6.6 GREENHOUSE GAS EMISSIONS

This section describes the existing greenhouse gas emissions (GHGs) for the project site, potential environmental impacts, recommended mitigation measures to help reduce or avoid impacts, and the level of significance after mitigation. The discussion of GHGs in this section was summarized from the *Air Quality and Climate Change Technical Report for the Scholl Canyon Landfill Expansion Project* (AECOM, October 2012). This report is included as Appendix F of the Draft Environmental Impact Report (DEIR).

6.6.1 EXISTING CONDITIONS

GHGs are defined as any gas that absorbs infrared radiation within the atmosphere. GHGs include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). These GHGs lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the "greenhouse effect." The accumulation of GHGs in the atmosphere regulates the earth's temperature.

Emissions from human activities such as electricity production and vehicle operation have elevated the concentration of these gases in the atmosphere. Emissions of GHGs in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and contribute to what is termed "climate change," a trend of unnatural warming of the earth's average surface temperature and other significant changes in measures of climate, including precipitation, wind, and the incidence of extreme weather.

Unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern, GHGs are global pollutants and climate change is a global issue. GHG emissions are normalized based on each specific GHG's global warming potential (GWP) relative to CO_2, referred to as the "carbon dioxide equivalent" (CO_2e). GHGs are described below.

Water vapor is the most abundant and variable GHG in the atmosphere. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans. Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

CO_2 is an odorless, colorless GHG. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic degassing. Anthropogenic (human caused) sources of CO_2 include burning fuels such as gasoline, diesel, oil, coal, natural gas, and wood. Concentrations are currently around 379 CO_2e parts per million (ppm), which may rise to 1,130 CO_2e ppm by 2100 as a direct result of anthropogenic sources (Intergovernmental Panel on Climate Change [IPCC], 2007).

CH_4 is a gas and is the main component of natural gas used in homes. A natural source of CH_4 is the decay of organic matter. Geological deposits known as natural gas fields contain CH_4, which is extracted for fuel. Other sources are the decay of organic material in landfills, the fermentation of manure, and ruminant animals such as cattle.

N_2O, also known as laughing gas, is a colorless gas. N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (nylon production and nitric acid production) emit N_2O. It is used in rocket engines, as an aerosol spray propellant, and in race cars. NO_x is a generic term for mono-nitrogen

oxides, NO and NO_2, which are produced during combustion and are not the same as N_2O. Very small quantities of N_2O may be formed during fuel combustion by reaction of nitrogen and oxygen.

CFCs are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. Because they destroy stratospheric O_3, their production was stopped as required by the Montreal Protocol. CFCs have a GWP of between 140 and 11,700 CO_2e, with the low end being for HFC-152a and the higher end being for HFC-23.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest global warming potential of any gas at 23,900 CO_2e. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Ozone (O_3) is a GHG; however, unlike the other GHGs, O_3 in the troposphere is relatively short-lived and therefore is not global in nature. According to the California Air Resources Board (CARB), it is difficult to make an accurate determination of the contribution of O_3 precursors (NO_x and VOCs) to climate change (CARB, 2006).

6.6.1.1 Regulatory Setting

A summary of the applicable GHG regulations to the proposed project is provided below.

International Regulatory Authority

The Intergovernmental Panel on Climate Change (IPCC) is the leading body for the assessment of climate change. The IPCC is a scientific body that reviews and assesses the most recent scientific, technical, and socio-economic information produced worldwide relevant to the understanding of climate change. The scientific evidence brought up by the first IPCC Assessment Report of 1990 unveiled the importance of climate change as a topic deserving international political attention to tackle its consequences; it therefore played a decisive role in leading to the creation of the United Nations Framework Convention on Climate Change (UNFCCC), the key international treaty to reduce global warming and cope with the consequences of climate change (IPCC, 1990).

On March 21, 1994, the United States (US) joined a number of countries around the world in signing the UNFCCC. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change (United Nations [UN], 1998).

