Air Quality Technical Report

Tierra del Sol Solar Farm Project

Major Use Permit 3300-12-010

Rezone 3600-12-005

Environmental Review Project Number 3910-120005

Boulevard, San Diego County, California

Lead Agency:

County of San Diego
Department of Planning and Land Use
5201 Ruffin Road, Suite B
San Diego, California 92123
Contact: Larry Hofreiter

Project Proponent:

Tierra del Sol LLC
c/o Soitec Solar Development LLC
4250 Executive Square, Suite 770
San Diego, California 92037

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Dave Deckman

David Deckman

DECEMBER 2013

Printed on 30% post-consumer recycled material.

TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (Continued)

APPENDICES

TABLE OF CONTENTS (Continued)

Page No.

FIGURES

TABLES

INTENTIONALLY LEFT BLANK

GLOSSARY OF TERMS AND ACRONYMS

APCD	Air Pollution Control District
AQMD	Air Quality Management District
BACT	Best Available Control Technology
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CO	Carbon monoxide
DPM	Diesel particulate matter
EPA	Environmental Protection Agency
HAPs	Hazardous air pollutants
$\mu g/m^3$	Micrograms per cubic meter
MUP	Major Use Permit
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NO_x/NO_2	Nitrogen oxides/nitrogen dioxide
O_3	Ozone
O&M	Operations and Maintenance
OEHHA	Office of Environmental Health Hazard Assessment
Pb	Lead
$PM_{2.5}$	Fine particulate matter
PM_{10}	Respirable particulate matter
ppm	Parts per million
RAQS	San Diego County's Regional Air Quality Strategy
SANDAG	San Diego Association of Governments
SCAQMD	South Coast Air Quality Management District
SDAB	San Diego Air Basin
SDAPCD	San Diego County Air Pollution Control District
SIP	State implementation plan
SO_x/SO_2	Sulfur oxides/sulfur dioxide
TACs	Toxic air contaminants
T-BACT	Toxics-Best Available Control Technology
VMT	Vehicle miles traveled
VOCs	Volatile organic compounds

INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The proposed Tierra del Sol solar farm project (Proposed Project) would produce up to 60 megawatts (MW) of solar energy and would consist of approximately 2,657 concentrator photovoltaic (CPV) trackers on 420 acres in southeastern San Diego County near the unincorporated community of Boulevard, California. As proposed, the project will be developed in two phases. Phase I would include the construction and operation of 45 MW on approximately 330 acres. Phase II would consist of the construction and operation of 15 MW on approximately 90 acres.

The air quality impact analysis evaluates the potential for significant adverse impacts to the air quality due to construction and operational emissions resulting from the Proposed Project. Construction of the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. The analysis concludes that the daily construction emissions would not exceed the County of San Diego's (County) significance thresholds for criteria pollutants. Air quality impacts resulting from construction would, therefore, be less than significant. Additionally, all operational emissions for criteria pollutants were found to be less than significant.

The following project design features (PDFs) will be implemented as part of the project during construction activities:

PDF AQ-1 To ensure the construction of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}) and to comply with County Code Section 87.428, the following will be implemented:

- The applicants would apply water as necessary to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction and/or apply a nontoxic soil binding agent to help with soil stabilization during construction. These measures will be applied to all active construction areas, unpaved access roads, parking areas, and staging areas as necessary.
- Sweepers and water trucks will be used to control dust and debris at public street access points.
- Internal construction roadways will be stabilized by paving, chip sealing or non-toxic chemicals after rough grading.

- Exposed stockpiles (e.g., dirt, sand) will be covered and/or watered or stabilized with nontoxic soil binders, tarps, fencing or other suppression methods as needed to control emissions.
- Traffic speeds on unpaved roads will be limited to 15 miles per hour (mph).
- All haul and dump trucks entering or leaving the site with soil or fill material will maintain at least 2 feet of freeboard, or cover loads of all haul and dump trucks securely.
- Disturbed areas should be reseeded with native plant hydroseed mix as soon as possible after disturbance, or covered with a non-toxic soil binding agent (Such as EP&A's Envirotac II and Rhinosnot Dust Control, Erosion Control and Soil Stabilization).

PDF AQ-2 To reduce NO_x and PM_{10} emissions associated with construction worker trips required during Proposed Project construction, the construction manager will implement a construction worker ridership program to encourage workers to carpool to and from the construction site to reduce single-occupancy vehicle trips by a minimum of 30%. The construction manager will log all daily construction worker trips using the San Diego iCommute program (SANDAG 2013) (accessed at http://www.icommutesd.com/) or similar program. The construction manager will notify all construction personnel of the program prior to the start of construction activities and will notify construction personnel of the iCommute program RideMatcher feature, or similar communication method, to ensure personnel can identify potential carpooling program participants. Trip data will be made readily available to County inspectors at the construction trailer on site during construction.

The following project design feature (PDF) will be implemented during project operation:

PDF AQ-3 To ensure the operation of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}), the following will be implemented:

- Enforce a 15-m[h speed limit on unpaved surfaces
- Provide any of the following or equally effective trackout/carryout and erosion control measures to minimize transfer of soil or other materials to public roads:
  - track-out grates or gravel beds at each egress point
  - wheel-washing at each egress during muddy conditions

- application of nontoxic, permeable soil binding agent; chemical soil stabilizers; geotextiles; mulching; and/or seeding annually.

Regarding consistency with local plans and policies affecting air quality, the Proposed Project does not include residential development that would contribute to local population growth and associated vehicle miles traveled on local roadways. As the project would not result in growth-inducing uses, project development has been accounted for in the Regional Air Quality Strategy, and the project would be consistent with local air quality plans. Impacts would be considered less than significant.

Impacts to sensitive receptors, including odor impacts, would be less than significant as the proposed solar CPV development would not be associated with a land use that would generate objectionable odors, and construction would be considered short-term and temporary in nature. The potential health effects to nearby sensitive receptors have been analyzed and found to be less than the County significance thresholds. Cumulative impacts resulting from the Proposed Project in combination with other projects within the site vicinity would not be considered cumulatively considerable.

INTENTIONALLY LEFT BLANK

Air Quality Technical Report
for the Tierra del Sol Solar Farm Project

1.0 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to estimate and evaluate the potential air quality impacts associated with construction and operation of the Proposed Project. Air quality impacts are evaluated for their significance based on the criteria provided in the County's *Guidelines for Determining Significance – Air Quality* (County of San Diego 2007).

1.2 Project Location and Description

Solar Farm

The Proposed Project is situated south of Tierra del Sol Road and immediately north of the U.S.–Mexico border, south of State Route 94 (SR-94) in the eastern portion of unincorporated San Diego County. Figure 1, Regional Map, shows the project's relationship within San Diego County. Figure 2, Vicinity Map, shows the project's relationship to the surrounding unincorporated community of Boulevard.

The proposed Tierra del Sol solar farm project (project) would produce up to 60 megawatts (MW) of solar energy and would consist of approximately 2,657 Concentrator Photovoltaic (CPV) dual axis trackeing systems ("trackers") located on 420 acres in southeastern San Diego County near the unincorporated community of Boulevard, California. The proposed project will be developed in two phases. Phase I would include the construction and operation of 45 MW (1,993 CPV trackers) on approximately 330 acres. Phase II would consist of the construction and operation of 15 MW (664 CPV trackers) on approximately 90 acres (Figure 3, Preliminary Site Plan). The project includes a Major Use Permit (MUP) to authorize a Major Impact Utility Pursuant to Sections 1350, 2705, and 2926 of the County of San Diego Zoning Ordinance. The project will also require a Rezone to remove Special Area Designator "A" to ensure compliance with Section 5100 of the County of San Diego's Zoning Ordinance. An Agricultural Preserve Cancellation will also be required to develop the project site as proposed.

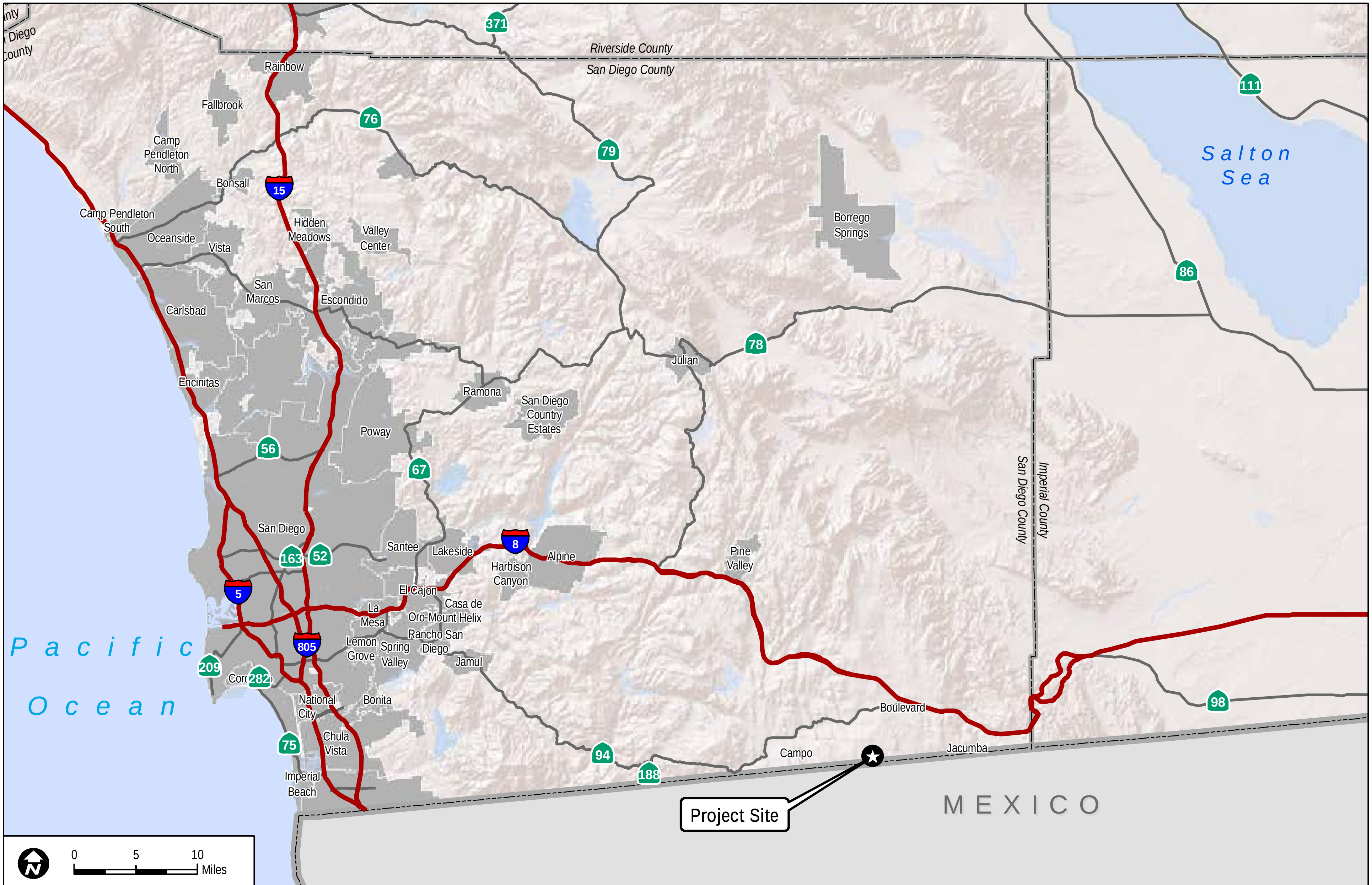
Individual tracker dimensions are approximately 48 feet across by 25 feet tall. Each tracker would be mounted on a 28-inch steel mast (steel pole), which would be supported by either (1) inserting the mast into the ground up to 20 feet and encasing it in concrete, (2) vibrating the mast into the ground up to 20 feet deep, or (3) attaching the mast to a concrete foundation sized to adequately support the tracker based on wind loading and soil conditions at the site. The preferred method would be to set the mast by vibratory pile driving methods depending upon soil conditions.

In its most vertical position and depending on foundation design, the top of each tracker would not exceed 30 feet above grade, and the lower edge would not be less than 1 foot above ground level. In its horizontal “stow” mode (for high winds), each tracker would have a minimum ground clearance of 13 feet, 6 inches.

Trackers would be installed and arranged into building blocks, or groups. Power from each building block would be delivered from each tracker to a conversion station through a 1,000 volt (V) direct current (DC) underground collection system. The underground 1,000 V DC collection system construction footprint would include a trench of 1 to 2 feet in width and a depth of up to approximately 4 feet. It is anticipated that power from the trackers on site would be separated into three 34.5-kilovolt (kV) underground collection circuits, each delivering approximately 20 MW of power to the project substation.

Each 34.5 kV underground branch circuit associated with Phase I would connect to a 34.5 kV overhead trunk line on the project site for delivery to the project substation. These two collection circuits for Phase I would run overhead on an above ground trunk line adjacent to the south side of the Southwest Powerlink right-of-way. The approximately 1.2 mile long above ground trunk line would utilize steel poles and would be approximately 50 to 75 feet high and spaced about 300 to 500 feet apart. The minimum ground clearance of the 34.5 kV lines would be 30 feet. The maximum hole dimensions for steel pole foundations would be 24 inches in diameter and approximately 20 feet deep. Phase 2 will connect to the project substation entirely via one 34.5 kV underground branch circuit and the underground 34.5 kV collection system construction footprint would include a trench of 3 to 4 feet in width and a depth of up to approximately 4 feet. Base material would be installed in all trenches to (i) ensure adequate drainage, and (ii) to ensure sufficient thermal conductivity and electrical insulating characteristics below and above collection system cables.

The project will include construction of a 34.5/138 kV step-up substation site (located within the northeast corner of the project site and adjacent to the operations and maintenance (O&M) annex site), which would increase the voltage received from the overhead and underground collector system from 34.5 to 138 kV. Switching and transformer equipment as well as a control house and a parking area for utility vehicles would be located within the 3-acre substation site and for security purposes and to allow for nighttime inspections lighting would be installed near substation equipment, the control shelter, and on the entrance gates.



