reference Point[b] (mty)		25,000
NEPA Significant?		N/A

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQ reference point of 25,000 mty CO_2e (CEQ 2010) used in this analysis serves as an indicator that the federal action's anticipated GHG emissions warrant detailed consideration in a NEPA review. The reference point does not constitute an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but rather a minimum standard for reporting emissions under the CAA. The NEPA reference point includes direct emissions from the federal action. Per CEQ guidance, indirect emissions are not considered in the reference point.

TBM = tunnel boring machine

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

Impact GHG-2. Would Alternative 4 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?

GHG emission impacts are analyzed on a regional basis. Consequently, the impacts under Impact GHG-2 would be common to all alternatives. Refer to the discussion for this impact under Alternative 1. Plan under Impact GHG-2 does not refer to Tier 2 of the SCAQMD GHG CEQA Significance Threshold.

9.4.6.2 Impact Summary – Alternative 4

Impacts on GHGs for Alternative 4 are summarized in Table 9-25. The proposed mitigation, where feasible, and the significance of the impact before and following mitigation are also listed in the table.

Table 9-25. Impact Summary – Alternative 4

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-1. Would Alternative 4 generate GHG emissions that may have a significant impact on the environment?		
CEQA Significant Impact During Construction and Operation	**Program** MM GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable. **Project** MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d) MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles. MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive. MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible. MM GHG-1g. Use lighter-colored pavement during construction, where feasible. MM GHG-1h. Recycle construction debris to the maximum extent feasible.	CEQA Significant and Unavoidable Impact During Construction and Operation
NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point	N/A	NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point

Table 9-25 (Continued)

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Impact GHG-2. Would Alternative 4 conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions?		
CEQA Less Than Significant Impact During Construction	No mitigation is required.	CEQA Less Than Significant Impact During Construction
NEPA N/A During Construction	N/A	NEPA N/A During Construction
CEQA Less Than Significant Impact During Operation	No mitigation is required.	CEQA Less Than Significant Impact During Operation
NEPA N/A During Operation	N/A	NEPA N/A During Operation

9.4.7 Alternative 5 (No-Project Alternative)

Pursuant to CEQA, an EIR must evaluate a no-project alternative. A no-project alternative describes the no-build scenario and what reasonably would be expected to occur in the foreseeable future if the project were not approved. Under the No-Project Alternative for the Clearwater Program, the Sanitation Districts would continue to expand, upgrade, and operate the JOS in accordance with the JOS 2010 Master Facilities Plan (2010 Plan) (Sanitation Districts 1994), which includes all program elements proposed under the Clearwater Program, excluding process optimization at the WRPs, as described in Section 3.4.1.5. A new or modified ocean discharge system would not be constructed. As a result, there would be a greater potential for an emergency discharge into various water courses, as described in Section 3.4.1.5.

Because there would be no construction of a new or modified JWPCP ocean discharge system, the Corps would not make any significance determinations under NEPA and would not issue any permits or discretionary approvals for dredge or fill actions or for transport or ocean disposal of dredged material.

9.4.7.1 Program

Construction and operation emissions for Alternative 5 are shown in Table 9-26.

Table 9-26. Alternative 5 Under CEQA Construction and Operation Annual Greenhouse Gas Emissions Without Mitigation

Time Period	Element/Phase	Total CO_2e Emissions (metric tons)
	Program Construction	
2035-2040	SJCWRP Plant Expansion	417
2018-2050	JWPCP Solids Processing	1,421
Total Program Construction		1,837
30-Year Amortized Program Construction Emissions (mty)		61
	Program Operation	
2050	SJCWRP Nitrification/Denitrification (mty)	2,975
2050	SJCWRP Generator (mty)	40
2050	WRPs Electricity Purchased at SJCWRP (mty)	1,444
2050	JWPCP Combustion of Digester Gas (mty)	117
2050	JWPCP Biosolids Hauling (mty)	16,805

Table 9-26 (Continued)

Time Period Element/Phase	Total CO_2e Emissions (metric tons)
Total Program Operation Annual Emissions	21,3780
Total Alternative 5 Annual Emissions	21,4341
CEQA Baseline[b] (mty)	11,978
CEQA Increment (mty)	9,463
CEQA Threshold (mty)	10,000
CEQA Significant?	No

All numbers are rounded; therefore, totals may differ slightly from tabular calculations.

[a] Emissions are from tunnel locomotive.

[b] The CEQA baseline is zero for new construction. The CEQA baseline represents baseline operations.