Federal Regulatory Authority

The federal Clean Air Act (CAA) defines the U.S. Environmental Protection Agency's (USEPA) responsibilities for protecting and improving the nation's air quality and the stratospheric O_3 layer. On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

Endangerment Finding: the current and projected concentrations of the six key well-mixed GHGs - CO_2, CH_4, N_2O, Hydrofluorocarbons **(**HFCs), Perfluorocarbons (PFCs), and SF_6 - in the atmosphere threaten the public health and welfare of current and future generations.

Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

In January 2010, the USEPA established a final rule based on the above findings that allowed for the initiation of regulatory development. In addition, on September 22, 2009, the USEPA released its final GHG Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required the USEPA to develop "mandatory reporting of GHGs above appropriate thresholds in all sectors of the economy."

The Reporting Rule applies to most entities that emit 25,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) or more per year. Facility owners are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule also mandates recordkeeping and administrative requirements in order for the USEPA to verify annual GHG emissions reports.

Requirements related to municipal solid waste (MSW) landfills are specific to facilities which emit equal to or greater than 25,000 $MTCO_2e$ of CH_4 emissions.

On June 3, 2010, the USEPA issued the Tailoring Rule and established two steps to implement PSD and Title V:

- Tailoring Rule Step 1 began on January 2, 2011. Step 1 applies to sources subject to PSD or Title V anyway due to their emissions of other pollutants ("anyway" sources) and that have the potential to emit 75,000 tons per year (TPY) CO_2e (or increase emissions by that amount for modifications);

- Tailoring Rule Step 2 began on July 1, 2011. In addition to anyway sources, Step 2 applies to facilities emitting GHGs in excess of 100,000 TPY CO_2e and facilities making changes that would increase GHG emissions by at least 75,000 TPY CO_2e, and that also exceed 100 to 250 TPY of GHGs on a mass basis.

The Tailoring Rule thresholds originally included biogenic CO_2. MSW GHG emissions are largely biogenic CO_2. In response to industry concerns that the regulation thresholds should not include biogenic CO_2, the USEPA issued a three-year deferral for the inclusion of CO_2 emissions from biological decomposition and biogas combustion for the applicability determinations for PSD and Title V. The deferral is in effect through 2014.

State Regulatory Authority

State Regulation

In efforts to reduce and mitigate climate change impacts, state and local governments are implementing policies and initiatives aimed at reducing GHG emissions. California, one of the largest state contributors to the national GHG emission inventory, has adopted significant reduction targets and strategies. A brief history of regulations and programs geared towards mitigating and reducing detrimental climate change

impacts are represented in Table 6.6-1 below. Extensive programs are described in detail following Table 6.6-1.

TABLE 6.6-1. CALIFORNIA STATE-WIDE GREENHOUSE GAS POLICY PROGRESS

Calendar Year	Policy	Initiative
1988	Assembly Bill (AB) 4420	California Energy Commission (CEC) began a study of statewide global warming impacts, and developed an inventory of GHG emission sources
2000	Senate Bill (SB) 1771	Established CCAR to allow companies, cities, and government agencies to voluntarily record GHG emissions in anticipation of early reduction credit
2004	AB 1493	CARB enacted and enforced emission standards that reduced GHG emissions from automobiles
2005	Executive Order (EO) S-3-05	Established GHG emission reduction targets through calendar year 2050; assigned lead agencies to develop a Climate Action Plan (CAP); the CAP developed programs and strategies to meet reduction targets
2006	SB 107 (Renewable Portfolio Standard)	Required investor owned utilities to get 20 percent of electricity from renewable sources by 2010
2006	AB 1925	Required CEC to study and make recommendations for capturing and storing industrial CO_2
2006	SB 1368	Required California Public Utilities Commission (CPUC) to develop and adopt a GHG emission performance standard for private electric utilities
2006	AB 32 (Global Warming Solutions Act)	Established statewide GHG emission limits, reporting requirements, and a verification procedure to monitor and enforce compliance
2007	EO S-01-07	Established statewide goal to reduce carbon intensity of transportation fuels by at least 10 percent by 2020
2007	SB 97	Required CEQA projects to provide GHG impact analysis; tasked local air districts to help lead and develop significance thresholds and significant impact criteria
2008	CARB Interim Significance Thresholds	CARB developed and proposed significance thresholds for industrial, commercial and residential projects; final recommendations to be promulgated in 2009
2008	SB 375	Established regional targets for reducing GHG emissions from passenger vehicles
2010	17 CCR Section 95100 - 95157	Established mandatory GHG reporting, verification, and other requirements for operators of certain facilities that directly emit GHG (such as electric power generating entities)