DUDEK

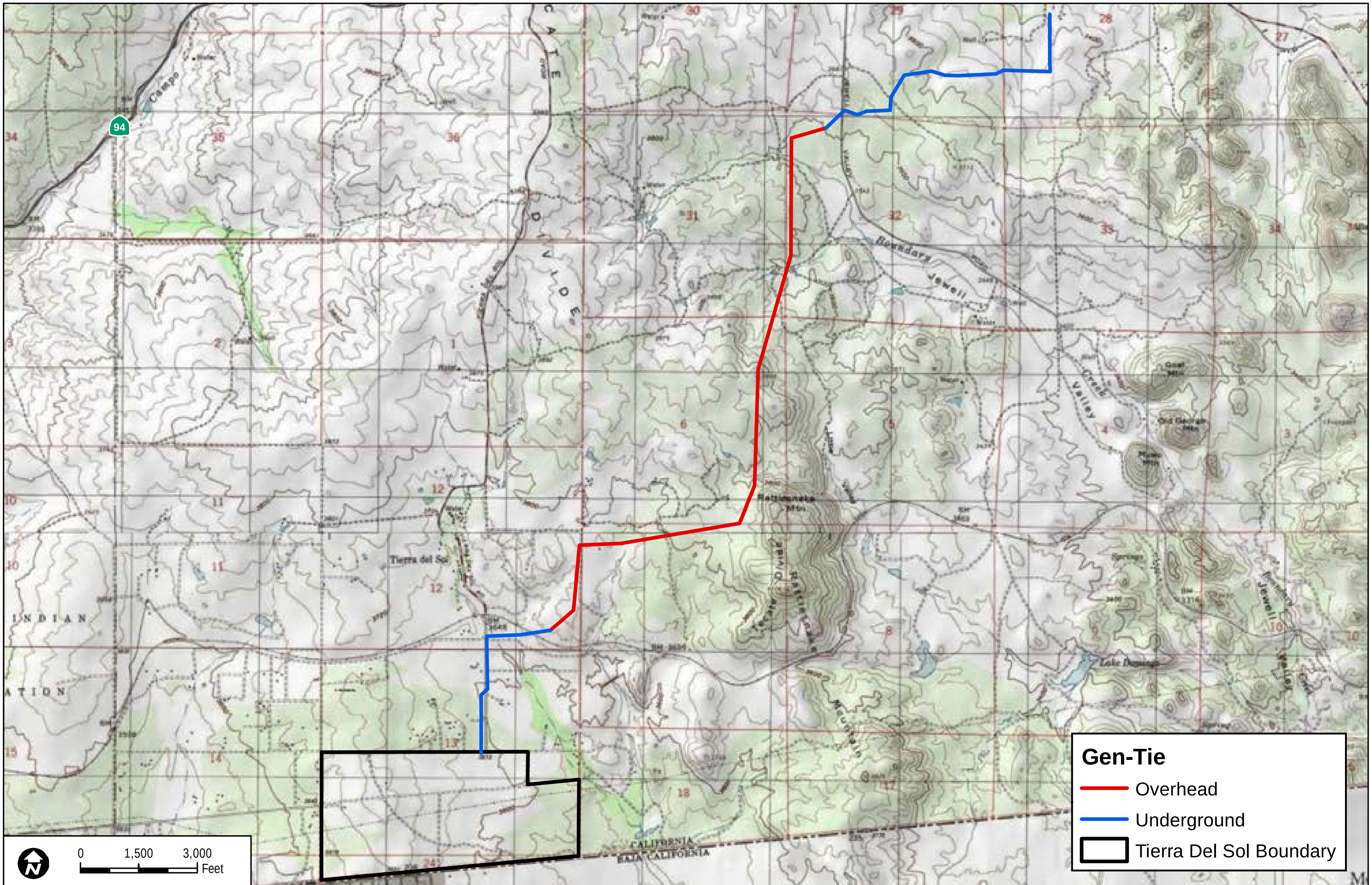
7123

FIGURE 1

Regional Map

TIERRA DEL SOL AIR QUALITY TECHNICAL REPORT

INTENTIONALLY LEFT BLANK



DUDEK

7123

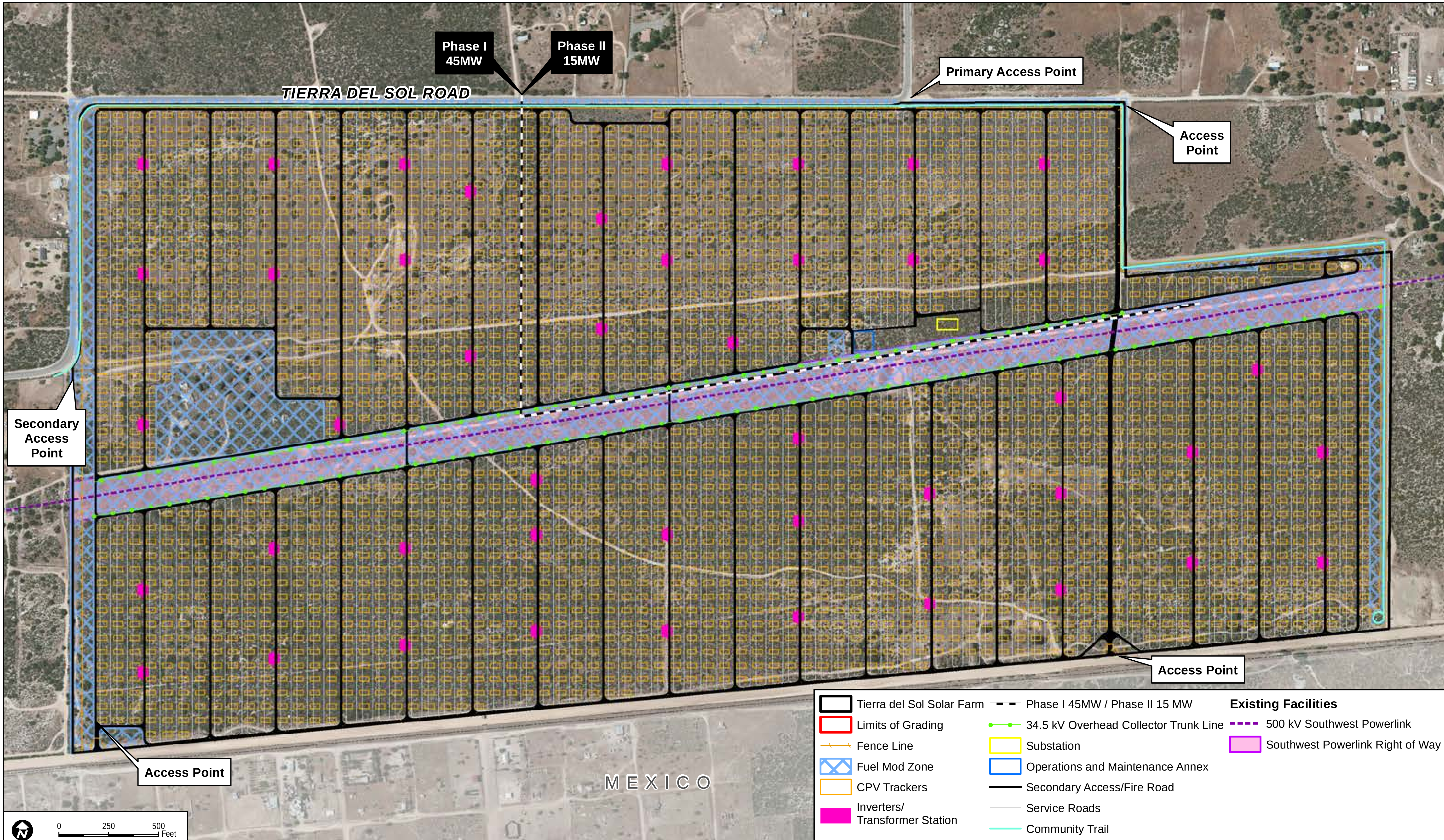
SOURCE: USGS 7.5-Minute Series Tierra Del Sol and Live Oak Springs Quadrangle.

FIGURE 2

Vicinity Map

TIERRA DEL SOL AIR QUALITY TECHNICAL REPORT

INTENTIONALLY LEFT BLANK



DUDEK

7123

SOURCE: SanGIS 2011; AECOM 2012; Soitec 2012; Bing Maps

FIGURE 3

Preliminary Site Plan

INTENTIONALLY LEFT BLANK

A backup power and storm positioning system would detect a damaging storm and communicate a storm position to each tracker. This system would also have enough electrical capacity to bring the trackers into the horizontal position ("storm position") in case the primary power supply is cut. The backup power and storm positioning system would include the following: (1) a 1.5 MW diesel-powered emergency generator or equivalent located at the substation, (2) an Uninterrupted Power Supply (UPS) battery storage system at each inverter station, or (3) a 20 kW propane generator at each inverter skid.

A 4-acre O&M annex site would be located adjacent to the substation site and would be used for storage, employee operations, and maintenance equipment. The approximate 125-foot by 60 foot pre-manufactured single story building would include administrative and operational offices, warehouse storage for material and equipment, and lavatory facilities served by an private on-site septic system and groundwater well. It is anticipated that in-place tracker washing would occur every 6–8 weeks during nighttime or evening hours using an IPC Eagle Wash Station which would be towed by a pick-up, ATV, or Cushman electric cart. On-site water storage tanks may be installed to facilitate washing.

Project construction would consist of several phases including site preparation, development of staging areas and site roads, tracker assembly and installation, and construction of electrical transmission facilities. The project would require a total of approximately 372 acres of site preparation activities prior to solar CPV installation, in addition to approximately 47 acres of fire buffer preparation involving non-motorized brush clearing techniques. Proposed grading for road construction would involve approximately 9,429 cubic yards of balanced cut and fill on an estimated 31.46 acres. After site preparation, initial project construction would include the development of the staging and assembly areas. The project would be constructed over a period of up to approximately 14 months, which includes Phase I, Phase II, and the gen-tie line.

Gen-Tie Line

Power from the on-site private substation would be delivered to the 138 kV bus at San Diego Gas & Electric's (SDG&E's) Rebuilt Boulevard Substation via an approximate 6-mile, dual circuit 138 kV transmission line or gen-tie line within the County of San Diego's right-of-way (Figure 4, Gen-Tie Route). The dual circuit 138 kV transmission line would travel in a roughly northeasterly direction over private land from the on-site private substation to SDG&E's Rebuilt Boulevard Substation. Approximately 3.5 miles of the transmission line would be overhead and 2.5 miles would be underground.

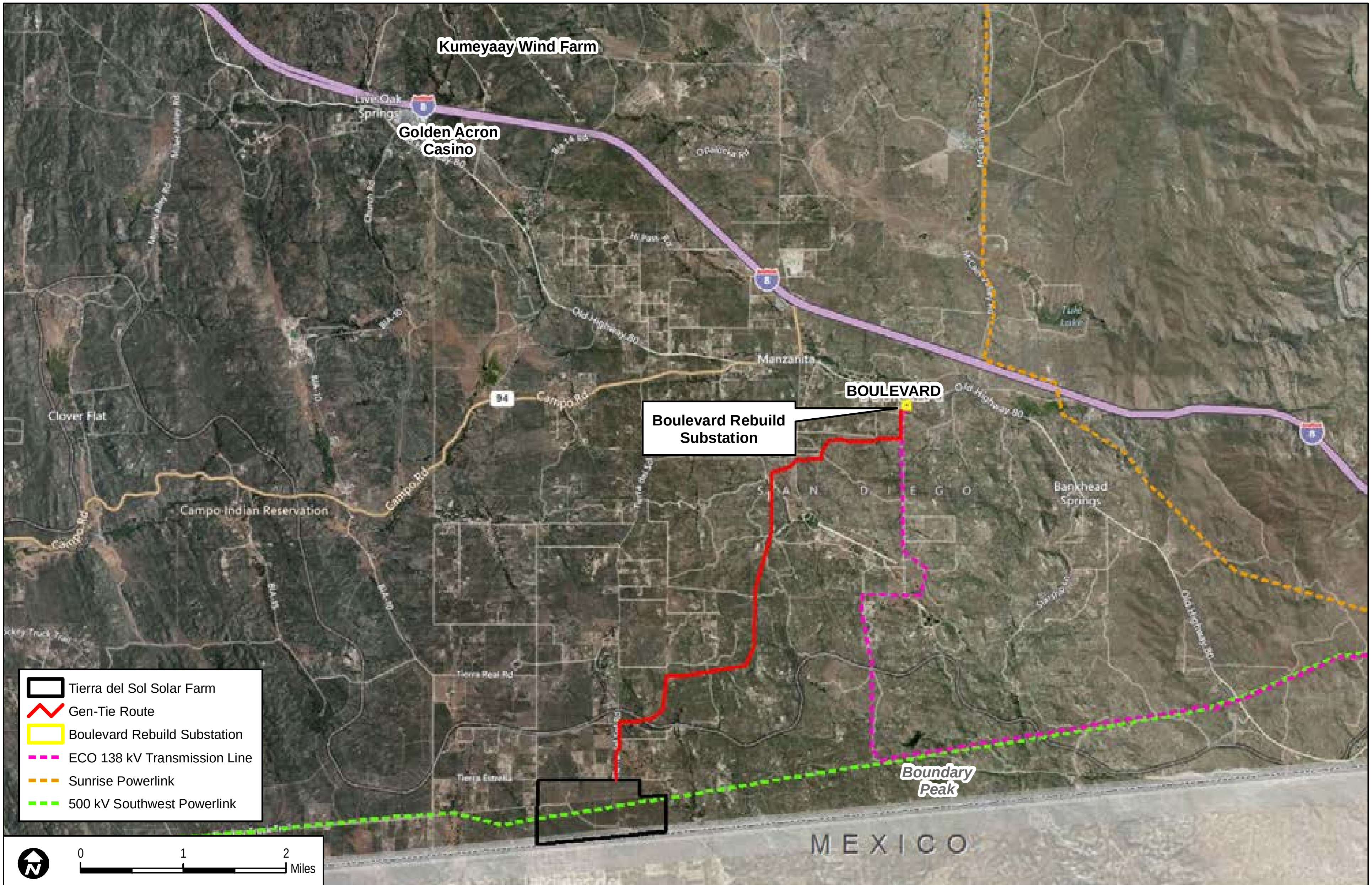
The overhead portion of the gen-tie alignment would require the setting of new steel transmission poles and conductors installed along the poles to deliver power from the project site to the Rebuilt Boulevard Substation. Since the span between poles would be dependent on the terrain, the cable span lengths range from 500 to 1,400 feet and would require between 20-25 steel poles, with a maximum height of 125-150 feet. Temporary work areas measuring 80 feet by 80 feet around each steel pole location would be cleared of vegetation in order to assist in pole installation.

Several of the pole site locations are accessible from existing dirt access roads; however, where pole site locations are not accessible from existing access roads, materials would be transported to the pole site by helicopter, light duty off-road equipment, and/or foot.

Blasting activities may be required to facilitate excavation in some areas where steel poles will be installed which is likely to be around 10 to 20 feet deep, depending on the soils and height of the pole. Holes will be formed via use of a truck-mounted auger and will excavate between 8 to 12 cubic yards of soil. Poles will then be delivered to the site via a flat-bed truck and lifted into place with a crane. The gap between the excavation and steel pole will then be backfilled with concrete.

Conductor wire stringing will be completed following pole installation. The work will be primarily completed from bucket trucks and pull sites located along the right of way. Rollers will be temporarily attached to the lower end of the insulators to allow the conductor to be pulled along the line. A rope will then be pulled onto the rollers from structure to structure. Once the rope is in place, it will be attached to a steel cable and pulled back through the sheaves. The conductor will then be attached and pulled back through the sheaves and into place using conventional tractor-trailer pulling equipment located at pull-and-tension sites along the line. The pulling through each structure will be done under a controlled tension to keep it elevated and away from obstacles.

Construction of the gen-tie alignment is anticipated to take place over a 6-month period, commencing immediately after the first construction phase, which includes site demolition, clearing, grubbing, grinding, and road construction.



DUDEK

7123

SOURCE: AECOM 2013; SOITEC 2013; SDG&E 2099; Bing Maps

FIGURE 4

Tierra del Sol - Gen-Tie Route

TIERRA DEL SOL AIR QUALITY TECHNICAL REPORT

INTENTIONALLY LEFT BLANK

Project Design Features

The following project design features (PDFs) will be implemented as part of the project during construction activities:

PDF AQ-1 To ensure the construction of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}) and to comply with County Code Section 87.428, the following will be implemented:

- The applicants would apply water as necessary to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction and/or apply a nontoxic soil binding agent to help with soil stabilization during construction. These measures will be applied to all active construction areas, unpaved access roads, parking areas, and staging areas as necessary.
- Sweepers and water trucks will be used to control dust and debris at public street access points.
- Internal construction roadways will be stabilized by paving, chip sealing or non-toxic chemicals after rough grading.
- Exposed stockpiles (e.g., dirt, sand) will be covered and/or watered or stabilized with nontoxic soil binders, tarps, fencing or other suppression methods as needed to control emissions.
- Traffic speeds on unpaved roads will be limited to 15 miles per hour (mph).
- All haul and dump trucks entering or leaving the site with soil or fill material will maintain at least 2 feet of freeboard, or cover loads of all haul and dump trucks securely.
- Disturbed areas should be reseeded with native plant hydroseed mix as soon as possible after disturbance, or covered with a non-toxic soil binding agent (Such as EP&A's Envirotac II and Rhinosnot Dust Control, Erosion Control and Soil Stabilization).

PDF AQ-2 To reduce NO_x and PM_{10} emissions associated with construction worker trips required during Proposed Project construction, the construction manager will implement a construction worker ridership program to encourage workers to carpool to and from the construction site to reduce single-occupancy vehicle trips by a minimum of 30%. The construction manager will log all daily construction worker trips using the San Diego iCommute program (SANDAG 2013) (accessed at http://www.icommutesd.com/), or similar program. The construction manager will notify all construction personnel of the program prior to the start of construction activities and will notify construction personnel of the iCommute program RideMatcher feature, or similar communication method, to ensure personnel can identify potential carpooling program participants. Trip data will be made readily available to County inspectors at the construction trailer on site during construction.

The following project design feature (PDF) will be implemented during project operation:

PDF AQ-3 To ensure the operation of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}), the following will be implemented:

- Enforce a 15-mph speed limit on unpaved surfaces
- Provide any of the following or equally effective trackout/carryout and erosion control measures to minimize transfer of soil or other materials to public roads:
  - track-out grates or gravel beds at each egress point
  - wheel-washing at each egress during muddy conditions
  - application of nontoxic, permeable soil binding agent; chemical soil stabilizers; geotextiles; mulching; and/or seeding annually.

As indicated in PDF AQ-1, the Proposed Project would use water to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction, and to apply a nontoxic soil binding agent once every 2 years to help with soil stabilization during construction. Water demands during construction would vary over the first 2 months (about 50 working days). Based on the estimated water demands for the Proposed Project, an estimated 50 acre-feet of water would be required during clear, grub, and grading activities. Over the peak water demand operations, an estimated 32 acre-feet (an average of approximately 208,545 gallons per day) of water would be supplied from off-site sources. Approximately 64% of the water distributed on-site for dust control during site preparation activities would be imported from the Padre Dam Municipal Water District, other water purveyors, or off-site wells requiring approximately 35 6,000-gallon water trucks per day for water import. The remaining water demand would be provided from an on-site well at a rate of 117,336 gallons per day. After the initial site preparation, the on-site supply well will be sufficient to meet the construction water demands.

Operations and maintenance activities would use on-site well water following construction. Additionally, it is anticipated that the soil stabilizer chosen for the project would need to be reapplied annually during project operations. The project would utilize a soil binding stabilization agent that is nontoxic and permeable. The purpose of the soil stabilizer is to prevent erosion and to reduce fugitive dust.

2.0 EXISTING CONDITIONS

2.1 Existing Setting

San Diego Region

The weather of the San Diego region, as in most of Southern California, is influenced by the Pacific Ocean and its semi-permanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average temperature ranges (in degrees Fahrenheit (°F)) from the mid-40s to the high 90s. Most of the region's precipitation falls from November to April with infrequent (approximately 10%) precipitation during the summer. The average seasonal precipitation along the coast is approximately 10 inches; the amount increases with elevation as moist air is lifted over the mountains to the east.

The topography in the San Diego region varies greatly, from beaches on the west to mountains and desert on the east. Along with local meteorology, the topography influences the dispersal and movement of pollutants in the basin. The mountains to the east prohibit dispersal of pollutants in that direction and help trap them in inversion layers.

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and influences the direction of prevailing winds (westerly to northwesterly). Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

Project Site

The project is situated south of Tierra del Sol Road and immediately north of the U.S.–Mexico border, and is traversed by SDG&E's 500 kV Southwest Powerlink, which consists of four lattice steel towers. The site area lies within the Tierra del Sol U.S. Geological Survey (USGS) 7.5-minute quadrangle, Township 18 South, Range 6 East, Section 13.

The project site is undeveloped but has remnants of some small structures associated with previous ranching activities located near the western portion and middle of the project site that would be demolished during construction. The entire project site is fenced. The U.S.–Mexico border fence is located adjacent to the southern portion of the project site. The area is accessed through locked gates and dirt roads that traverse the project site. Nearby sensitive receptors include single-family residences located adjacent to the project site.