Sources: CARB 2006a, 2006b, 2005a, 2005b; CR 2011; Cooper 2004; SCAQMD 2008; Starcrest 2009; EPA 2005, 1995; DieselNet 2011

Alternative 5 (Program) would consist of the implementation of the 2010 Plan. The impacts for plant expansion at the SJCWRP, WRP effluent management, JWPCP solids processing, and JWPCP biosolids management for Alternative 5 (Program) would be the same as for Alternative 1 (Program) and would be subject to mitigation in accordance with the EIR prepared for the 2010 Plan (Jones & Stokes 1994). Operational emissions associated with Alternative 5 (Program) would be the same as Alternative 1 (Program), excluding process optimization at the WRPs. As shown in Table 9-26, impacts would be less than significant.

9.4.7.2 Project

Alternative 5 does not include a project; therefore, a new or modified ocean discharge system would not be constructed. As a consequence of taking no action, there would be a greater potential for emergency discharges into various water courses, as described in Section 3.4.1.5. The emergency discharges would not result in impacts on the GHG emissions resource area, as the discharge would consist of water flowing through an existing river channel.

9.4.7.3 Impact Summary – Alternative 5

There would be less than significant impacts on GHGs for Alternative 5.

9.4.8 Alternative 6 (No-Federal-Action Alternative)

Pursuant to NEPA, an environmental impact statement (EIS) must evaluate a no-federal-action alternative. The No-Federal-Action Alternative for the Clearwater Program consists of the activities that the Sanitation Districts would perform without the issuance of the Corps' permits. The Corps' permits would be required for the construction of the offshore tunnel, construction of the riser and diffuser, the rehabilitation of the existing ocean outfalls, and the ocean disposal of dredged material. Without a Corps permit to work on the aforementioned facilities, the Sanitation Districts would not construct the onshore tunnel and shaft sites. Therefore, none of the project elements would be constructed under the No-Federal-Action Alternative. The Sanitation Districts would continue to use the existing ocean discharge system, which could result in emergency discharges into various water courses as described in Sections 3.4.1.6 and 9.5.5.2. The program elements for the recommended alternative would be implemented in accordance with CEQA requirements. However, based on the NEPA scope of analysis established in Sections 1.4.2 and 3.5, these elements would not be subject to NEPA because the Corps would not make any significance determinations and would not issue any permits or discretionary approvals.

9.4.8.1 Program

The program elements are beyond the NEPA scope of analysis.

9.4.8.2 Project

The impact analysis for Alternative 6 (Project) is the same as described for Alternative 5 (Project).

9.4.8.3 Impact Summary – Alternative 6

The program is not analyzed under Alternative 6. In compliance with NEPA implementing regulations and CEQ guidance, no impact determination was made for Alternative 6 (project). Furthermore, there is currently no federal plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

9.4.9 Comparison of Significant Impacts and Mitigation for All Alternatives

A summary of significant impacts on GHGs resulting from the construction and/or operation of program and/or project elements is provided in Table 9-27. Impacts are compared by alternative. Proposed mitigation, where feasible, and the significance of the impact following mitigation under CEQA and NEPA are also listed in the table.

Table 9-27. Comparison of Significant Impacts and Mitigation for Greenhouse Gas Emissions for All Alternatives

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
Alternatives 1, 2, 3, and 4		
Impact GHG-1. Would Alternatives 1 through 4 generate GHG emissions that would have a significant impact on the environment?		
CEQA Significant Impact During Construction and Operation	**Program** MM GHG-1a (same as MM AQ-2a). All on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating greater than 14,000 pounds will have a 2007 model year engine or newer, or be equipped with a particulate matter trap. MM GHG-1b (same as MM AQ-2b). All off-road diesel-powered equipment used during construction will be equipped with a U.S. Environmental Protection Agency (EPA) Tier 3 engine, except for specialized construction equipment in which an EPA Tier 3 engine is not available, and a diesel particulate matter trap. MM GHG-1c (same as MM AQ-2d). Commercially available construction equipment and heavy-duty trucks that use alternative fuels will be evaluated for use during construction, provided that they will be available prior to commencing construction and proven reliable.	CEQA Significant and Unavoidable Impact During Construction and Operation

Table 9-27 (Continued)

Impact Determination Before Mitigation	Mitigation Measure	Residual Impact After Mitigation
	Project MM GHG-1a (same as MM AQ-2a) MM GHG-1b (same as MM AQ-2b) MM GHG-1c (same as MM AQ-2d) MM GHG-1d (same as MM AQ-2f). Use harbor craft with the cleanest marine diesel engines available at the Port of Los Angeles. MM GHG-1e (same as MM AQ-2g). Use a U.S. Environmental Protection Agency Tier 4 engine to power the tunnel locomotive. MM GHG-1f. Use energy efficient lighting systems, such as LED technology, during construction, where feasible. MM GHG-1g. Use lighter-colored pavement during construction, where feasible. MM GHG-1h. Recycle construction debris to the maximum extent feasible.	
NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point	N/A	NEPA N/A During Construction and Operation; however, GHG emissions would be below the CEQ reference point