Source: CARB, 2010.

AB 32, the California Global Warming Solutions Act of 2006

Assembly Bill (AB) No. 32 (Chapter 488, Statutes of 2006) (AB 32) established specific statewide GHG emission reduction targets, as well as monitoring and reporting requirements for businesses and industries. The first emission reduction target for California is to reduce GHG emissions to 1990 levels by 2020. This legislation represents the first enforceable state-wide program in the US to cap all GHG emissions from major industries and include penalties for non-compliance.

In order to achieve this goal, a Climate Action Team was formed and a Climate Change Scoping Plan (CCSP) was drafted and accepted by CARB. The CCSP describes comprehensive, sector-based strategies

and programs tasked with significantly reducing GHG emissions in California. These reduction actions include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. These measures have been introduced through various workshops and continue to be developed (CARB, 2008a).

Sector-based strategies will have a direct impact on electricity generators such as the Grayson Power Plant, to which the Scholl Canyon Landfill's (SCLF) landfill gas (LFG) is sent to be converted into energy. Electricity generation is the second largest contributor to the national GHG emission inventory. In 2004, California's energy sector contributed 25 percent of the state's GHG emissions. The CCSP tasks the electricity sector with reducing GHG emissions by 40 percent by 2020. To achieve the reduction targets, the CCSP recommends a multi-faceted approach including aggressive energy efficiency programs and standards, a multi-sector regional cap-and-trade program, and economic incentives for renewable energy development (CARB, 2008a).

In addition, CARB has adopted a discrete early action GHG reduction measure under AB 32 to reduce emissions of CH_4 from MSW landfills. Effective June 17, 2010, this regulation requires owners and operators of certain uncontrolled MSW landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local Air Quality Management Districts (AQMDs) to voluntarily enter into memoranda of understanding with CARB to implement and enforce the regulation, and to assess fees to cover costs (CARB, 2010d). In 2011, the South Coast Air Quality Management District (SCAQMD) took delegation of this regulation by modifying its existing Rule 1150.1 to be fully compliant with the methane reduction regulation.

In addition, the CCSP includes the following recommended actions related to landfills (CARB, 2008a):

- Recommended Action 4: "Achieve 33 percent renewable energy mix statewide."
    - "Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and LFG."
- Recommended Action 15: "Reduce CH_4 emissions at landfills. Increase waste diversion, composting, and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste."

Overall, the CCSP calls on the recycling and waste sector to help meet AB 32's 2020 emission reduction target by reducing GHG emissions by 1 million $MTCO_2e$ through landfill methane capture (CARB, 2008a).

Local Regulatory Authority

Local Regulation

The City of Glendale has adopted General Plans geared towards reducing GHG emissions and mitigating climate change impacts. Applicable plans, policies, or goals are briefly described below.

On November 9, 2010, the City Council adopted a Resolution to Address Sustainability & Climate Change. In addition, the Mayor signed the United Nations Urban Environmental Accords (UNUEA) on behalf of the City. The UNUEA set out 21 specific actions for sustainable urban living, and will serve

as a framework for the City's future sustainability actions. Participating cities are be rated on how many actions they have achieved (City of Glendale, 2010).