The project site is located in a desert transition zone dominated by the chaparral plant community. The site was previously utilized for an active ranching operation. The project site is within the Boulevard Community Plan Area of San Diego County's General Plan; the land use designation is Rural with a permitted density of 1 dwelling unit per 80 acres. Existing zoning is General Rural (S92) and Agriculture (A72). The Boulevard plan area requires a minimum lot size of 1 unit per 8 acres due to the County's Groundwater Ordinance. The site is located at an elevation of approximately 3,700 to 3,566 feet above mean sea level. The project site is located within San Diego County's draft East County Multiple Species Conservation Program Plan Area. The majority of the project site was previously disturbed by extensive grazing activities; however, chaparral vegetation has become more established which provides moderate value for wildlife species.

2.2 Climate and Meteorology

The project site is located within the San Diego Air Basin (SDAB or basin) and is subject to the San Diego Air Pollution Control District (SDAPCD) guidelines and regulations. The SDAB is one of 15 air basins that geographically divide the State of California. The SDAB is currently classified as a federal nonattainment area for ozone (O_3) and a state nonattainment area for particulate matter less than or equal to 10 microns (PM_{10}), particulate matter less than or equal to 2.5 microns ($PM_{2.5}$), and O_3.

The SDAB lies in the southwest corner of California and comprises the entire San Diego region, covering 4,260 square miles, and is an area of high air pollution potential. The basin experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The SDAB experiences frequent temperature inversions. Subsidence inversions occur during the warmer months as descending air associated with the Pacific High Pressure Zone meets cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. Another type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce O_3, commonly known as smog.

Light daytime winds, predominately from the west, further aggravate the condition by driving air pollutants inland, toward the mountains. During the fall and winter, air quality problems are created due to carbon monoxide (CO) and oxides of nitrogen (NO_x) emissions. CO concentrations are generally higher in the morning and late evening. In the morning, CO levels are elevated due to cold temperatures and the large number of motor vehicles traveling. Higher CO levels during the late evenings are a result of stagnant atmospheric conditions trapping CO in the area. Since CO is produced almost entirely from automobiles, the highest CO concentrations in the basin are associated with heavy traffic. Nitrogen dioxide (NO_2) levels are also generally higher during fall and winter days.

Under certain conditions, atmospheric oscillation results in the offshore transport of air from the Los Angeles region to San Diego County. This often produces high O_3 concentrations, as measured at air pollutant monitoring stations within the County. The transport of air pollutants from Los Angeles to San Diego has also occurred within the stable layer of the elevated subsidence inversion, where high levels of O_3 are transported.

Site-Specific Meteorological Conditions

The local climate in southeastern San Diego County, which is primarily desert, consists of dry, hot summers (temperatures reaching 120° Fahrenheit (F)) and milder winters (daytime temperature in the 80s). The average summertime high temperature in the project vicinity is approximately 90°F, although record highs have approached 120°F in July. The average wintertime low temperature is approximately 33°F, although record lows have approached 10°F in January. Average precipitation in the local area is approximately 9 inches per year, with the bulk of precipitation falling during January and February.

2.3 Regulatory Setting

2.3.1 Federal

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The U.S. Environmental Protection Agency (EPA) is responsible for implementing most aspects of the Clean Air Act, including the setting of National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutant standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric O_3 protection, and enforcement provisions. NAAQS are established for “criteria pollutants” under the Clean Air Act, which are O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a State Implementation Plan (SIP) that demonstrates how those areas will attain the standards within mandated time frames.

2.3.2 State

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to the California Air Resources Board (CARB), with subsidiary responsibilities assigned to air quality management districts (AQMDs) and air pollution control districts (APCDs) at the regional and county levels. CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 1, Ambient Air Quality Standards.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]
O_3	1hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard
	8-hour	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3)	
CO	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
NO_2[6]	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
SO_2[7]	1-hour	0.25 ppm (655 μg/m^3)	0.75 ppm (196 μg/m^3)	—
	3-hour	—	—	0.5 ppm (1300 μg/m^3)
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[7]	
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)[7]	—

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]
PM_{10}[8]	24-hour	50 μg/m³	150 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m³	—	
$PM_{2.5}$[8]	24-hour	—	35 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m³	12.0 μg/m³	15.0 μg/m³
Lead[9,10]	30-day Average	1.5 μg/m³	—	—
	Calendar Quarter	—	1.5 μg/m³ (for certain areas)[10]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m³	
Hydrogen sulfide	1-hour	0.03 ppm (42 μg/m³)	—	—
Vinyl chloride[9]	24-hour	0.01 ppm (26 μg/m³)	—	—
Sulfates	24-hour	25 μg/m3	—	—
Visibility reducing particles[11]	8-hour (10:00 a.m. to 6:00 p.m. PST)	See footnote 11	—	—

ppm= parts per million by volume μg/m³ = micrograms per cubic meter mg/m³= milligrams per cubic meter

Source: CARB 2013b

1 California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For NO_2 and SO_2, the standard is attained when the 3-year average of the 98th and 99th percentile, respectively, of the daily maximum 1-hour average at each monitor within an area does not exceed the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr.
Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

5 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

6 To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

7 On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is

designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

8 On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m^3 to 12 μg/m^3. The existing national 24-hour PM 2.5 standards (primary and secondary) were retained at 35 μg/m^3, as was the annual secondary standard of 15 μg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

9 CARB has identified lead and vinyle chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

10 The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

11 In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

2.3.3 Local

San Diego Air Pollution Control District

While CARB is responsible for the regulation of mobile emission sources within the state, local AQMDs and APCDs are responsible for enforcing standards and regulating stationary sources. The project is located within the SDAB and is subject to SDAPCD guidelines and regulations. In San Diego County, O_3 and particulate matter are the pollutants of main concern, since exceedances of state ambient air quality standards for those pollutants are experienced here in most years. For this reason, the SDAB has been designated as a nonattainment area for the state PM_{10}, $PM_{2.5}$, and O_3 standards. The SDAB is also a federal O_3 nonattainment area and a CO maintenance area (western part of the SDAB only); the project area is a CO attainment area.

The SDAPCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The Regional Air Quality Strategy (RAQS) for the SDAB was initially adopted in 1991, and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities in the County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities in the County as part of the development of their general plans.

The *Eight-Hour Ozone Attainment Plan for San Diego County* indicates that local controls and state programs would allow the region to reach attainment of the federal 8-hour O_3 standard by

2009 (SDAPCD 2007). In this plan, SDAPCD relies on the RAQS to demonstrate how the region will comply with the federal O_3 standard. The RAQS details how the region will manage and reduce O_3 precursors (NO_x and volatile organic compounds (VOCs)) by identifying measures and regulations intended to reduce these contaminants. The control measures identified in the RAQS generally focus on stationary sources; however, the emissions inventories and projections in the RAQS address all potential sources, including those under the authority of CARB and the EPA. Incentive programs for reduction of emissions from heavy-duty diesel vehicles, off-road equipment, and school buses are also established in the RAQS.

In December 2005, SDAPCD prepared a report titled *Measures to Reduce Particulate Matter in San Diego County* to address implementation of Senate Bill (SB) 656 in San Diego County (SB 656 required additional controls to reduce ambient concentrations of PM_{10} and $PM_{2.5}$) (SDAPCD 2005). In the report, SDAPCD evaluates the implementation of source-control measures that would reduce particulate matter emissions associated with residential wood combustion; various construction activities including earthmoving, demolition, and grading; bulk material storage and handling; carryout and trackout removal and cleanup methods; inactive disturbed land; disturbed open areas; unpaved parking lots/staging areas; unpaved roads; and windblown dust.

As stated above, the SDAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards in the SDAB. The following rules and regulations would apply to the construction of the Proposed Project:

1. **SDAPCD Regulation IV: Prohibitions; Rule 51: Nuisance.** Prohibits the discharge, from any source, of such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property (SDAPCD 1969).
2. **SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust.** Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as track-out and carry-out onto paved roads beyond a project site (SDAPCD 2009).
3. **SDAPCD Regulation IV: Prohibitions; Rule 67.0: Architectural Coatings.** Requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories (SDAPCD 2001).

San Diego County

During construction of the project, the construction contractor would be required to comply with County Code Section 87.428 and implement appropriate dust control measures.

County Code Section 87.428, Dust Control Measures. As part of the San Diego County Grading, Clearing, and Watercourses Ordinance, County Code Section 87.428 requires all clearing and grading to be carried out with dust control measures adequate to prevent creation of a nuisance to persons or public or private property. Clearing, grading, or improvement plans shall require that measures such as the following be undertaken to achieve this result: watering, application of surfactants, shrouding, control of vehicle speeds, paving of access areas, or other operational or technological measures to reduce dispersion of dust. These project design measures are to be incorporated into all earth-disturbing activities to minimize the amount of particulate matter emissions from construction (County of San Diego 2004).

2.4 Background Air Quality

2.4.1 Pollutants and Effects

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include: O_3, NO_2, CO, sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead. These pollutants are discussed below.[1] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone. O_3 is a colorless gas that is formed in the atmosphere when VOCs, sometimes referred to as reactive organic gases (ROGs), and NO_x react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NO_x, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation and ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a

[1] The following descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on the EPA's Six Common Air Pollutants (EPA 2010) and the CARB Glossary of Air Pollutant Terms (CARB 2013a) published information.

few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Nitrogen Dioxide. Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_x and are major contributors to O_3 formation. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere with reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million by volume (ppm).

Carbon Monoxide. CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions; primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or

$PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOC. Inhalable or coarse particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Lead. Lead (Pb) in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline, the manufacturing of batteries, paint, ink, ceramics, and ammunition and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a toxic air contaminant (TAC). Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources such as automobiles; and area sources such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced either on short-term (acute) or long-term (chronic) exposure to a given TAC. CARB has identified diesel engine exhaust particulate matter as the predominant TAC in California. Diesel particulate matter is emitted into the air by diesel-powered mobile vehicles, including heavy-duty diesel trucks, construction equipment, and passenger vehicles. Certain ROGs may also be designated as TACs.

2.4.2 SDAB Attainment Designation

An area is designated in attainment when it is in compliance with the NAAQS and/or CAAQS. These standards are set by the EPA or CARB for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or the public welfare.

The criteria pollutants of primary concern that are considered in this air quality assessment include O_3, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3.

The SDAB is designated by EPA as an attainment area for the 1997 8-hour NAAQS for O_3 and as a marginal nonattainment area for the 2008 8-hour NAAQS for O_3.The SDAB is designated in attainment for all other criteria pollutants under the NAAQS with the exception of PM_{10}, which was determined to be unclassifiable. The SDAB is currently designated nonattainment for O_3 and particulate matter, PM_{10} and $PM_{2.5}$, under the CAAQS. It is designated attainment for the CAAQS for CO, NO_2, SO_2, lead, and sulfates. Table 2, SDAB Attainment Classification, summarizes the SDAB's federal and state attainment designations for each of the criteria pollutants.

Table 2
SDAB Attainment Classification

Pollutant	Federal Designation[a]	State Designation[b]
O_3 (1-hour)	Attainment[1]	Nonattainment
O_3 (8-hour – 1997) (8-hour – 2008)	Attainment (Maintenance) Nonattainment (Marginal)	Nonattainment
CO	Unclassifiable/Attainment[2]	Attainment
PM_{10}	Unclassifiable[3]	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
NO_2	Unclassifiable/Attainment	Attainment

Table 2
SDAB Attainment Classification

Pollutant	Federal Designation[a]	State Designation[b]
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified
Visibility-Reducing Particles	(no federal standard)	Unclassified

Sources: [a]EPA 2013a; [b]CARB 2013c.
Notes:
1 The federal 1-hour standard of 0.12 ppm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in SIPs.
2 The western and central portions of the SDAB are designated attainment, while the eastern portion is designated unclassifiable/attainment.
3 At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

2.4.3 Air Quality Monitoring Data

The SDAPCD operates a network of ambient air monitoring stations throughout San Diego County, which measure ambient concentrations of pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The SDAPCD monitors air quality conditions at 10 locations throughout the basin. Due to its proximity to the site and similar geographic and climactic characteristics, the Alpine–Victoria Drive monitoring station concentrations for all pollutants, except PM_{10}, CO, and SO_2, are considered most representative of the project site. The Chula Vista monitoring station is the nearest location to the project site where CO and SO_2 concentrations are monitored, and the El Cajon–Redwood Avenue monitoring station is the nearest location to the project site where PM_{10} concentrations are monitored. Ambient concentrations of pollutants from 2008 through 2012 are presented in Table 3, Ambient Air Quality Data. The number of days exceeding the AAQS is shown in Table 4, Frequency of Air Quality Standard Violations. The federal and state 8-hour and state 1-hour O_3 standards were exceeded every year from 2008 to 2012. The state 24-hour PM_{10} standard was exceeded in 2009, and the federal 24-hour $PM_{2.5}$ standard was exceeded in 2009 and 2011. Air quality within the project region was in compliance with both CAAQS and NAAQS for NO_2, CO, PM_{10} (NAAQS only), and SO_2 during this monitoring period.

Table 3
Ambient Air Quality Data (ppm unless otherwise indicated)

Pollutant	Averaging Time	2008	2009	2010	2011	2012	Most Stringent Ambient Air Quality Standard	Monitoring Station
O_3	8-hour	0.110	0.098	0.088	0.093	0.084	0.070	Alpine – Victoria Drive
	1-hour	0.139	0.119	0.105	0.114	0.101	0.090	
PM_{10}	Annual	27.3 $\mu g/m^3$	25.3 $\mu g/m^3$	21.3 $\mu g/m^3$	23.7 $\mu g/m^3$	23.4 $\mu g/m^3$	20 $\mu g/m^3$	El Cajon – Redwood Avenue
	24-hour	41.4 $\mu g/m^3$	57.0 $\mu g/m^3$	42.0 $\mu g/m^3$	41.9 $\mu g/m^3$	47.2 $\mu g/m^3$	50 $\mu g/m^3$	
$PM_{2.5}$	Annual[1]	14.0 $\mu g/m^3$	12.2 $\mu g/m^3$	10.8 $\mu g/m^3$	10.6 $\mu g/m^3$	NA	12 $\mu g/m^3$	Alpine – Victoria Drive
	24-hour	37.3 $\mu g/m^3$	29.7 $\mu g/m^3$	23.4 $\mu g/m^3$	25.5 $\mu g/m^3$	25.5 $\mu g/m^3$	35 $\mu g/m^3$	
NO_2	Annual	0.008	0.008	0.007	0.006	NA	0.030	Alpine – Victoria Drive
	1-hour	0.047	0.056	0.052	0.040	0.047	0.180	
CO	8-hour[2]	1.87	1.43	1.56	1.46	1.85	9.0	Chula Vista
	1-hour*	3.0	2.0	2.0	1.7	2.2	20	
SO_2	Annual	0.002	0.002	0.001	NA	NA	0.030	Chula Vista
	24-hour	0.004	0.003	0.002	NA	NA	0.040	

Sources: CARB 2013d; EPA 2013b.
Data represent maximum values
Notes: A new 1-hour NAAQS for NO_2 became effective in April 2010. Data reflect compliance with the 1-hour CAAQS.
NA = data not available
* Data were taken from EPA 2013b.
1. 2009, 2010, 2011, and 2012 data were taken from El Cajon – Redwood Avenue monitoring station
2. 2011 and 2012 data were taken from El Cajon – Redwood Avenue monitoring station

Table 4
Frequency of Air Quality Standard Violations

Monitoring Site	Year	Number of Days Exceeding Standard				
		State 1-Hour O_3	*State 8-Hour O_3*	*National 8-Hour O_3*	*State 24-hour PM_{10}**	*National 24-hour $PM_{2.5}$**
Alpine – Victoria Drive	2008	13	61	31	—	—
	2009	6	43	22	—	—
	2010	4	20	12	—	—
	2011	4	30	10	—	—
	2012	1	22	7	—	—
El Cajon – Redwood Avenue	2008	—	—	—	—	—
	2009	—	—	—	6.0 (1)	3.0 (1)
	2010	—	—	—	—	—
	2011	—	—	—	—	1.0 (1)
	2012	—	—	—	—	—

Source: CARB 2013d.
* Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and 3 days, respectively. "Number of days exceeding the standards" is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

3.0 SIGNIFICANCE CRITERIA AND ANALYSIS METHODOLOGIES

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

1. Conflict with or obstruct the implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O_3 precursors);
4. Expose sensitive receptors to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

The following significance thresholds for air quality are based on criteria provided in the County's *Guidelines for Determining Significance – Air Quality* (County of San Diego 2007). The County's guidelines were adapted from Appendix G of the CEQA Guidelines listed above.

A significant impact would result if any of the following would occur:

- The project would conflict with or obstruct the implementation of the County RAQS and/or applicable portions of the SIP.
- The project would result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation:
  - The project would result in emissions that exceed 250 pounds per day of NO_x or 75 pounds per day of VOCs
  - The project would result in emissions of CO that, when totaled with the ambient concentration, would exceed a 1-hour concentration of 20 ppm or an 8-hour average of 9 ppm
  - The project would result in emissions of $PM_{2.5}$ that exceed 55 pounds per day
  - The project would result in emissions of PM_{10} that exceed 100 pounds per day and increase the ambient PM_{10} concentrations by 5 $\mu g/m^3$ or greater at the maximum exposed individual.