The City of Glendale adopted the *Greener Glendale Plan for Municipal Operations*, which applies to internal government operations, on November 1, 2011 and the *Greener Glendale Plan for Community Activities*, which applies to community development, on March 27, 2012. The *Greener Glendale Plan for Community Activities* includes objectives that would indirectly reduce GHG emissions from landfill operations (City of Glendale, 2011). These objectives include diverting landfill waste to reduce GHG emissions from landfill waste decay, as listed below:

Objective WS2 – Reduce Use of Disposable, Non-Renewable Products
Objective WS3 – Improve Commercial Waste Diversion
Objective WS4 – Expand Waste Diversion Services

The *Greener Glendale Plan for Community Activities* also includes an objective to increase citywide use of renewable energy sources including landfill gas, solar, and wind power sources, as listed below.

Objective E1 – Increase the Use of Renewable Energy Citywide

6.6.1.2 Environmental Setting

This section discusses the existing national and state GHG emissions inventory and also discusses the existing GHG emissions and sources at SCLF.

National GHG Inventory

The USEPA publication, *Inventory of US GHG Emissions and Sinks: 1990-2008*, provides a comprehensive emissions inventory of the nation's primary anthropogenic sources of GHG emissions. In 2008, total US GHG emissions were approximately 6,956.8 million $MTCO_2e$, 84.1 percent of which was contributed from the combustion of fossil fuels. Landfills accounted for approximately 22 percent of total anthropogenic CH_4 emissions, the second largest contribution of any CH_4 source in the US (USEPA, 2010c).

State GHG Inventory

The State of California is a substantial contributor of GHG emissions. As of 2009, it is the second largest contributor in the US, and the 15th largest in the world, exceeding most nations (Southern California Association of Governments [SCAG], 2009). In 2010, CARB released a detailed inventory of statewide sources and estimated statewide gross emissions at approximately 478 million $MTCO_2e$ in 2008. The two largest contributors were the transportation and electric power sectors, accounting for 175 and 116 million $MTCO_2e$ (approximately 37 percent and 24 percent of total CO_2e emissions), respectively. Landfills accounted for 6.71 million $MTCO_2e$, or 1.4 percent of the total. The balance of California's GHG emissions inventory is comprised of the following sectors: commercial and residential, industrial, high GWP sources (such as substitutes for ozone-depleting substances, electricity grid SF_6 losses, and semiconductor manufacturing), agriculture, and forestry (CARB, 2010b).

Landfill GHG Emissions Sources and Baseline Site Conditions

Existing direct sources of GHG emissions include mobile and stationary sources. Baseline GHG emissions at the SCLF are presented in Table 6.6-2.

TABLE 6.6-2. BASELINE CONDITIONS - ANNUAL GHG EMISSIONS

Direct Source Type	$MTCO_2e/yr$
On site Mobile Equipment[1]	
Off-road Equipment	2,063
On-road Equipment	11
Customer and Employee Vehicles[2]	
Customer Vehicles	2,497
Employee Vehicles	720
Lift Construction[3]	
Mobile Sources	68
Annual Greenhouse Gas Emissions[4] =	5,358

Source: Modeled by AECOM, 2012.
Acronyms: $MTCO_2e$/year = metric tons of CO_2 equivalent per year
Notes:
1. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 4 of the DEIR.
2. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 6b) of the DEIR.
3. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 7) of the DEIR.
4. Biogenic sources of GHG emissions are not included in the total presented in Table 3.3-4. Biogenic CO_2 emissions include combustion of LFG and the inherent CO_2 that is produced during the formation of LFG. In addition, the methane emissions due to incomplete combustion of the LFG and from uncontrolled emissions through the landfill cover are also considered biogenic. The biogenic emission breakdown is as follows:
   CO_2 from combustion processes: 12,049.72 MT CO_2e
   CO_2 inherent in LFG: 10,633.74 MT CO_2e
   Methane from combustion processes: 1.81 MT (38 MT CO_2e)
   Methane fugitive emissions: 240.93 MT (5,060 MT CO_2e)