- The project would result in a cumulatively considerable net increase of any criteria pollutant for which the SDAB is in nonattainment under an applicable federal or state ambient air quality standard.
  - The following guidelines for determining significance must be used for determining the cumulatively considerable net increases during the construction phase:
    - A project that has a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs would also have a significant cumulatively considerable net increase
    - In the event direct impacts from a proposed project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions of concern from the proposed project, in combination with the emissions of concern from other proposed projects or reasonably foreseeable future projects within a proximity relevant to the pollutants of concern, are in excess of the guidelines, including the SDAPCD screening-level thresholds.
  - The following guidelines for determining significance must be used for determining the cumulatively considerable net increase during the operational phase:
    - A project that does not conform to the County's RAQS and/or has a significant direct impact on air quality with regard to operation emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs would also have a significant cumulatively considerable net increase
    - Projects that cause road intersections to operate at or below level of service E (analysis required only when the addition of peak-hour trips from the proposed project and the surrounding projects exceeds 2,000) and create a CO hotspot create a cumulatively considerable net increase of CO.
- The project would expose sensitive receptors to substantial pollutant concentrations:
  - The project places sensitive receptors near CO hotspots or creates CO hotspots near sensitive receptors
  - Project implementation would result in exposure to TACs, resulting in a maximum incremental cancer risk greater than one in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than one would be deemed as having a potentially significant impact.
- The project, which is not an agricultural, commercial, or an industrial activity subject to SDAPCD standards, as a result of implementation, would either generate objectionable odors or place sensitive receptors next to existing objectionable odors, which would affect a considerable number of persons or the public.

SDAPCD

As part of its air quality permitting process, the SDAPCD has established thresholds in Rule 20.2 requiring the preparation of Air Quality Impact Assessments (AQIA) for permitted stationary sources. The SDAPCD sets forth quantitative emission thresholds below which a stationary source would not have a significant impact on ambient air quality. Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 5, SDAPCD Air Quality Significance Thresholds, are exceeded.

For CEQA purposes, these screening criteria can be used as numeric methods to demonstrate that a project's total emissions would not result in a significant impact to air quality.

Table 5
SDAPCD Air Quality Significance Thresholds

Construction Emissions			
Pollutant	*Total Emissions (Pounds per Day)*		
Respirable Particulate Matter (PM_{10})	100		
Fine Particulate Matter ($PM_{2.5}$)	55		
Oxides of Nitrogen (NO_x)	250		
Oxides of Sulfur (SO_x)	250		
Carbon Monoxide (CO)	550		
Volatile Organic Compounds (VOC)	75*		
Operational Emissions			
	Total Emissions		
Pollutant	*Pounds per Hour*	*Pounds per Day*	*Pounds per Year*
Respirable Particulate Matter (PM_{10})	—	100	15
Fine Particulate Matter ($PM_{2.5}$)	—	55	10
Oxides of Nitrogen (NO_x)	25	250	40
Sulfur Oxides (SO_x)	25	250	40
Carbon Monoxide (CO)	100	550	100
Lead and Lead Compounds	—	3.2	0.6
Volatile Organic Compounds (VOC)	—	75*	13.7

Sources: SDAPCD Rules 1501 (SDAPCD 1995a) and 20.2(d)(2) (SDAPCD 1998).
* VOC threshold based on the threshold of significance for VOCs from the South Coast Air Quality Management District for the Coachella Valley as stated in the San Diego County Guidelines for Determining Significance.

The thresholds listed in Table 5 represent screening-level thresholds that can be used to evaluate whether project-related emissions could cause a significant impact on air quality. Emissions below the screening-level thresholds would not cause a significant impact. In the event that emissions exceed these thresholds, modeling would be required to demonstrate that the project's total air quality impacts result in ground-level concentrations that are below the CAAQS and NAAQS, including appropriate background levels. For nonattainment pollutants, if emissions exceed the thresholds shown in Table 5, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality.

With respect to odors, SDAPCD Rule 51 (Public Nuisance) prohibits emission of any material that causes nuisance to a considerable number of persons or endangers the comfort, health, or safety of any person. A project that proposes a use that would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of off-site receptors.

4.0 PROJECT IMPACT ANALYSIS

The significance criteria described in Section 3.0 were used to evaluate impacts associated with the construction and operation of the Proposed Project.

4.1 Conformance to the RAQS

4.1.1 Guideline for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County *Guidelines for Determining Significance – Air Quality*, the proposed project would have a significant impact if it would:

- Conflict with or obstruct the implementation of the RAQS and/or applicable portions of the State Implementation Plan (SIP).

4.1.2 Significance of Impacts Prior to Mitigation

As mentioned in Section 2.3, the SDAPCD and SANDAG are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The RAQS was initially adopted in 1991 and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities in the County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities in the County as part of the development of their general plans.

The RAQS relies on SANDAG growth projections based on population, vehicle trends, and land use plans developed by the cities and by the County as part of the development of their general plans. As such, projects that propose development that is consistent with the growth anticipated by local plans would be consistent with the RAQS. However, if a project proposes development that is greater than that anticipated in the local plan and SANDAG's growth projections, the project might be in conflict with the RAQS and may contribute to a potentially significant cumulative impact on air quality. The Proposed Project site is currently designated Rural with a permitted density of 1 dwelling unit per 80 acres. Existing zoning is General Rural (S92) and Agriculture (A72). At this density, the current land use designation would generate approximately 48 trips per day.2 The Proposed Project consists of up to 60 MW of solar energy development and would consist of approximately 2,657 concentrator photovoltaic (CPV) trackers on 420 acres. No residential, commercial, or growth-inducing development is proposed. The operation of the project would result in a small increase in local employment and associated trips. The Proposed Project would employ 6 to 7 workers generating up to 14 trips per day. As such, the Proposed Project would consist of a less intense land use than what is currently allowed under the County General Plan.

As the Proposed Project would not contribute to local population growth or substantial employment growth and associated vehicle miles traveled (VMT) on local roadways, the proposed solar development project is considered accounted for in the RAQS, and the project would not conflict with or obstruct the implementation with local air quality plans. Impacts would be considered **less than significant**.

4.1.3 Mitigation Measures and Design Considerations

No mitigation measures would be required.

4.1.4 Conclusions

The Proposed Project would be in conformance with the RAQS.

4.2 Conformance to Federal and State Ambient Air Quality Standards

4.2.1 Construction Impacts

4.2.1.1 Guideline for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County *Guidelines for Determining Significance – Air Quality*, the proposed project would have a significant impact if it would:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

[2] At a density of 1 unit per 80 acres, the development of the 420-acre project site would allow 5 dwelling units. Using a trip generation rate of 9.57 trips per single-family residential unit (ITE 2008), this level of land use would generate 47.85 trips per day.

4.2.1.2 Significance of Impacts Prior to Mitigation

Construction of the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials to the project site. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can be approximately estimated only with a corresponding uncertainty in precise ambient air quality impacts. Fugitive dust emissions would primarily result from site preparation and road construction activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles.

Emissions from off-road equipment used during the construction phase of the project were estimated using emission rates derived from CARB's OFFROAD model: OFFROAD2007, available online (http://www.arb.ca.gov/msei/offroad/offroad.htm), for CO and SO_x, and the 2011 update ("OFFROAD2011"), available online (http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles), for VOC, NO_x, and PM_{10} (CARB 2011a).[3] Emissions of all pollutants from on-road trucks and passenger vehicles were estimated using emission factors derived using CARB's motor vehicle emission inventory program, EMFAC2011, available online (http://www.arb.ca.gov/msei/modeling.htm) (CARB 2011b). Fugitive dust emissions during clear and grub activities were estimated using the default emission factor of 20 pounds per acre-day from the URBEMIS 2007, Version 9.2.4, land use and air emission model (Jones & Stokes 2007) because extensive earthmoving would not be conducted. For road construction, fugitive dust emissions were estimated using a "worst-case" emission factor of 38.2 pounds per acre-day, which is recommended in URBEMIS 2007 for grading that involves substantial earthmoving activity. The clear and grub operation would involve nearly the entire project site of 420 acres. Proposed grading for road construction would involve approximately 9,429 cubic yards of balanced cut and fill on an estimated 31.46 acres. Road construction would not require extensive soil hauling throughout the project site.[4] Rather, cut-and-fill activities would primarily consist of excavation using scrapers and bulldozers and localized recompaction of the top 8 inches of soil at the point of cut. The basis for the URBEMIS 2007 fugitive dust factor also accounts for dust generated by equipment and vehicles traveling on

---

3 Both the OFFROAD 2007 model and the OFFROAD 2011 update to the 2007 model were utilized in this analysis because the 2011 update accounts for recent revisions to the Airborne Toxic Control Measure governing off-road vehicle fleets. This regulatory update only estimates VOC, NO_x, and PM_{10} emissions. Other pollutants are estimated using OFFROAD2007 as they were not affected by the regulatory update.

4 The "low level of detail" factor in URBEMIS 2007 is based on cut and fill for projects involving extensive transport of soil using haul trucks on unpaved roads over large construction sites. This factor would overestimate fugitive dust emissions for the construction activities to be conducted for the Proposed Project, which would involve localized transport using scrapers and bulldozers.

unpaved roads and surfaces at a construction site; thus, a separate calculation has not been performed. The average daily disturbed area would be 8.4 and 3.9 acres, respectively, for the clear-and-grub activities and road construction.

Entrained road dust emissions for vehicles traveling off site on local roads were estimated using calculations in Section 13.2.1 (Paved Roads) of the EPA's *Compilation of Air Pollutant Emission Factors* (EPA 2011). VMT for paved road travel by workers is assumed to be approximately 35 miles based on local workforce from Alpine, El Centro, and surrounding areas,[5] and equipment delivery truck VMT are based on 85-mile one-way routes from Rancho Bernardo where equipment deliveries would originate.[6]

The project proponent has stated that the project is scheduled to commence construction in September 2014 and would be completed within approximately 14 months for both Phase I and Phase II. Construction phases and associated durations were provided by the project proponent and include the following phases:

- Mobilization (1 week)
- Clearing, grubbing, and grinding (9 weeks)
- Road construction (8 days)
- Underground electric/communications cable installation (17 weeks)
- Tracker installation Phase 1a – 30 MW (20 weeks)
- Tracker installation Phase 1b – 15 MW (7 weeks)
- Tracker installation Phase 2a – 15 MW (7 weeks)
- Substation construction (4 weeks)
- Operations and maintenance building construction (13 weeks)
- Gen-tie (10 weeks, commencing prior to clearing/grubbing/grinding).

Project completion is anticipated in November 2015, although construction of Phase II could be completed at a later date. Details of the construction schedule including heavy construction equipment hours of operation and duration, worker trips, and equipment mix are included in Appendix A.

[5] The average of the distances from Alpine and El Centro is 46 miles. This distance was reduced by 25% to reflect worker commute trips from local housing (temporary or permanent) for an average worker commute distance of 35 miles.

[6] VMT = one-way miles × 2 × number of trips.

The equipment mix anticipated for construction activity was based on information provided by the applicant and best engineering judgment. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. To account for dust control measures in the calculations, it was assumed that the active sites would be watered at least three times daily to comply with SDAPCD Rule 55 and PDF AQ-1, resulting in an approximately 61% reduction of particulate matter.

Table 6, Estimated Daily Maximum Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phase of the Proposed Project. The maximum daily emissions for each pollutant may occur during different phases of construction.

Table 6
Estimated Daily Maximum Construction Emissions (pounds per day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
2014	15.45	247.16	107.69	0.46	75.50	21.99
2015	7.24	93.85	59.53	0.23	5.29	3.67
Maximum Daily Emissions	*15.45*	*247.16*	*107.69*	*0.46*	*75.50*	*21.99*
Pollutant Threshold	*75*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	No	No	No	No	No	No

Sources: OFFROAD2007 (CARB 2006); OFFROAD2011 (CARB 2011a); EMFAC2011 (CARB 2011b); EPA 2011. See Appendix A for complete results.

As shown, daily construction emissions would not exceed the thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$.

4.2.1.3 Mitigation Measures and Design Considerations

Impacts would be less than significant and mitigation would not be required.

4.2.1.4 Conclusions

The emissions associated with construction would be temporary, lasting approximately 14 months. As shown in Table 6 above, daily construction emissions would not exceed the thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. To ensure PM_{10} emissions remain at a less-than-significant level during site preparation and road construction activities, project design features have been incorporated as part of the project as described in Section 1.2. Construction of the Proposed Project would result in a **less-than-significant impact**.

4.2.2 Operational Impacts

4.2.2.1 Guideline for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County *Guidelines for Determining Significance – Air Quality*, the proposed project would have a significant impact if it would:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

4.2.2.2 Significance of Impacts Prior to Mitigation

Operations of the project would produce VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions associated with employee vehicles, personnel transport vehicles, washing vehicles (heavy-duty diesel water trucks), and service trucks during operations and maintenance for the solar farm. Area source emissions generated from landscaping and natural gas use are not anticipated, as the O&M building and substation would not require natural gas consumption or landscaping during project operations.

The Proposed Project would marginally impact air quality through O&M vehicles frequenting the site during monitoring, tracker washing, inspection, and repair activities throughout the life of the project. EMFAC2011 was utilized to estimate daily emissions from proposed vehicular sources (see Appendix A). Trip distances were conservatively estimated for the model inputs for all operations and maintenance vehicles as follows: employee vehicles were assumed to originate from 35 miles away based on local workforce from Alpine, El Centro, and surrounding areas[7]; O&M vehicles for the solar farm were assumed to conduct approximately 10 miles per day of maintenance activities per vehicle, and O&M vehicles would be stored on site; and gen-tie maintenance vehicles were assumed to travel approximately 41 miles one-way based on the approximate distance to Alpine and the full length of the gen-tie line.

The solar farm would be equipped with two emergency generators. The diesel-powered generators are each anticipated to be rated at 680 kilowatts. Operational emissions would result from intermittent use of emergency generators for maintenance and testing purposes. Each generator would be run for testing and maintenance approximately 1 hour each week for a total of 50 hours per year. In the event of an electrical outage, the emergency generators would be expected to operate no more than 20 minutes to bring all the trackers into the stow mode

7 The average of the distances from Alpine and El Centro is 46 miles. This distance was reduced by 25% to reflect worker commute trips from local housing (temporary or permanent) for an average worker commute distance of 35 miles.

position. The generator engines would meet the CARB/EPA standards for Tier 2 engines as required by the CARB Airborne Toxic Control Measure for new and in-use stationary diesel engines. The engines would also be required to use ultra-low-sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight. The estimated emissions from the emergency generator engines are based on compliance with the Tier 2 engine standards and use of ultra-low-sulfur diesel fuel.

Table 7, Estimated Daily Maximum Operational Emissions, presents the maximum daily emissions associated with the operation of the Proposed Project. The maximum daily emissions assume that all O&M activities associated with the solar farm and the gen-tie could occur on the same day.

Table 7
Estimated Daily Maximum Operational Emissions (pounds per day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Solar Farm						
Employee Vehicles	0.23	0.22	2.19	0.00	0.15	0.05
Personnel Transport Vehicles	0.01	0.01	0.09	0.00	0.01	0.00
Washing Vehicles	0.01	0.17	0.04	0.00	0.01	0.00
Satellite Washing Vehicles	0.01	0.01	0.09	0.00	0.01	0.00
Service Trucks	0.00	0.01	0.05	0.00	0.00	0.00
Emergency Generators	1.02	19.30	11.01	0.02	0.63	0.62
Gen-Tie Line						
Pole/Structure Brushing	0.12	0.11	1.10	0.00	0.08	0.02
Herbicide Application	0.12	0.11	1.10	0.00	0.08	0.02
Equipment Repair	0.15	0.15	1.47	0.00	0.10	0.03
Equipment Repair	0.10	2.08	0.45	0.00	0.08	0.04
Helicopter Inspection	0.99	11.89	19.09	1.08	0.00	0.00
Maximum Daily Emissions	***2.75***	***34.05***	***36.67***	***1.12***	***1.14***	***0.80***
Pollutant Threshold	*75*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	No	No	No	No	No	No

Source: EMFAC2011 (CARB 2011b). See Appendix A for complete results.

As shown, daily operational emissions would not exceed the thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$.

4.2.2.3 Mitigation Measures and Design Considerations

Impacts would be less than significant and mitigation would not be required.

4.2.2.4 Conclusions

As shown in Table 7 above, daily operational emissions would not exceed the thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. As such, operation of the Proposed Project would result in a **less-than-significant impact**.

4.3 Cumulatively Considerable Net Increase of Criteria Pollutants

In analyzing cumulative impacts from a proposed project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SDAB is listed as nonattainment for the state and federal ambient air quality standards. The proposed project would have a cumulatively considerable impact if project-generated emissions would exceed thresholds for PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs. If the proposed project does not exceed thresholds and is determined to have less-than-significant project-specific impacts, it may still have a cumulatively considerable impact on air quality if the emissions from the project, in combination with the emissions from other proposed or reasonably foreseeable future projects, are in excess of established thresholds. However, the project would be considered to have a cumulative impact only if the project's contribution accounts for a significant proportion of the cumulative total emissions.

Background ambient air quality, as measured at the monitoring stations maintained and operated by SDAPCD, measures the concentrations of pollutants from existing sources; therefore, past and present project impacts are included in the background ambient air quality data.

Geographic Extent

The geographic extent for the analysis of cumulative impacts related to air quality includes the southeastern corner of the SDAB (San Diego County). Furthermore, the primary air quality impacts of the Proposed Project would occur during construction, since the operational impacts would result from limited vehicle trips for operations, maintenance, washing, and inspection, and would be substantially less than construction impacts. Due to the nonattainment status of the SDAB, the primary air pollutants of concern would be NO_x and VOCs, which are ozone precursors, and PM_{10} and $PM_{2.5}$. NO_x and VOC are primarily emitted from motor vehicles and construction equipment, while PM_{10} and $PM_{2.5}$ are emitted primarily as fugitive dust during construction. Because of the nature of ozone as a regional air pollutant, emissions from the entire geographic area for this cumulative impact analysis would tend to be important, although maximum ozone impacts generally occur downwind of the area in which the ozone precursors are released. PM_{10} and $PM_{2.5}$ impacts, on the other hand, would tend to occur locally; thus, projects occurring in the same general area and in the same time period would tend to create cumulative air quality impacts.