As presented in Table 6.6-2, direct sources of GHG emissions result in approximately 5,358 $MTCO_2e$/yr, which would not be considered a significant climate change impact when compared to the SCAQMD's stationary source threshold of 10,000 metric $MTCO_2e$/yr for industrial sources. Biogenic CO_2 emissions are excluded from this evaluation because they are the result of materials in the biological/physical carbon cycle, rather than the geological carbon cycle. Based on the cycle, process, and accuracy of quantification, biogenic sources of GHGs from MSW landfills have historically not been included in national (USEPA) or international (IPCC) emissions inventories. Therefore, these sources should not be included in the evaluation of project significance under CEQA.

6.6.2 THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the CEQA Guidelines, implementation of the proposed project would result in a significant adverse impact on the environment related to GHG emissions if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Section 15064.4 of the CEQA Guidelines states that a lead agency should consider the following factors, among others, when assessing the significance of impacts from GHG emissions on the environment:

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

- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

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

6.6.2.1 Agency Guidance

In October 2008, CARB released interim guidance on significance thresholds for industrial and residential projects. This interim threshold has been proposed but not yet been adopted. The draft proposal for industrial projects lists the GHG threshold at 7,000 $MTCO_2e$ per year for operational emissions (excluding transportation).

On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for interim GHG significance thresholds for projects where the SCAQMD is the lead agency. The SCAQMD significance thresholds are designed to reduce GHG emissions by 90 percent. The thresholds provide guidance to existing and future projects required to complete a GHG impact analysis. Formal methodologies for determining project significance are being developed. SCAQMD has published a five-tiered draft GHG threshold approach with bifurcated screening levels. Based on the SCAQMD draft, Tier 3 industrial development projects have a significance threshold of 10,000 $MTCO_2e$ per year, including both stationary and mobile source-related emissions (with construction impacts amortized over a 30-year period, plus operational impacts). If the proposed project exceeds the GHG screening significance threshold level and GHG emissions cannot be mitigated to less than the screening level, the project would move to Tier 4. The SCAQMD threshold for industrial projects has been used for this analysis because it applies to both stationary and mobile source emissions.

SCAQMD recommends mitigation for projects that cause a significant impact to minimize potentially adverse impacts per CEQA Guidelines §15126.4. Because GHG emissions are thought to contribute to global change, mitigation measures could be implemented locally, nationally, or internationally and provide global climate change benefits. Because reducing GHG emissions may provide co-benefits through concurrent reductions in criteria pollutants, when considering mitigation measures where the SCAQMD is the lead agency under CEQA, staff recommends mitigation measures that are real, quantifiable, verifiable, and surplus to be selected in the following order of preference:

- Incorporate GHG reduction features into the project design, e.g., increase a boiler's energy efficiency, use materials with a lower GWP than conventional materials, etc.

- Implement on site measures that provide direct GHG emission reductions on site, e.g., replace on site combustion equipment (boilers, heaters, steam generators, etc.) with more efficient combustion equipment, install solar panels on the roof, minimize fugitive emissions, etc.

- Implement neighborhood mitigation measure projects that could include installing solar power, increasing energy efficiency through replacing low-efficiency water heaters with high-efficiency water heaters, increasing building insulation, using fluorescent bulbs, replacing old inefficient refrigerators with efficient refrigerators using low-GWP refrigerants, etc.

- Implement in-district mitigation measures (such as any of the above identified GHG reduction measures); reduce vehicle miles traveled (VMT) through greater rideshare incentives, transit improvements, etc.

- Implement in-state mitigation measures, which could include any of the above measures.

- Implement out-of-state mitigation measure projects, which may include purchasing offsets if other options are not feasible.

The analysis quantifies the annual GHG emissions that will result from project-related mobile and stationary sources for construction and operation, and compares them to SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* (SCAQMD, 2008a).

Biogenic sources including biological decomposition and biogas combustion have not been quantified or included in this assessment. Based on industry concerns, the USEPA has deferred these sources from inclusion in PSD and Title permitting. In addition, exclusion of biogenic sources from environmental impact analysis under CEQA is supported by numerous regulatory measures. For example:

- USEPA's AP-42 and National GHG Inventory excludes solid waste and wastewater treatment biogenic emissions.

- USEPA's GHG Mandatory Reporting Rule segregates biogenic and anthropogenic emissions in its report formats.

- California's AB32 GHG regulation:

    - Does not require biogenic CO_2 emissions to count towards the threshold to determine what industries are part of the cap-and-trade carbon market.

    - Segregates biogenic and anthropogenic emissions in its Mandatory Reporting Program.

- The U.S. Department of Energy's GHG accounting protocols exclude biogenic emissions.

- The Bay Area Air Quality Management District's GHG fee regulation and CEQA Guidelines excludes biogenic CO_2 because "these are a result of materials in the biological/ physical carbon cycle, rather than the geological carbon cycle."

- The Regional GHG Initiative (RGGI) and the European Union both consider biomass energy to be a zero-greenhouse-gas-emitting technology.

The 2006 version (and earlier versions) of the United Nations Intergovernmental Panel on Climate Change (IPCC) Guidelines for national GHG inventories, excludes biogenic emissions from GHG inventory accounting. For similar reasons, these sources have been omitted from the GHG impact evaluation and significance determination and are not further evaluated in this Technical Report. However, an evaluation of existing plans and policies has been completed to demonstrate consistency in meeting local and regional GHG reduction targets and goals.

6.6.3 METHODOLOGY

GHG emissions from current operational sources are determined, and a discussion of significance is based upon Section 15064.4 of the CEQA Checklist, Appendix G, of the CEQA Guidelines.

6.6.3.1 Methodology Related to Direct GHG Emission Sources

Off-Road Mobile Sources

The operation of diesel-fueled mobile sources would result in CO_2 emissions. Emissions from daily operation of off-road equipment for cover transport and use, green waste shredding, and water application were calculated based on the Sanitation Districts of Los Angeles County (Sanitation Districts) records of fuel usage by equipment at the SCLF.

Composite, average emission factors representative of off-road vehicles operating during 2011 within the SCAB were utilized to estimate mobile source CO_2 emissions from baseline conditions, the No Project Alternative, Variation 1, and Variation 2. For this analysis, construction equipment includes both existing SCLF equipment and additional contractor equipment. It is important to note that due to fleet turnover and regulatory implications resulting from the CARB's In-Use Off-road Diesel Regulation, mobile source emissions will continue to decrease over the lifetime of the project. Off-road emissions have been estimated based on 2011 average emission factors and therefore do not account for the additional benefit realized due to fleet turnover and regulatory implications referenced above.

Emissions were quantified using spreadsheets populated with composite, fleet average emission factors for the appropriate equipment type. Schedule assumptions, hours of operation, equipment type, and detailed emission calculations are provided in Appendix F of the DEIR.

On-Road Mobile Sources

On-road mobile sources include gasoline- and diesel-fueled, on-road light- and heavy-duty trucks used during worker commute trips and operation of assorted on site equipment such as pickup trucks, and customer vehicles hauling refuse, green waste and soil. These emissions were estimated using emission factors derived from CARB's on-road emissions inventory model (On-Road EMFAC 2011), obtained from the SCAQMD website (SCAQMD, 2010b). For baseline conditions, worker commute emissions were calculated for the 31 regular SCLF employees, who were assumed to commute 60 miles round trip. For the No Project Alternative, Variation 1 and Variation 2, worker commute emissions were calculated for 40 regular SCLF employees, who were assumed to commute 60 miles round trip.