Existing Cumulative Conditions

Air quality management in the geographic area for the cumulative impact assessment is the responsibility of the SDAPCD. Existing levels of development in San Diego County have led to the nonattainment status for ozone with respect to the CAAQS and NAAQS, and for PM_{10} and $PM_{2.5}$ with respect to the CAAQS. The nonattainment status is based on ambient air quality monitoring generally conducted in the urban portions of the County. No monitoring stations exist in the geographic area for the cumulative impact assessment, but air quality would generally be better than that in the urban areas in the western portion of the County due to the lack of major air pollutant sources. The air quality plans prepared by the SDAPCD reflect future growth under local development plans but are intended to reduce emissions countywide to levels that would comply with the NAAQS and CAAQS through implementation of new regulations at the local, state, and federal levels.

The separate guidelines of significance discussed below have been developed to respond to the following question from the state CEQA Guidelines Appendix G:

- The project will result in a cumulatively considerable net increase of any criteria pollutant for which the SDAB is nonattainment under an applicable federal or state ambient air quality standard (including emissions that exceed the significance thresholds for O_3 precursors listed in Table 5).

4.3.1 Construction Impacts

4.3.1.1 Guidelines for the Determination of Significance

Cumulatively considerable net increases during the construction phase would typically occur if two or more projects near each other are simultaneously under construction. The following guidelines for determining significance must be used for determining the cumulatively considerable net increases during the construction phase:

- A project that has a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs would also have a significant cumulatively considerable net increase.
- In the event direct impacts from a proposed project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions of concern from the proposed project, in combination with the emissions of concern from other proposed projects or reasonably foreseeable future projects within a proximity relevant to the pollutants of concern, are in excess of the guidelines identified in Table 5.

4.3.1.2 Significance of Impacts Prior to Mitigation

As discussed Section 4.2.1, the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. As shown in Table 6, emissions of all criteria pollutants, including PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs, would be below the significance levels. Additionally, construction would be short-term (14 months), during which the majority of pollutants would be emitted and would not result in long-term construction-related emissions. Moreover, emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs would be localized to the Proposed Project site during construction. Therefore, construction of the Proposed Project would not result in a cumulatively considerable net increase in criteria pollutants.

Similar to the Proposed Project, construction of cumulative projects simultaneously with the Proposed Project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance and hauling activities, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials and worker vehicular trips. Fugitive dust (PM_{10} and $PM_{2.5}$) emissions would primarily result from site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles, the latter of which would generally be dispersed over a large area where the vehicles are traveling. The extent to which all reasonably foreseeable cumulative projects and the Proposed Project would result in significant cumulative impacts depends on their proximity and construction time schedules. The Proposed Project would be constructed from 2014 to 2015 and would be constructed concurrently with, and in proximity to, other land use and infrastructure development projects (e.g., wind and solar facilities). Additionally, the Proposed Project would be constructed as part of a larger solar development project which would include the Rugged, LanEast, and LanWest solar farms, collectively referred to as the Soitec Solar Development Project. The LanEast and LanWest solar farms would not be constructed concurrently with the Tierra del Sol solar farm and Rugged solar farm, but they would be constructed following the completion of these two projects.

However, the proposed Tierra del Sol solar farm would be constructed concurrently with several phases of the Rugged solar farm. PM_{10} emissions for the Proposed Project would not exceed the significance threshold, and project design features as described in Section 1.2 have been incorporated as part of project implementation to ensure fugitive dust emissions remain below the significance thresholds at the project level. Additionally, the Proposed Project would be required to comply with SDAPCD Rule 55 and County Code Section 87.428 regarding fugitive dust emissions. Additionally, compliance with the County Grading Ordinance would ensure dust control measures would be provided to reduce PM_{10} and $PM_{2.5}$ emissions that may result during construction. The NO_x emissions from the Proposed Project were less than significant, and project design features for NO_x emissions would not substantially reduce those emissions from the Proposed Project. Moreover, when added to the NO_x and PM_{10} emissions associated with the Rugged solar farm, the cumulative emissions would exceed the NO_x and PM_{10} significance thresholds at various times throughout the construction period. Accordingly, generation of these criteria pollutant emissions, particularly those occurring simultaneously during various construction periods of the Tierra del Sol and Rugged projects, would result in a temporary significant cumulative impact to air quality.

4.3.1.3 Mitigation Measures and Design Considerations

Project impacts would be less than significant; however, in combination with construction emissions from the Rugged solar farm, the cumulative impact would be significant. No additional feasible mitigation measures are available to reduce the cumulative impact to less than significant.

4.3.1.4 Conclusions

Construction of the Proposed Project would not result in a cumulatively considerable net increase of PM_{10}, $PM_{2.5}$, NO_x, or VOCs.

4.3.2 Operational Impacts

4.3.2.1 Guidelines for the Determination of Significance

The guidelines for the consideration of operational cumulatively considerable net increases are treated differently due to the mobile nature of the emissions. The SDAB's RAQS, based on growth projections derived from the allowed general plan densities, are updated every 3 years by SDAPCD and lay out the programs for attaining the CAAQS and NAAQS for O_3 precursors. It is assumed that a project that conforms to the County General Plan, and does not have emissions exceeding the screening-level thresholds, will not create a cumulatively considerable net increase to O_3 since the emissions were accounted for in the RAQS.

The following guidelines for determining significance must be used for determining the cumulatively considerable net increases during the operational phase:

- A project that does not conform to the RAQS and/or has a significant direct impact on air quality with regard to operational emissions of PM_{10}, $PM_{2.5}$, NO_x, and/or VOCs would also have a significant cumulatively considerable net increase.

- Projects that cause road intersections to operate at or below a level of service E (analysis only required when the addition of peak-hour trips from the Proposed Project and the surrounding projects exceeds 2,000) and create a CO hotspot create a cumulatively considerable net increase of CO.

4.3.2.2 Significance of Impacts Prior to Mitigation

With regard to cumulative impacts associated with O_3 precursors, in general, if a project is consistent with the community and general plans, it has been accounted for in the O_3 attainment demonstration contained within the RAQS. As such, it would not cause a cumulatively significant impact on the ambient air quality for O_3. The Proposed Project site is currently designated Rural with a permitted density of 1 dwelling unit per 80 acres, and existing zoning for the site is General Rural (S92) and Agriculture (A72). The Proposed Project would, therefore, consist of a less intense land use than what is currently allowed under the County General Plan as no residential development is proposed. The Proposed Project would marginally impact air quality through operation and maintenance vehicles frequenting the site during monitoring, washing, inspection, and repair activities throughout the life of the project. As the project does not propose residential, commercial, or other growth-inducing uses that would contribute substantially to local population or employment growth and associated VMT on local roadways, the project's contribution to cumulative operational impacts due to motor vehicles would be minimal. No significant area source emissions generated from landscaping or natural gas use are anticipated, as the O&M building and project substation would not require landscaping or natural gas for operational purposes. Therefore, as the Proposed Project does not represent a substantial increase in projected traffic over current conditions, emissions of O_3 precursors (VOCs and NO_x) would be well below the screening-level thresholds and would not result in a significant increase of O_3 precursors during operation. Thus, the Proposed Project would not result in a cumulatively significant impact on O_3 concentrations.

Additionally, consistent with the County's guidelines, analysis of potential CO hotspots would not be required for this project since the project does not propose uses that would significantly contribute to local population or employment growth or congestion on local roadways. The addition of O&M vehicles would not significantly contribute peak-hour trips in the project area or impact roadway intersections. Therefore, the project would not have the potential to create a CO hotspot or a cumulatively considerable net increase of CO.

4.3.2.3 Mitigation Measures and Design Considerations

Mitigation would not be required.

4.3.2.4 Conclusions

Operation of the Proposed Project would not result in a cumulatively considerable net increase of PM_{10}, $PM_{2.5}$, NO_x, or VOCs nor create a CO hotspot due to cumulative traffic impacts at road intersections.

4.4 Impacts to Sensitive Receptors

Air quality varies as a direct function of the amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality problems arise when the rate of pollutant emissions exceeds the rate of dispersion. Reduced visibility, eye irritation, and adverse health impacts upon sensitive receptors are the most serious hazards of existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. Air quality regulators typically define sensitive receptors as schools (preschool–12th grade), hospitals, resident care facilities, day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality. However, for the purposes of CEQA analysis in the County, the definition of a sensitive receptor also includes residents. The two primary emissions of concern regarding health effects for land development projects are diesel-fired particulates and CO.

4.4.1 Construction Impacts

4.4.1.1 Guidelines for the Determination of Significance

A significant impact would result if:

- Project implementation will result in exposure to TACs resulting in a maximum incremental cancer risk greater than 1 in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than 1 would be deemed as having a potentially significant impact.

4.4.1.2 Significance of Impacts Prior to Mitigation

Project construction would result in emissions of diesel particulate matter (DPM) from heavy-duty construction equipment and trucks operating on the project site (e.g., water trucks). DPM is characterized as a TAC by CARB. The Office of Environmental Health Hazard Assessment (OEHHA) has identified carcinogenic and chronic noncarcinogenic effects from long-term (chronic) exposure, but it has not identified health effects due to short-term (acute) exposure to DPM. The nearest sensitive receptors consist of scattered residences located along the northern limits of Tierra del Sol Road and immediately adjacent to the western project limits. The nearest sensitive receptor is located to the west, approximately 150 feet from the proposed limits of disturbance.

Cancer risk is defined as the increase in lifetime probability (chance) of an individual developing cancer due to exposure to a carcinogenic compound, typically expressed as the increased probability in 1 million. The cancer risk from inhalation of a TAC is estimated by calculating the inhalation dose in units of milligrams/kilogram body weight per day based on an ambient concentration in units of micrograms per cubic meter ($\mu g/m^3$), breathing rate, and exposure period, and multiplying the dose by the inhalation cancer potency factor, expressed as (milligrams/kilogram body weight per day)$^{-1}$. Typically, cancer risks for residential receptors and similar sensitive receptors are estimated based on a lifetime (70 years) of continuous exposure; however, for the purposes of this analysis, a 1.2-year (up to 14 months) exposure scenario, corresponding to the approximate construction period for the solar project, was evaluated because the majority of all project-related DPM would cease following construction activities. It should be noted that construction activity would occur throughout the 420-acre project site; thus, sources of DPM emissions (e.g., heavy-duty construction equipment) would not be concentrated in any one area for the entire construction period.

Cancer risks are typically calculated for all carcinogenic TACs and summed to calculate the overall increase in cancer risk to an individual. The calculation procedure assumes that cancer risk is proportional to concentrations at any level of exposure and that risks from various TACs are additive. This is generally considered a conservative assumption at low doses and is consistent with the current OEHHA-recommended approach.

Noncancer health impact of an inhaled TAC is measured by the hazard quotient, which is the ratio of the ambient concentration of a TAC in units of $\mu g/m^3$ divided by the reference exposure level (REL), also in units of $\mu g/m^3$. The inhalation REL is the concentration at or below which no adverse health effects are anticipated. The REL is typically based on health effects to a particular target organ system, such as the respiratory system, liver, or central nervous system. Hazard quotients are then summed for each target organ system to obtain a hazard index.

To estimate the ambient concentrations of DPM resulting from construction activities at nearby sensitive receptors, a dispersion modeling analysis was performed using the Lakes Environmental SCREEN-View air quality dispersion model, Version 3.5.0 (Lakes Environmental 2011), which uses the EPA's SCREEN3 model.

The DPM emissions from diesel-powered construction equipment and on-site diesel-powered trucks that would be used during construction are provided in Appendix B. The total pounds of DPM emissions from these sources over the entire construction period were converted to pounds per year by dividing the total by 1.2. Because the sources of DPM would occur throughout the project site, a subset of the total construction DPM emissions was calculated based on the average daily acreage over which construction activity would occur during grading. The daily acreage will be variable depending on the activity (e.g., clear and grub, underground trenching, tracker installation. For the purpose of this analysis, the average daily acreage was assumed to be 5 acres; thus, a fraction of 5/420 was applied to the total construction DPM emissions. Total emissions of construction-related PM_{10}, as a surrogate for DPM, during the overall construction period were calculated and then converted to grams per second for use in the SCREEN3 model. An annualized 1-hour emission rate of 1.02×10^{-4} grams per second (g/s) was calculated as follows:

692.63 lb/year PM_{10} during construction

$$692.63 \text{ lb/year} \times 5/420 \times 453.6 \text{ g/lb} \div 8760 \text{ hours/year} \div 3600 \text{ seconds/hour} = 1.02 \times 10^{-4} \text{ g/second}$$

The emissions from heavy-duty equipment and trucks are represented by a single volume source with an area of 5 acres. The following parameters were utilized in the SCREEN3 model to represent the sources of DPM emissions on the project site:

- Source type: volume
- Source height: 5 meters
- Initial vertical dimension: 1.16 meters (corresponding to a 5-meter release height divided by 4.3 per SCREEN3 guidance)
- Initial lateral dimension: 33.08 meters (corresponding to the side of a 5-acre site divided by 4.3 per SCREEN3 guidance)
  - Receptor height: 2.0 meters
  - Rural setting
  - Simple terrain.

The default regulatory mixing height and anemometer height options were selected for the purposes of modeling. The closest sensitive receptor (single-family residence) is located approximately 111 feet (34 meters) west of the project site.

The results of the SCREEN3 modeling are provided in Appendix B. It should be noted that the maximum modeled concentration occurred under Stability Class E (slightly stable, nighttime condition) and a wind speed of 1.0 meter/second. These conditions are not representative of typical daytime conditions during which construction would occur. Accordingly, using the maximum modeled concentration would result in a conservative (i.e., health protective) estimate of the associated health effects. Per EPA guidance (EPA 1992), the maximum modeled 1-hour concentration was then multiplied by 0.1 to simulate the annual average concentration. The modeled annual average concentration at the maximally exposed individual (located 84 meters from the volume source) is shown in Table 8, Summary of Average DPM Concentrations.

Table 8
Summary of Average DPM Concentrations

Receptor	Modeled 1-hour Concentration μg/m³	Modeled Annual Concentration μg/m³
Maximally Exposed Individual – Residential	0.0969	0.0097

Source: SCREEN3 Model results. See Appendix B for complete results.

The cancer risk calculations were performed by multiplying the predicted annual DPM concentrations from SCREEN3 by the appropriate risk values. The exposure and risk equations that are used to calculate the cancer risk at residential receptors are taken from the OEHHA manual for health risk assessments prepared under the Air Toxics Hot Spots program (OEHHA 2003). As noted, while the nearest sensitive receptors are located approximately 34 meters from the volume source, the maximum exposure would occur at 84 meters from the volume source representing the construction DPM emissions.

The potential exposure pathway for DPM includes inhalation only. Cancer risks were evaluated using the inhalation Cancer Potency Factor published by the OEHHA and CARB (CARB 2012). The cancer risks were calculated using the "derived (adjusted)" approach in the OEHHA risk assessment manual. The cancer potency factor for DPM is 1.1 per milligram per kilogram of body weight per day (1.1 (mg/kg-day)-1). The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for DPM are not known for these pathways.

The following equations were used to calculate the cancer risk due to inhalation using the modeled DPM concentrations:

Risk = Inhalation potency factor * Dose Inhalation (1)

where:

Inhalation potency factor = 1.1 $(mg/kg\text{-}day)^{-1}$ for DPM,

and:

Dose Inhalation = C_{air}*DBR*A*EF*ED*10^{-6} / AT (2)

where:

C_{air} = concentration of DPM in $\mu g/m^3$

DBR = breathing rate in liter per kilogram of body weight per day
A = inhalation absorption factor (1 for DPM)
EF = exposure frequency in days per year
ED = exposure duration in years
AT = averaging time period over which exposure is averaged in days (25,550 days for 70 years)

For the derived (adjusted) cancer risk calculation, the breathing rate is equal to the 80th percentile or 302 liters per kilogram of body weight per day (L/kg-day) per CARB and OEHHA guidance (CARB and OEHHA 2003).

Table 9, Summary of Maximum Modeled Cancer Risks, shows the maximum modeled annual DPM concentration for the maximally exposed individual and the associated cancer risk. The cancer risk at a sensitive receptor is less than the County significance threshold of 1 in 1 million for cancer impacts.

Table 9
Summary of Maximum Modeled Cancer Risks

Receptor	DPM Annual Concentration μg/m³	Cancer Risk
Maximally Exposed Individual – Residential	0.0097	0.1 in 1 million

Source: SCREEN3 Model results. See Appendix B for complete results.

In addition to the potential cancer risk, DPM has chronic (i.e., long-term) noncarcinogenic health impacts. The chronic hazard index was evaluated using the OEHHA/CARB inhalation RELs (CARB 2012). The chronic noncarcinogenic inhalation hazard index for construction activities was calculated by dividing the modeled annual average concentrations of DPM by its REL, which is 5 $\mu g/m^3$.

Table 10, Summary of Maximum Chronic Hazard Index, shows the maximum modeled annual DPM concentration for the maximally exposed individual and the associated maximum chronic hazard index. The chronic hazard index at this receptor is less than the County significance threshold of 1.0 for noncarcinogenic health impacts.

Table 10
Summary of Maximum Chronic Hazard Index

Receptor	DPM Concentration μg/m³	Chronic Hazard Index
Maximally Exposed Individual – Residential	0.0097	0.0019

Source: SCREEN3 Model results. See Appendix B for complete results.