Stationary Sources

Existing stationary sources of GHGs consist of permitted equipment such as a diesel-powered pressure washer and LFG flares. These stationary sources primarily result in CO_2 emissions as a direct result of fossil fuel combustion and biogenic activity, respectively. Because the permitted intake of the facility would not increase and is not proposed for modification, it has been assumed that permitted and non-permitted stationary sources (such as heaters or engines) would not result in a change in operational parameters as a result of the No Project Alternative, Variation 1 or Variation 2. Therefore, there would be no incremental increase or decrease in GHG emissions from existing stationary sources.

6.6.3.2 Methodology Related to Indirect GHG Emission Sources

Indirect sources include off site electricity generation resulting from the electrical demand of SCLF. However, on site electrical demand is powered by Grayson Power Plant, which receives LFG from SCLF. SCLF LFG is a local source of alternative, renewable fuel which reduces the demand for non-domestic, non-renewable, fossil-fuels. Therefore, the facility's indirect GHG impacts are minimal and have not been further evaluated.

6.6.4 IMPACTS

6.6.4.1 Variation 1

Construction Impacts

Because Variation 1 does not include any lateral expansion, there will be no "new" construction activities associated with continued operation of the landfill. No further analysis has been conducted. Therefore, impacts related to GHGs would be considered less than significant.

Operation Impacts

The estimated annual incremental increase in GHG emissions resulting from operation of Variation 1, compared to baseline conditions, is presented in Table 6.6-3.

TABLE 6.6-3. VARIATION 1 – ANNUAL GREENHOUSE GAS EMISSIONS

Direct Source Type	$MTCO_2e$/year
On site Mobile Equipment[1]	
Off-road Equipment	3,633
On-road Equipment	11
Customer and Employee Vehicles[2]	
Customer Vehicles	5,061
Employee Vehicles	929
Lift Construction[3]	
Mobile Sources	140
Annual GHG Emissions, Variation 1	9,774
Annual GHG Emissions, Baseline Conditions	5,358
Net Change in Annual GHG Emissions compared to Baseline Conditions	4,416
SCAQMD's Interim GHG Threshold	10,000
Would Variation 1 Exceed the SCAQMD's Interim GHG Threshold (Y/N)?	No

Source: Modeled by AECOM, 2012.
Notes:
1. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 5) of the DEIR.
2. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 6f) of the DEIR.
3. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 8) of the DEIR.

As described previously, biogenic sources of GHG emissions have not been included in this evaluation. As presented in Table 6.6-3, the incremental increase in direct GHG emissions generated from Variation 1, compared to baseline conditions, would not exceed the SCAQMD's GHG threshold of 10,000 $MTCO_2e$/yr for industrial projects. Therefore, impacts related to GHGs would be considered less than significant.

Conformance with Applicable Plans, Policies, Regulations, and Requirements

Implementation and operation of Variation 1 would result in continued operation of the SCLF, which provides a renewable energy source for electricity generation. This is consistent with the CCSP Recommended Action 4 to provide renewable energy sources as an alternative to fossil fuel combustion. In addition, as described above, the GHG emissions generated during construction and operation of

Variation 1 are below all available thresholds and would therefore not produce a significant climate change impact. Variation 1 would not conflict with the AB 32 CCSP's overall emissions reduction goal. Therefore, Variation 1 would not conflict with any applicable plan, policy, regulation, or requirement adopted for the purpose of reducing GHG emissions.

6.6.4.2 Variation 2

Construction Impacts

State and regional efforts to mitigate and control emissions of GHGs currently focus on operational emissions. Variation 2 would result in short-term, temporary construction activities that would result in GHG emissions as a direct result of equipment operations and fossil-fuel combustion. CO_2 emission estimates during construction are represented in Table 6.6-4. These emission estimates are provided for project reference. In addition, total GHG emissions for construction are also amortized over 30 years, per SCAQMD guidance.