In summary, the maximum anticipated cancer risk associated with the project is 0.1 in 1 million at maximally exposed sensitive receptors, based on a 1.2-year exposure scenario. The assessment also finds that the chronic hazard index for noncancer health impacts are well below 1.0 at the maximally exposed individual. As such, the exposure of project-related TAC emission impacts to sensitive receptors during construction of the Proposed Project would be less than significant.

4.4.1.3 Mitigation Measures and Design Considerations

Mitigation would not be required.

4.4.1.4 Conclusions

Construction of the Proposed Project would not result in significant impacts to sensitive receptors.

4.4.2 Operational Impacts

4.4.2.1 Guidelines for the Determination of Significance

A significant impact would result if:

- The project places sensitive receptors near CO “hotspots” or creates CO “hotspots” near sensitive receptors.
- Project implementation will result in exposure to TACs resulting in a maximum incremental cancer risk greater than 1 in 1 million without application of Toxics-Best Available Control Technology (T-BACT) or a health hazard index greater than one would be deemed as having a potentially significant impact.

The potential for the project to create CO hotspots was discussed previously in Section 4.3.2.2. The project would not result in a significant impact with respect to this threshold.

In addition to impacts from criteria pollutants, project impacts may include emissions of pollutants identified by the state and federal government as TACs or hazardous air pollutants (HAPs). State law has established the framework for California’s TAC identification and control program, which is generally more stringent than the federal program and is aimed at HAPs that are a problem in California. The state has formally identified more than 200 substances as TACs, including the federal HAPs, and is adopting appropriate control measures for sources of these TACs. As examples, TACs include acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and

DPM. Some of the TACs are groups of compounds that contain many individual substances (for example, copper compounds and polycyclic organic matter).

In San Diego County, APCD Rule 1210 implements the public notification and risk reduction requirements of state law, and requires facilities with high potential health risk levels to reduce health risks below significant risk levels (SDAPCD 1995b). In addition, Rule 1200 establishes acceptable risk levels and emission control requirements for new and modified facilities that may emit additional TACs (SDAPCD 1996). Under Rule 1200, permits to operate may not be issued when emissions of TACs result in an incremental cancer risk greater than 1 in 1 million without application of T-BACT, or an incremental cancer risk greater than 10 in 1 million with application of T-BACT, or a health hazard index (chronic and acute) greater than one (SDAPCD 1996). The human health risk analysis is based on the time, duration, and exposures expected. T-BACT will be determined on a case-by-case basis; however, examples of T-BACT include diesel particulate filters, catalytic converters, and selective catalytic reduction technology.

4.4.2.2 Significance of Impacts Prior to Mitigation

The nearest sensitive receptors consist of scattered residences located along the northern limits of Tierra del Sol Road and immediately adjacent to the western project limits. The nearest sensitive receptor is located to the west, approximately 111 feet from the proposed limits of disturbance. As the project would consist of construction of trackers and associated infrastructure for the procurement and delivery of renewable energy, the Proposed Project, by nature, would not generate a significant amount of TACs in the immediate area. Additionally, the project would not require the extensive use of diesel trucks during operation but would include employee commute vehicles, and limited use of personnel transport vehicles, washing vehicles, and a service truck. The only stationary sources of TACs associated with the project that would be subject to Rule 1200 would be the emergency generators. The emergency generators would emit diesel particulate matter, which CARB has designated as a TAC. They would be operated during routine testing and maintenance, typically for about 1 hour no more often than once a week, and during electrical outages. The emergency generators would be located at the substation, which is approximately 1,750 feet (0.33 mile) from the nearest sensitive receptor. Additionally, the emergency generators would be operated for a limited time, would meet the required emission rates for diesel particulate matter at the time of installation, and must be demonstrated to meet the requirements of Rule 1200 before the SDAPCD can issue an Authority to Construct. As such, the exposure of project-related TAC emission impacts to sensitive receptors during operation of the Proposed Project would be less than significant.

4.4.2.3 Mitigation Measures and Design Considerations

Mitigation would not be required.

4.4.2.4 Conclusions

Operation of the Proposed Project would not result in significant impacts to sensitive receptors.

4.5 Odor Impacts

Odors are a form of air pollution that is most obvious to the general public. Odors can present significant problems for both the source and surrounding community. Although offensive odors seldom cause physical harm, they can be annoying and cause concern.

4.5.1 Guidelines for the Determination of Significance

Based on Appendix G of the CEQA Guidelines, and the County *Guidelines for Determining Significance – Air Quality*, the proposed project would have a significant impact if:

- The project, which is not an agricultural, commercial, or an industrial activity subject to SDAPCD standards, as a result of implementation, would either generate objectionable odors or place sensitive receptors next to existing objectionable odors, which would affect a considerable number of persons.

The State of California Health and Safety Code, Division 26, Part 4, Chapter 3, Section 41700 and SDAPCD Rule 51, commonly referred to as public nuisance law, prohibits emissions from any source whatsoever in such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to the public health or damage to property. The potential for an operation to result in odor complaints from a "considerable" number of persons in the area will be considered to be a significant, adverse odor impact.

Projects required to obtain permits from SDAPCD are evaluated by SDAPCD staff for potential odor nuisance, and conditions may be applied (or control equipment required) where necessary to prevent occurrence of public nuisance.

Odor issues are very subjective by the nature of odors themselves and due to the fact that their measurements are difficult to quantify. As a result, this guideline is qualitative, and each project will be reviewed on an individual basis, focusing on the existing and potential surrounding uses and location of sensitive receptors.

4.5.2 Significance of Impacts Prior to Mitigation

4.5.2.1 Construction

Section 6318 of the San Diego County Zoning Ordinance requires that all commercial and industrial uses be operated so as not to emit matter causing unpleasant odors that are perceptible by the average person at or beyond any lot line of the lot containing said uses. Section 6318 goes on to further provide specific dilution standards that must be met "at or beyond any lot line of the lot containing the uses" (County of San Diego 1979). APCD Rule 51 (Public Nuisance) also prohibits emission of any material that causes nuisance to a considerable number of persons or endangers the comfort, health, or safety of any person. A project that proposes a use that would produce objectionable odors would be deemed to have a significant odor impact if it would affect a considerable number of off-site receptors. The nearest sensitive receptors consist of scattered residences located along the northern limits of Tierra del Sol Road and immediately adjacent to the western project limits. The nearest sensitive receptor is located to the west, approximately 150 feet from the proposed limits of disturbance.

Construction of Proposed Project components would result in the emission of diesel fumes and other odors typically associated with construction activities. These compounds would be emitted in varying amounts on the project site depending on where construction activities are occurring. Sensitive receptors located in the vicinity of the construction site may be affected. Odors are highest near the source and would quickly dissipate off site. Any odors associated with construction activities would be temporary and would cease upon project completion.

4.5.2.2 Operations

Land uses and industrial operations that are associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies and fiberglass molding. The proposed solar farm would not be associated with a land use that would generate objectionable odors within the project vicinity. As such, a solar farm would not generate objectionable odors off-site, nor would significant odors be generated during O&M of the facility. Operations would consist of standard service and personnel vehicles which would visit the site regularly during inspection, maintenance, and washing activities. Thus, the impacts associated with odors would be less than significant.

4.5.3 Mitigation Measures and Design Considerations

No mitigation measures or design considerations would be required.

4.5.4 Conclusion

Although odor impacts are unlikely, the Proposed Project would be required to comply with the County odor policies enforced by SDAPCD, including Rule 51 in the event a nuisance complaint occurs, and County Code Sections 63.401 and 63.402, which prohibit nuisance odors and identify enforcement measures to reduce odor impacts to nearby receptors. Therefore, impacts associated with objectionable odors would be **less than significant**.

5.0 SUMMARY OF RECOMMENDED PROJECT DESIGN FEATURES, IMPACTS, AND MITIGATION MEASURES

All impacts identified under the proposed Tierra del Sol solar farm project would be **less than significant**.

The following project design features (PDFs) will be implemented as part of the project during construction activities:

PDF AQ-1 To ensure the construction of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}) and to comply with County Code Section 87.428, the following will be implemented:

- The applicants would apply water as necessary to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction and/or apply a nontoxic soil binding agent to help with soil stabilization during construction. These measures will be applied to all active construction areas, unpaved access roads, parking areas, and staging areas as necessary.
- Sweepers and water trucks will be used to control dust and debris at public street access points.
- Internal construction roadways will be stabilized by paving, chip sealing or non-toxic chemicals after rough grading.
- Exposed stockpiles (e.g., dirt, sand) will be covered and/or watered or stabilized with nontoxic soil binders, tarps, fencing or other suppression methods as needed to control emissions.
- Traffic speeds on unpaved roads will be limited to 15 miles per hour (mph).
- All haul and dump trucks entering or leaving the site with soil or fill material will maintain at least 2 feet of freeboard, or cover loads of all haul and dump trucks securely.
- Disturbed areas should be reseeded with native plant hydroseed mix as soon as possible after disturbance, or covered with a non-toxic soil binding agent (Such as EP&A's Envirotac II and Rhinosnot Dust Control, Erosion Control and Soil Stabilization).

PDF AQ-2 To reduce NO_x and PM_{10} emissions associated with construction worker trips required during Proposed Project construction, the construction manager will implement a construction worker ridership program to encourage workers to carpool to and from the construction site to reduce single-occupancy vehicle trips by a minimum of 30%. The construction manager will log all daily construction worker trips using the San Diego iCommute program (SANDAG 2013) (accessed at http://www.icommutesd.com/), or similar program. The construction manager will notify all construction personnel of the program prior to the start of construction activities and will notify construction personnel of the iCommute program RideMatcher feature, or similar communication method, to ensure personnel can identify potential carpooling program participants. Trip data will be made readily available to County inspectors at the construction trailer on site during construction.

The following project design feature (PDF) will be implemented during project operation:

PDF AQ-3 To ensure the operation of the Proposed Project will not result in a significant impact relative to fugitive dust (PM_{10}), the following will be implemented:

- Enforce a 15-mph speed limit on unpaved surfaces
- Provide any of the following or equally effective trackout/carryout and erosion control measures to minimize transfer of soil or other materials to public roads:
    - track-out grates or gravel beds at each egress point
    - wheel-washing at each egress during muddy conditions
    - application of nontoxic, permeable soil binding agent; chemical soil stabilizers; geotextiles; mulching; and/or seeding annually.

6.0 REFERENCES

CARB (California Air Resources Board). 2006. "User's Guide for OFFROAD2007." Off-Road Emissions Inventory Program. CARB, Mobile Source Emissions Inventory Program. December 15, 2006. http://www.arb.ca.gov/msei/offroad/offroad.htm.

CARB. 2011a. "User's Guide for OFFROAD2011." Off-Road Emissions Inventory Program. CARB, Mobile Source Emission Inventory. http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles.

CARB. 2011b. "EMFAC2011 Model." CARB, Motor Vehicle Emission Inventory Program. http://www.arb.ca.gov/msei/ modeling.htm.

CARB. 2012. "Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values." May 3, 2012. http://www.arb.ca.gov/toxics/healthval/healthval.htm.

CARB. 2013a. "Glossary of Air Pollutant Terms." CARB website. http://www.arb.ca.gov/html/gloss.htm.

CARB. 2013b. "Ambient Air Quality Standards." June 4, 2013. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

CARB. 2013c. "Area Designations Maps/State and National." Last reviewed on April 22, 2013. http://www.arb.ca.gov/desig/adm/htm.

CARB. 2013d. "iADAM: Air Quality Data Statistics." http://arb.ca.gov/adam.

CARB and OEHHA (California Air Resources Board and Office of Environmental Health Hazard Assessment). 2003. "Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk," October 9, 2003. http://www.arb.ca.gov/toxics/harp/docs/rmpolicy.PDF.

County of San Diego. 1979. San Diego County Zoning Ordinance, Part Six: General Regulations, Section 6318, Odors. May 16, 1979. http://www.sdcounty.ca.gov/pds/zoning/index.html.

County of San Diego. 2004. San Diego County Grading, Clearing and Watercourses Ordinance. San Diego County Code, Title 8, Division 7, Section 87.428, Dust Control Measures. April 23, 2004. http://www.sdcounty.ca.gov/dpw/docs/propgradord.pdf.

County of San Diego. 2007. *Guidelines for Determining Significance and Report Format and Content Requirements – Air Quality*. Department of Planning and Land Use, Department of Public Works. March 19, 2007.

EPA (Environmental Protection Agency). 1992. "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised." EPA-454/R-92-019. October 1992. http://www.epa.gov/opptintr/exposure/pubs/usepa_1992b_sp_for_estim_aqi_of_ss.pdf

EPA. 2010. "Six Common Air Pollutants." Air and Radiation. July 1, 2010. http://www.epa.gov/air/urbanair.

EPA. 2011. "Paved Roads." Chapter 13.2.1 in *Compilation of Air Pollutant Emission Factors*. Update to 5th ed. AP-42. Research Triangle Park, North Carolina: EPA. Office of Air and Radiation, Office of Air Quality Planning and Standards. January 2011. http://www.epa.gov/ttn/chief/ap42/ch13/index.html.

EPA. 2013a. "Region 9: Air Programs, Air Quality Maps." Last updated on April 8, 2013. http://www.epa.gov/region9/air/maps/maps_top.html.

EPA. 2013b. "Monitor Values Report." http://www.epa.gov/airdata/ad_rep_mon.html.

ITE (Institute of Transportation Engineers). 2008. *Trip Generation Manual, 8th Edition*.

Jones & Stokes Associates. 2007. *Software User's Guide: URBEMIS2007 for Windows; Emissions Estimation for Land Use Development Projects*. Version 9.2. Prepared for the South Coast Air Quality Management District. November 2007. http://www.urbemis.com/support/manual.html.

Lakes Environmental. 2011. "SCREEN-View Air Quality Dispersion Model." Version 3.5.0. April 26, 2011. http://weblakes.com/products/screen/index.html.

OEHHA (Office of Environmental Health Hazard Assessment). 2003. "Air Toxics Hot Spots Program Risk Assessment Guidelines." The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August 2003.

SANDAG (San Diego Association of Governments). 2013. "iCommute." http://www.icommutesd.com/.

SDAPCD (San Diego Air Pollution Control District). 1969. Rules and Regulations. Regulation IV. Prohibitions. Rule 51. Nuisance. Effective January 1, 1969.

SDAPCD. 1995a. Rules and Regulations. Regulation XV. Federal Conformity. Rule 1501. Conformity with General Federal Actions. Adopted March 7, 1995.

SDAPCD. 1995b. Rules and Regulations. Regulation XI. National Emission Standards for Hazardous Air Pollutants, Subpart M. Rule 361.145. Standard for Demolition and Renovation. Adopted February 1, 1995.

SDAPCD. 1996. SDAPCD Regulation XII: Prohibitions; Rule 1200: Toxic Air Contaminants—New Source Review. June 12, 1996. http://www.sdapcd.org/rules/Reg12pdf/R1200.pdf.

SDAPCD. 1998. SDAPCD Regulation II: Permits; Rule 20.2: New Source Review—Non-Major Sources. December 17, 1998. http://www.sdapcd.org/rules/Reg2pdf/R20-2.pdf.

SDAPCD. 2001. Rules and Regulations. Regulation IV. Prohibitions. Rule 67. Architectural Coatings. Revised December 12, 2001.

SDAPCD. 2005. *Measures to Reduce Particulate Matter in San Diego County*. December 2005. http://www.sdapcd.org/planning/plan.html.

SDAPCD. 2007. *Eight-Hour Ozone Attainment Plan for San Diego County*. May 2007. http://www.sdapcd.org/planning/plan.html.

SDAPCD. 2009. SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust. December 24, 2009. http://www.sdapcd.org/rules/Reg4pdf/R67-0.pdf.

INTENTIONALLY LEFT BLANK

7.0 LIST OF PREPARERS

David Deckman	Director of Air Quality Services
Jennifer Longabaugh	Environmental Planner
Amy Seals	Technical Editor
Hannah DuBois	Publications Services
Devin Brookhart	Publications Services

INTENTIONALLY LEFT BLANK

APPENDIX A

Criteria Pollutant Emission Estimates

Tierra del Sol Solar Farm Project
Emissions Summary

CONSTRUCTION

ROG

	2014 Emissions (lbs/day)							2015 Emissions (lbs/day)										
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**
Offroad Emissions																		
Mobilization and Clean Up			0.21	0.21														
Site Clearing/Grubbing/Grinding				1.94	1.94	1.94												
Grading/Road Construction						4.13												
Underground Electric/Communications Cable Installation					0.42	0.42		0.42	0.42									
Tracker Installation Project 1a (30 MW)					3.41	3.41		3.38	3.38	3.38								
Tracker Installation Project 1b (15 MW)														3.38	3.38	3.38		
Tracker Installation Project 2 (15 MW)																	3.38	3.38
Substation Construction				0.91	0.91													
O&M Building Construction											0.79	0.79	0.79	0.79				
Gen-Tie Line Construction	4.48	4.48	1.32															
OFFROAD MONTHLY TOTAL (max daily)	**4.48**	**4.48**	**1.32**	**2.85**	**5.77**	**7.96**		**3.79**	**3.79**	**3.38**	**0.79**	**0.79**	**0.79**	**3.38**	**3.38**	**3.38**	**3.38**	**3.38**
Onroad Emissions	**0.69**	**0.69**	**0.65**	**5.32**	**7.26**	**7.48**		**3.45**	**3.45**	**3.45**	**0.83**	**0.73**	**0.73**	**0.73**	**3.70**	**3.70**	**3.70**	**3.70**
MAX DAILY EMISSIONS	**5.17**	**5.17**	**1.98**	**8.17**	**13.03**	**15.45**		**7.24**	**7.24**	**6.82**	**1.62**	**1.52**	**1.52**	**4.10**	**7.08**	**7.08**	**7.08**	**7.08**

CO

	2014 Emissions (lbs/day)							2015 Emissions (lbs/day)										
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**
Offroad Emissions																		
Mobilization and Clean Up			2.25	2.25														
Site Clearing/Grubbing/Grinding				17.67	17.67	17.67												
Grading/Road Construction						28.06												
Underground Electric/Communications Cable Installation					4.50	4.50		4.46	4.46									
Tracker Installation Project 1a (30 MW)					31.43	31.43		31.21	31.21	31.21								
Tracker Installation Project 1b (15 MW)														31.21	31.21	31.21		
Tracker Installation Project 2 (15 MW)																	31.21	31.21
Substation Construction				8.34	8.34													
O&M Building Construction											5.18	5.18	5.18	5.18				
Gen-Tie Line Construction	39.11	39.11	11.50															
OFFROAD MONTHLY TOTAL (max daily)	**39.11**	**39.11**	**11.50**	**26.01**	**53.60**	**63.99**		**35.67**	**35.67**	**31.21**	**5.18**	**5.18**	**5.18**	**31.21**	**31.21**	**31.21**	**31.21**	**31.21**
Onroad Emissions	**3.77**	**3.77**	**5.20**	**27.35**	**42.60**	**43.71**		**23.86**	**23.86**	**23.86**	**6.11**	**5.62**	**5.62**	**5.62**	**26.73**	**26.73**	**26.73**	**26.73**
MAX DAILY EMISSIONS	**42.88**	**42.88**	**16.70**	**53.36**	**96.19**	**107.69**		**59.53**	**59.53**	**55.07**	**11.29**	**10.80**	**10.80**	**36.83**	**57.94**	**57.94**	**57.94**	**57.94**

NOx

	2014 Emissions (lbs/day)							2015 Emissions (lbs/day)										
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**
Offroad Emissions																		
Mobilization and Clean Up			2.53	2.53														
Site Clearing/Grubbing/Grinding				28.18	28.18	28.18												
Grading/Road Construction						61.71												
Underground Electric/Communications Cable Installation					5.07	5.07		4.93	4.93									
Tracker Installation Project 1a (30 MW)					48.79	48.79		47.18	47.18	47.18								
Tracker Installation Project 1b (15 MW)														47.18	47.18	47.18		
Tracker Installation Project 2 (15 MW)																	47.18	47.18
Substation Construction				12.33	12.33													
O&M Building Construction											10.29	10.29	10.29	10.29				
Gen-Tie Line Construction	63.63	63.63	21.56															
OFFROAD MONTHLY TOTAL (max daily)	**63.63**	**63.63**	**21.56**	**40.51**	**82.03**	**115.57**		**52.11**	**52.11**	**47.18**	**10.29**	**10.29**	**10.29**	**47.18**	**47.18**	**47.18**	**47.18**	**47.18**
Onroad Emissions	**13.42**	**13.42**	**5.33**	**110.21**	**127.00**	**131.60**		**41.74**	**41.74**	**41.74**	**8.44**	**6.18**	**6.18**	**6.18**	**40.11**	**40.11**	**40.11**	**40.11**
MAX DAILY EMISSIONS	**77.05**	**77.05**	**26.88**	**150.72**	**209.04**	**247.16**		**93.85**	**93.85**	**88.92**	**18.73**	**16.47**	**16.47**	**53.36**	**87.29**	**87.29**	**87.29**	**87.29**

Tierra del Sol Solar Farm Project
Emissions Summary

SOx

Activity	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)										
Activity	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov
Offroad Emissions																	
Mobilization and Clean Up			0.00	0.00													
Site Clearing/Grubbing/Grinding				0.04	0.04	0.04											
Grading/Road Construction						0.07											
Underground Electric/Communications Cable Installation					0.01	0.01	0.01	0.01									
Tracker Installation Project 1a (30 MW)					0.10	0.10	0.10	0.10	0.10								
Tracker Installation Project 1b (15 MW)													0.10	0.10	0.10		
Tracker Installation Project 2 (15 MW)																0.10	0.10
Substation Construction				0.02	0.02												
O&M Building Construction										0.02	0.02	0.02	0.02				
Gen-Tie Line Construction	0.09	0.09	0.04														
OFFROAD MONTHLY TOTAL (max daily)	**0.09**	**0.09**	**0.04**	**0.06**	**0.15**	**0.18**	**0.11**	**0.11**	**0.10**	**0.02**	**0.02**	**0.02**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Onroad Emissions	**0.03**	**0.03**	**0.02**	**0.22**	**0.28**	**0.28**	**0.12**	**0.12**	**0.12**	**0.03**	**0.02**	**0.02**	**0.02**	**0.12**	**0.12**	**0.12**	**0.12**
MAX DAILY EMISSIONS	**0.12**	**0.12**	**0.06**	**0.29**	**0.42**	**0.46**	**0.23**	**0.23**	**0.22**	**0.04**	**0.04**	**0.04**	**0.12**	**0.22**	**0.22**	**0.22**	**0.22**

PM10

Activity	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)										
Activity	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov
Offroad Emissions																	
Mobilization and Clean Up			0.17	0.17													
Site Clearing/Grubbing/Grinding				1.32	1.32	1.32											
Grading/Road Construction						2.78											
Underground Electric/Communications Cable Installation					0.34	0.34	0.33	0.33									
Tracker Installation Project 1a (30 MW)					2.45	2.45	2.38	2.38	2.38								
Tracker Installation Project 1b (15 MW)													2.38	2.38	2.38		
Tracker Installation Project 2 (15 MW)																2.38	2.38
Substation Construction				0.63	0.63												
O&M Building Construction										0.55	0.55	0.55	0.55				
Gen-Tie Line Construction	3.02	3.02	0.90														
OFFROAD MONTHLY TOTAL (max daily)	**3.02**	**3.02**	**0.90**	**1.95**	**4.11**	**5.57**	**2.72**	**2.72**	**2.38**	**0.55**	**0.55**	**0.55**	**2.38**	**2.38**	**2.38**	**2.38**	**2.38**
Onroad Emissions	**0.58**	**0.58**	**0.40**	**4.47**	**5.87**	**6.01**	**2.57**	**2.57**	**2.57**	**0.59**	**0.53**	**0.53**	**0.53**	**2.78**	**2.78**	**2.78**	**2.78**
Fugitive Dust	**—**	**—**	**—**	**65.52**	**65.52**	**58.10**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
MAX DAILY EMISSIONS	**3.60**	**3.60**	**1.30**	**71.94**	**75.50**	**69.68**	**5.29**	**5.29**	**4.96**	**1.14**	**1.08**	**1.08**	**2.91**	**5.17**	**5.17**	**5.17**	**5.17**

PM2.5

Activity	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)										
Activity	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov
Offroad Emissions																	
Mobilization and Clean Up			0.16	0.16													
Site Clearing/Grubbing/Grinding				2.56	2.56	1.21											
Grading/Road Construction						2.56											
Underground Electric/Communications Cable Installation					0.32	0.32	0.31	0.31									
Tracker Installation Project 1a (30 MW)					2.25	2.25	2.19	2.19	2.19								
Tracker Installation Project 1b (15 MW)													2.19	2.19	2.19		
Tracker Installation Project 2 (15 MW)																2.19	2.19
Substation Construction				0.58	0.58												
O&M Building Construction										0.51	0.51	0.51	0.51				
Gen-Tie Line Construction	2.78	2.78	0.83														
OFFROAD MONTHLY TOTAL (max daily)	**2.78**	**2.78**	**0.83**	**3.14**	**5.13**	**5.13**	**2.50**	**2.50**	**2.19**	**0.51**	**0.51**	**0.51**	**2.19**	**2.19**	**2.19**	**2.19**	**2.19**
Onroad Emissions	**0.32**	**0.32**	**0.18**	**2.58**	**3.18**	**3.28**	**1.17**	**1.17**	**1.17**	**0.26**	**0.22**	**0.22**	**0.22**	**1.21**	**1.21**	**1.21**	**1.21**
Fugitive Dust	**—**	**—**	**—**	**13.68**	**13.68**	**12.13**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
MAX DAILY EMISSIONS	**3.11**	**3.11**	**1.01**	**19.40**	**21.99**	**20.54**	**3.67**	**3.67**	**3.36**	**0.76**	**0.72**	**0.72**	**2.41**	**3.41**	**3.41**	**3.41**	**3.41**

Tierra del Sol Solar Farm Project
Emissions Summary

CO2

Activity	2014 Emissions (tons/yr)		2015 Emissions (tons/yr)
Offroad Emissions			
Mobilization and Clean Up	1.01		—
Site Clearing/Grubbing/Grinding	93.35		—
Grading/Road Construction	26.29		—
Underground Electric/Communications Cable Installation	20.54		19.74
Tracker Installation Project 1a (30 MW)	206.13		331.60
Tracker Installation Project 1b (15 MW)	—		179.24
Tracker Installation Project 2 (15 MW)	—		179.24
Substation Construction	25.50		—
O&M Building Construction	—		57.35
Gen-Tie Line Construction	134.71		—
OFFROAD ANNUAL TOTAL	**507.53**		**415.84**
Onroad Emissions	**944.80**		**1,280.85**
ANNUAL EMISSIONS	**1,452.33**		**1,696.69**

Notes:
1. Emissions per month reflect worst-case daily emissions accounting for construction phases occuring concurrently.

OPERATION

Vehicle Type	ROG	CO	NOx	SOx	PM10	PM2.5
Solar Farm						
Employee Vehicles	0.23	2.19	0.22	0.00	0.15	0.05
Personnel Transport Vehicles	0.01	0.09	0.01	0.00	0.01	0.00
Washing Vehicles	0.01	0.04	0.17	0.00	0.01	0.00
Satellite Washing Vehicles	0.01	0.09	0.01	0.00	0.01	0.00
Service Trucks	0.00	0.05	0.01	0.00	0.00	0.00
Emergency Generators	1.02	11.01	19.30	0.02	0.63	0.62
Gen-Tie Line						
Pole/Structure Brushing	0.12	1.10	0.11	0.00	0.08	0.02
Herbicide Application	0.12	1.10	0.11	0.00	0.08	0.02
Equipment Repair	0.15	1.47	0.15	0.00	0.10	0.03
Equipment Repair	0.10	0.45	2.08	0.00	0.08	0.04
Helicopter Inspection	0.99	19.09	11.89	1.08	0.00	0.00
Maximum Daily Emissions	**2.75**	**36.67**	**34.05**	**1.12**	**1.14**	**0.80**

Tierra del Sol Solar Farm Project
Off Road Equipment Emissions

2014 EMISSIONS

Equipment	# of Units	Hrs/Day	Duration (Days)	Category	2014 Emissions (lb/day)							2014 Emissions (tons/year)						
					ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Mobilization and Clean-Up																		
Tractor/Loader/Backhoes	3	2	5	Off-Road	0.21	2.25	2.53	0.00	0.17	0.16	402.78	0.00	0.01	0.01	0.00	0.00	0.00	1.01
				PHASE SUBTOTAL	**0.21**	**2.25**	**2.53**	**0.00**	**0.17**	**0.16**	**402.78**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**1.01**
Site Clearing/Grubbing/Grinding																		
Crawler Tractors	2	8	50	Off-Road	1.35	9.21	19.46	0.02	0.94	0.86	1822.00	0.03	0.23	0.49	0.00	0.02	0.02	45.55
Excavators	2	8	50	Off-Road	0.59	8.46	8.72	0.02	0.38	0.35	1912.02	0.01	0.21	0.22	0.00	0.01	0.01	47.80
				PHASE SUBTOTAL	**1.94**	**17.67**	**28.18**	**0.04**	**1.32**	**1.21**	**3734.02**	**0.05**	**0.44**	**0.70**	**0.00**	**0.03**	**0.03**	**93.35**
Grading/Road Construction																		
Tractor/Loader/Backhoes	1	8	8	Off-Road	0.28	3.00	3.38	0.01	0.23	0.21	537.03	0.00	0.01	0.01	0.00	0.00	0.00	2.15
Crawler Tractors	2	8	8	Off-Road	1.35	9.21	19.46	0.02	0.94	0.86	1822.00	0.01	0.04	0.08	0.00	0.00	0.00	7.29
Scrapers	2	8	8	Off-Road	2.51	15.85	38.87	0.04	1.61	1.48	4212.75	0.01	0.06	0.16	0.00	0.01	0.01	16.85
				PHASE SUBTOTAL	**4.13**	**28.06**	**61.71**	**0.07**	**2.78**	**2.56**	**6571.78**	**0.02**	**0.11**	**0.25**	**0.00**	**0.01**	**0.01**	**26.29**
Underground Electric/Communications Cable Installation																		
Tractor/Loader/Backhoes	2	6	51	Off-Road	0.42	4.50	5.07	0.01	0.34	0.32	805.55	0.01	0.11	0.13	0.00	0.01	0.01	20.54
				PHASE SUBTOTAL	**0.42**	**4.50**	**5.07**	**0.01**	**0.34**	**0.32**	**805.55**	**0.01**	**0.11**	**0.13**	**0.00**	**0.01**	**0.01**	**20.54**
Tracker Installation (Phase 1a - 10MW)																		
Skid Steer Loader	1	6	46	Off-Road	0.09	1.36	1.30	0.00	0.08	0.07	181.50	0.00	0.03	0.03	0.00	0.00	0.00	4.17
Bore/Drill Rigs	4	8	46	Off-Road	1.45	15.92	26.28	0.05	0.99	0.91	5173.12	0.03	0.37	0.60	0.00	0.02	0.02	118.98
Cranes	1	8	46	Off-Road	0.60	3.54	8.42	0.01	0.40	0.37	999.10	0.01	0.08	0.19	0.00	0.01	0.01	22.98
Module Suction Lifters	6	8	46	Off-Road	1.26	10.61	12.79	0.03	0.98	0.90	2608.65	0.03	0.24	0.29	0.00	0.02	0.02	60.00
				PHASE SUBTOTAL	**3.41**	**31.43**	**48.79**	**0.10**	**2.45**	**2.25**	**8962.37**	**0.08**	**0.72**	**1.12**	**0.00**	**0.06**	**0.05**	**206.13**
Substation Construction																		
Cranes	1	6	25	Off-Road	0.45	2.66	6.31	0.01	0.30	0.28	749.32	0.01	0.03	0.08	0.00	0.00	0.00	9.37
Aerial Lifts	1	4	25	Off-Road	0.03	0.74	0.62	0.00	0.03	0.03	138.76	0.00	0.01	0.01	0.00	0.00	0.00	1.73
Excavators	1	6	25	Off-Road	0.22	3.17	3.27	0.01	0.14	0.13	717.01	0.00	0.04	0.04	0.00	0.00	0.00	8.96
Forklifts	1	8	25	Off-Road	0.21	1.77	2.13	0.00	0.16	0.15	434.78	0.00	0.02	0.03	0.00	0.00	0.00	5.43
				PHASE SUBTOTAL	**0.91**	**8.34**	**12.33**	**0.02**	**0.63**	**0.58**	**2,039.87**	**0.01**	**0.10**	**0.15**	**0.00**	**0.01**	**0.01**	**25.50**
Gen-Tie Line Construction																		
Access Road Construction																		
Crawler Tractors	4	8	12	Off-Road	2.69	18.43	38.92	0.04	1.88	1.73	3644.00	0.02	0.11	0.23	0.00	0.01	0.01	21.86
Excavators	3	8	12	Off-Road	0.89	12.68	13.08	0.03	0.57	0.52	2868.03	0.01	0.08	0.08	0.00	0.00	0.00	17.21
Graders	1	8	12	Off-Road	0.61	4.79	8.72	0.01	0.39	0.36	1061.05	0.00	0.03	0.05	0.00	0.00	0.00	6.37
Rollers	1	8	12	Off-Road	0.29	3.21	2.92	0.01	0.19	0.18	535.93	0.00	0.02	0.02	0.00	0.00	0.00	3.22
				PHASE SUBTOTAL	**4.48**	**39.11**	**63.63**	**0.09**	**3.02**	**2.78**	**8,109.00**	**0.03**	**0.23**	**0.38**	**0.00**	**0.02**	**0.02**	**48.65**
Pole Installation																		
Bore/Drill Rigs[2]	2	8	48	Off-Road	0.73	7.96	13.14	0.03	0.50	0.46	2586.56	0.02	0.19	0.32	0.00	0.01	0.01	62.08
Cranes	1	8	48	Off-Road	0.60	3.54	8.42	0.01	0.40	0.37	999.10	0.01	0.09	0.20	0.00	0.01	0.01	23.98
				PHASE SUBTOTAL	**1.32**	**11.50**	**21.56**	**0.04**	**0.90**	**0.83**	**3,585.66**	**0.03**	**0.28**	**0.52**	**0.00**	**0.02**	**0.02**	**86.06**
				Gen-Tie Line Phase Total							**11,694.66**							**134.71**
											2014 TOTALS	**0.22**	**2.01**	**3.26**	**0.01**	**0.16**	**0.14**	**507.53**