TABLE 6.6-4. VARIATION 2 - CONSTRUCTION GREENHOUSE GAS EMISSIONS SUMMARY

Construction Activity	$MTCO_2e$[1]
Total Construction, $MTCO_2e$/Project =	3,130
Amortized Emissions, $MTCO_2e/Yr$[2] =	104

Source: Modeled by AECOM, 2012.
Acronyms: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Notes:
1. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 9) of the DEIR.
2. Construction emissions have been amortized over the projected 30-year project duration, in accordance with SCAQMD guidance.

GHG emissions are evaluated by summing amortized construction emissions and operational emissions. The annual GHG emissions impact, accounting for both construction and operation, is presented in Table 6.6-5.

Operation Impacts

GHG emissions resulting from the operation of Variation 2 are evaluated based on direct sources. Direct sources of GHG emissions include mobile and stationary sources. The incremental increases in annual GHG emissions resulting from Variation 2, compared to baseline conditions, are presented in Table 6.6-5.

TABLE 6.6-5. VARIATION 2 –ANNUAL GREENHOUSE GAS EMISSIONS

Direct Source Type	$MTCO_2e$/year[1]
On site Mobile Equipment[2]	
Off-road Equipment	3,633
On-road Equipment	11
Customer and Employee Vehicles[3]	
Customer Vehicles	5,061
Employee Vehicles	929
Lift Construction[4]	
Mobile Sources	157
Annual Operational GHG Emissions, Variation 2	9,791
Amortized Construction GHG Emissions, Variation 2	104

TABLE 6.6-5. VARIATION 2 –ANNUAL GREENHOUSE GAS EMISSIONS

Direct Source Type	$MTCO_2e$/year[1]
Annual GHG Emissions, Baseline Conditions	5,358
Net Change in Annual GHG Emissions compared to Baseline Conditions	4,537
SCAQMD's Interim GHG Threshold	10,000
Would Variation 2 Exceed the SCAQMD's Interim GHG Threshold (Y/N)?	No

Source: Modeled by AECOM, 2012.
Notes:
1. Annual emissions are based on projected lifetime operation of 27 years
2. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 5) of the DEIR.
3. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 6f) of the DEIR.
4. Detailed emission calculations are presented in Appendix F (Appendix A-1, Table 9) of the DEIR.

As described previously, biogenic sources of GHG emissions have not been included in this evaluation. As presented in Table 6.6-5, the incremental increase in direct GHG emissions generated from Variation 2, compared to baseline conditions, would not exceed the SCAQMD's interim GHG threshold for industrial projects, and thus would not be significant. Therefore, impacts related to GHGs would be considered less than significant.

Conformance with Applicable Plans, Policies, Regulations, and Requirements

Implementation and operation of Variation 2 would result in continued operation of the SCLF, which provides a renewable energy source for electricity generation. This is consistent with the CCSP Recommended Action 4 to provide renewable energy sources as an alternative to fossil fuel combustion. In addition, as described above, the GHG emissions generated during construction and operation of Variation 2 are below all available thresholds and would therefore not produce a significant climate change impact. Variation 2 would not conflict with the AB 32 CCSP's overall emissions reduction goal. Therefore, Variation 2 would not conflict with any applicable plan, policy, regulation, or requirement adopted for the purpose of reducing GHG emissions.

6.6.5 MITIGATION MEASURES

6.6.5.1 Variation 1

No mitigation measures are required.

6.6.5.2 Variation 2

No mitigation measures are required.

6.6.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

6.6.6.1 Variation 1

Implementation of Variation 1 would result in a less than significant impact related to GHG emissions. There would be no impacts related to conflicts with GHG plans, policies, regulations, and requirements.

6.6.6.2 Variation 2

Implementation of Variation 2 would result in a less than significant impact related to GHG emissions. There would be no impacts related to conflicts with GHG plans, policies, regulations, and requirements.