2015 EMISSIONS

Equipment	# of Units	Hrs/Day	Duration (Days)	Category	2015 Emissions (lb/day)							2015 Emissions (tons/year)						
					ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Underground Electric/Communications Cable Installation																		
Tractor/Loader/Backhoes	2	6	49	Off-Road	0.42	4.46	4.93	0.01	0.33	0.31	805.54	0.01	0.11	0.12	0.00	0.01	0.01	19.74
				PHASE SUBTOTAL	**0.42**	**4.46**	**4.93**	**0.01**	**0.33**	**0.31**	**805.54**	**0.01**	**0.11**	**0.12**	**0.00**	**0.01**	**0.01**	**19.74**
Tracker Installation (Phase 1a - 20MW)																		
Skid Steer Loader	1	6	74	Off-Road	0.09	1.33	1.24	0.00	0.07	0.07	181.50	0.00	0.05	0.05	0.00	0.00	0.00	6.72
Bore/Drill Rigs	4	8	74	Off-Road	1.45	15.89	25.41	0.05	0.96	0.88	5173.00	0.05	0.59	0.94	0.00	0.04	0.03	191.40
Cranes	1	8	74	Off-Road	0.59	3.42	8.24	0.01	0.39	0.36	999.10	0.02	0.13	0.30	0.00	0.01	0.01	36.97
Module Suction Lifters	6	8	74	Off-Road	1.25	10.56	12.29	0.03	0.96	0.88	2608.66	0.05	0.39	0.45	0.00	0.04	0.03	96.52
				PHASE SUBTOTAL	**3.38**	**31.21**	**47.18**	**0.10**	**2.38**	**2.19**	**8962.25**	**0.12**	**1.15**	**1.75**	**0.00**	**0.09**	**0.08**	**331.60**
Tracker Installation (Phase 1b - 15MW)																		
Skid Steer Loader	1	6	40	Off-Road	0.09	1.33	1.24	0.00	0.07	0.07	181.50	0.00	0.03	0.02	0.00	0.00	0.00	3.63
Bore/Drill Rigs	4	8	40	Off-Road	1.45	15.89	25.41	0.05	0.96	0.88	5173.00	0.03	0.32	0.51	0.00	0.02	0.02	103.46
Cranes	1	8	40	Off-Road	0.59	3.42	8.24	0.01	0.39	0.36	999.10	0.01	0.07	0.16	0.00	0.01	0.01	19.98
Module Suction Lifters	6	8	40	Off-Road	1.25	10.56	12.29	0.03	0.96	0.88	2608.66	0.02	0.21	0.25	0.00	0.02	0.02	52.17
				PHASE SUBTOTAL	**3.38**	**31.21**	**47.18**	**0.10**	**2.38**	**2.19**	**8962.25**	**0.07**	**0.62**	**0.94**	**0.00**	**0.05**	**0.04**	**179.24**
Tracker Installation (Phase 2 - 15MW)																		
Skid Steer Loader	1	6	40	Off-Road	0.09	1.33	1.24	0.00	0.07	0.07	181.50	0.00	0.03	0.02	0.00	0.00	0.00	3.63
Bore/Drill Rigs	4	8	40	Off-Road	1.45	15.89	25.41	0.05	0.96	0.88	5173.00	0.03	0.32	0.51	0.00	0.02	0.02	103.46
Cranes	1	8	40	Off-Road	0.59	3.42	8.24	0.01	0.39	0.36	999.10	0.01	0.07	0.16	0.00	0.01	0.01	19.98
Module Suction Lifters	6	8	40	Off-Road	1.25	10.56	12.29	0.03	0.96	0.88	2608.66	0.02	0.21	0.25	0.00	0.02	0.02	52.17
				PHASE SUBTOTAL	**3.38**	**31.21**	**47.18**	**0.10**	**2.38**	**2.19**	**8962.25**	**0.07**	**0.62**	**0.94**	**0.00**	**0.05**	**0.04**	**179.24**
O&M Building Construction																		
Cranes	1	8	80	Off-Road	0.59	3.42	8.24	0.01	0.39	0.36	999.10	0.02	0.14	0.33	0.00	0.02	0.01	39.96
Forklifts	1	8	80	Off-Road	0.20	1.76	2.05	0.00	0.16	0.14	434.78	0.01	0.07	0.08	0.00	0.01	0.01	17.39
				PHASE SUBTOTAL	**0.79**	**5.18**	**10.29**	**0.02**	**0.55**	**0.51**	**1433.87**	**0.03**	**0.21**	**0.41**	**0.00**	**0.02**	**0.02**	**57.35**
											2015 TOTALS	**0.17**	**1.46**	**2.30**	**0.00**	**0.12**	**0.11**	**415.84**

Tierra del Sol Solar Farm Project
Off-Road Equipment Emission Rates

Equipment	Category	2014 Emission Rates (lb/hr)						
		ROG	CO	NOx	SOx	PM10	PM2.5[1]	CO2
Mobilization/Site Clearing/Grubbing/Grinding/Grading								
Tractor/Loader/Backhoes	Off-Road	0.035	0.375	0.422	0.001	0.029	0.026	67.129
Crawler Tractors	Off-Road	0.084	0.576	1.216	0.001	0.059	0.054	113.875
Excavators	Off-Road	0.037	0.529	0.545	0.001	0.024	0.022	119.501
Scrapers	Off-Road	0.157	0.990	2.429	0.003	0.101	0.093	263.297
Underground Electric/Communications Cable Installation								
Tractor/Loader/Backhoes	Off-Road	0.035	0.375	0.422	0.001	0.029	0.026	67.129
Tracker Installation (Phase I -30MW)								
Skid Steer Loaders	Off-Road	0.016	0.226	0.217	0.000	0.013	0.012	30.249
Bore/Drill Rigs	Off-Road	0.045	0.497	0.821	0.002	0.031	0.029	161.660
Cranes	Off-Road	0.075	0.443	1.052	0.001	0.050	0.046	124.887
Module Suction Lifters[1]	Off-Road	0.026	0.221	0.267	0.001	0.020	0.019	54.347
Tracker Installation (Phase 1b/2 - 15MW)								
Skid Steer Loaders	Off-Road	0.016	0.226	0.217	0.000	0.013	0.012	30.249
Bore/Drill Rigs	Off-Road	0.045	0.497	0.821	0.002	0.031	0.029	161.660
Cranes	Off-Road	0.075	0.443	1.052	0.001	0.050	0.046	124.887
Module Suction Lifters[1]	Off-Road	0.026	0.221	0.267	0.001	0.020	0.019	54.347
Substation Construction								
Cranes	Off-Road	0.075	0.443	1.052	0.001	0.050	0.046	124.887
Aerial Lifts	Off-Road	0.008	0.186	0.155	0.000	0.007	0.006	34.691
Excavators	Off-Road	0.037	0.529	0.545	0.001	0.024	0.022	119.501
Forklifts	Off-Road	0.026	0.221	0.267	0.001	0.020	0.019	54.347
O&M Building Construction								
Cranes	Off-Road	0.075	0.443	1.052	0.001	0.050	0.046	124.887
Forklifts	Off-Road	0.026	0.221	0.267	0.001	0.020	0.019	54.347
Crawler Tractors	Off-Road	0.084	0.576	1.216	0.001	0.059	0.054	113.875
Excavators	Off-Road	0.037	0.529	0.545	0.001	0.024	0.022	119.501
Graders	Off-Road	0.076	0.598	1.090	0.001	0.049	0.045	132.631
Rollers	Off-Road	0.037	0.401	0.365	0.001	0.024	0.022	66.991
Bore/Drill Rigs	Off-Road	0.045	0.497	0.821	0.002	0.031	0.029	161.660
Cranes	Off-Road	0.075	0.443	1.052	0.001	0.050	0.046	124.887

Source (Emission Factors): OFFROAD2011 - ROG, NOx, PM10; OFFROAD2007 - CO, SOx, CO2.

PM2.5 fraction = 92% of PM10 (http://www.arb.ca.gov/ei/speciate/pmsize_07242008.xls for "diesel vehicle exhaust")

Tierra del Sol Solar Farm Project
Fugitive Dust Emissions

Phase	Max. Daily Disturbance (acres)	PM10 Emissions (lb/day)[1,2,3]	PM2.5 Emissions (lb/day)[4]
Site Clearing/Grubbing/Grinding	8.4	65.52	13.68
Grading/Road Construction	3.9	58.10	12.13

1. Utilizes emission factor of 20.0 pounds PM10 per acre per day per SMAQMD Road Construction Emissions Model Version 7.1.3.
2. Utilizes emission factor of 38.2 pounds PM10 per acre per day ("worst case conditions"), per URBEMIS2007 Software User's Guide, Appendix A, Table A-4.
3. 3x daily watering results in a 61% decrease in particulate matter, per URBEMIS default.
4. PM2.5 emissions are 20.88% of PM10 emissions for construction dust, per URBEMIS default.

Tierra del Sol Solar Farm Project
Paved Road Fugitive Dust Emission Factors

Vehicle Type	sL (g/m^2)	Average Weight (tons)	PM10 Emission Factor (lb/VMT)	PM2.5 Emission Factor (lb/VMT)
Worker Vehicles and Delivery Trucks	0.027	2.4	0.00020	0.000049

1. Emission factors from AP-42, Section 13.2.1 (Paved Roads).
   $E = k * (sL)^{0.91} * (W)^{1.02}$
2. Silt loading from California Air Resources Board, Areawide Source Methodologies, Section 7.9, Entrained Paved Road Dust, Paved Road Travel (July 1997).
   http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9.pdf.
   Silt loading is for freeways, major, and collector roads in San Diego County.

Tierra del Sol Solar Farm Project
On-Road Motor Vehicle Emissions

2014 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2014 Emissions (lb/day)							2014 Emissions (lbs/month)						
						ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
July																			
Gen-Tie Line																			
Worker Vehicles[1]	6	4	35	12	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	1.31	12.58	1.26	0.02	0.77	0.24	2,252.30
Delivery Trucks[2]	8		67	12	On-Road	0.46	2.15	10.52	0.02	0.41	0.24	2,156.10	5.54	25.85	126.29	0.25	4.91	2.89	25,873.23
Water Trucks[3]		1	30	12	On-Road	0.03	0.12	0.59	0.00	0.02	0.01	120.68	0.31	1.45	7.07	0.01	0.20	0.14	1,448.13
Concrete Trucks[4]	16		7	12	On-Road	0.10	0.45	2.20	0.00	0.09	0.05	450.53	1.16	5.40	26.39	0.05	1.03	0.60	5,406.35
August																			
Gen-Tie Line																			
Worker Vehicles[1]	6	4	35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Delivery Trucks[2]	8		67	26	On-Road	0.46	2.15	10.52	0.02	0.41	0.24	2,156.10	12.00	56.01	273.63	0.53	10.65	6.27	56,058.67
Water Trucks[3]		1	30	26	On-Road	0.03	0.12	0.59	0.00	0.02	0.01	120.68	0.67	3.13	15.32	0.03	0.44	0.31	3,137.61
Concrete Trucks[4]	16		7	26	On-Road	0.10	0.45	2.20	0.00	0.09	0.05	450.53	2.51	11.70	57.18	0.11	2.23	1.31	11,713.75
September																			
Gen-Tie Line																			
Worker Vehicles[1]	24	15	35	26	On-Road	0.44	4.19	0.42	0.01	0.26	0.08	750.77	11.37	109.02	10.90	0.20	6.67	2.05	19,519.93
Bucket Trucks[5]		8	20	26	On-Road	0.14	0.64	3.14	0.01	0.09	0.06	643.61	3.58	16.72	81.68	0.16	2.34	1.67	16,733.93
Pull Site Tensioners[6]		3	20	26	On-Road	0.05	0.24	1.18	0.00	0.03	0.02	241.35	1.34	6.27	30.63	0.06	0.88	0.63	6,275.22
Water Trucks[3]		1	30	26	On-Road	0.03	0.12	0.59	0.00	0.02	0.01	120.68	0.67	3.13	15.32	0.03	0.44	0.31	3,137.61
October																			
Worker Vehicles[1]	28		35	26	On-Road	0.51	4.89	0.49	0.01	0.30	0.09	875.89	13.27	127.19	12.72	0.23	7.79	2.40	22,773.25
Delivery Trucks[7]	12		85	26	On-Road	0.88	4.10	20.03	0.04	0.78	0.46	4,103.03	22.84	106.58	520.71	1.02	20.26	11.94	106,678.81
Water Trucks (On-Site)[8]		2	120	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Water Trucks (Off-Site)[9]	70		58	26	On-Road	3.50	16.32	79.72	0.16	3.10	1.83	16,331.67	90.91	424.25	2072.64	4.05	80.66	47.51	424,623.49
Dump Trucks[10]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Concrete Trucks[4]	4		7	26	On-Road	0.02	0.11	0.55	0.00	0.02	0.01	112.63	0.63	2.93	14.29	0.03	0.56	0.33	2,928.44
November																			
Worker Vehicles[1]	92		35	26	On-Road	1.68	16.07	1.61	0.03	0.98	0.30	2,877.94	43.60	417.90	41.80	0.75	25.58	7.87	74,826.38
Delivery Trucks[7]	24		85	26	On-Road	1.76	8.20	40.05	0.08	1.56	0.92	8,206.06	45.68	213.17	1041.43	2.04	40.53	23.87	213,357.62
Commissioning Trips[11]	5		35	26	On-Road	0.09	0.87	0.09	0.00	0.05	0.02	156.41	2.37	22.71	2.27	0.04	1.39	0.43	4,066.65
Water Trucks (On-Site)[8]		2	120	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Water Trucks (Off-Site)[9]	70		58	26	On-Road	3.50	16.32	79.72	0.16	3.10	1.83	16,331.67	90.91	424.25	2072.64	4.05	80.66	47.51	424,623.49
Concrete Trucks[4]	6		7	26	On-Road	0.04	0.17	0.82	0.00	0.03	0.02	168.95	0.94	4.39	21.44	0.04	0.83	0.49	4,392.66
December																			
Worker Vehicles[1]	92		35	26	On-Road	1.68	16.07	1.61	0.03	0.98	0.30	2,877.94	43.60	417.90	41.80	0.75	25.58	7.87	74,826.38
Delivery Trucks[7]	24		85	26	On-Road	1.76	8.20	40.05	0.08	1.56	0.92	8,206.06	45.68	213.17	1041.43	2.04	40.53	23.87	213,357.62
Commissioning Trips[11]	6		35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Water Trucks (On-Site)[8]		2	120	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Water Trucks (Off-Site)[9]	70		58	2	On-Road	3.50	16.32	79.72	0.16	3.10	1.83	16,331.67	6.99	32.63	159.43	0.31	6.20	3.65	32,663.35
Dump Trucks[10]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Concrete Trucks[4]	5		7	26	On-Road	0.03	0.14	0.69	0.00	0.03	0.02	140.79	0.78	3.66	17.87	0.03	0.70	0.41	3,660.55
												TOTAL 2014	**480.61**	**2838.98**	**8309.88**	**18.11**	**382.19**	**207.79**	**1,889,599.83**

Tierra del Sol Solar Farm Project
On-Road Motor Vehicle Emissions

2015 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2015 Emissions (lb/day)							2015 Emissions (lbs/month)						
						ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
January																			
Worker Vehicles[1]	92		35	26	On-Road	1.52	14.42	1.45	0.03	0.98	0.30	2,877.63	39.46	374.83	37.57	0.75	25.55	7.84	74,818.30
Delivery Trucks[7]	24		85	26	On-Road	1.58	7.42	34.44	0.08	1.37	0.74	8,199.39	41.15	192.82	895.55	2.03	35.59	19.33	213,184.25
Commissioning Trips[11]	5		35	26	On-Road	0.08	0.78	0.08	0.00	0.05	0.02	156.39	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21
Water Trucks (On-Site)[8]		1	60	26	On-Road	0.05	0.22	1.01	0.00	0.03	0.02	241.16	1.21	5.67	26.34	0.06	0.73	0.49	6,270.12
Dump Trucks[10]		4	60	26	On-Road	0.19	0.87	4.05	0.01	0.11	0.08	964.63	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
Concrete Trucks[4]	6		7	26	On-Road	0.03	0.15	0.71	0.00	0.03	0.02	168.81	0.85	3.97	18.44	0.04	0.73	0.40	4,389.09
February																			
Worker Vehicles[1]	92		35	26	On-Road	1.52	14.42	1.45	0.03	0.98	0.30	2,877.63	39.46	374.83	37.57	0.75	25.55	7.84	74,818.30
Delivery Trucks[7]	24		85	26	On-Road	1.58	7.42	34.44	0.08	1.37	0.74	8,199.39	41.15	192.82	895.55	2.03	35.59	19.33	213,184.25
Commissioning Trips[11]	5		35	26	On-Road	0.08	0.78	0.08	0.00	0.05	0.02	156.39	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21
Water Trucks (On-Site)[8]		1	60	26	On-Road	0.05	0.22	1.01	0.00	0.03	0.02	241.16	1.21	5.67	26.34	0.06	0.73	0.49	6,270.12
Dump Trucks[10]		4	60	26	On-Road	0.19	0.87	4.05	0.01	0.11	0.08	964.63	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
Concrete Trucks[4]	6		7	26	On-Road	0.03	0.15	0.71	0.00	0.03	0.02	168.81	0.85	3.97	18.44	0.04	0.73	0.40	4,389.09
March																			
Worker Vehicles[1]	92		35	26	On-Road	1.52	14.42	1.45	0.03	0.98	0.30	2,877.63	39.46	374.83	37.57	0.75	25.55	7.84	74,818.30
Delivery Trucks[7]	24		85	26	On-Road	1.58	7.42	34.44	0.08	1.37	0.74	8,199.39	41.15	192.82	895.55	2.03	35.59	19.33	213,184.25
Commissioning Trips[11]	5		35	26	On-Road	0.08	0.78	0.08	0.00	0.05	0.02	156.39	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21
Water Trucks (On-Site)[8]		1	60	26	On-Road	0.05	0.22	1.01	0.00	0.03	0.02	241.16	1.21	5.67	26.34	0.06	0.73	0.49	6,270.12
Dump Trucks[10]		4	60	26	On-Road	0.19	0.87	4.05	0.01	0.11	0.08	964.63	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
Concrete Trucks[4]	6		7	26	On-Road	0.03	0.15	0.71	0.00	0.03	0.02	168.81	0.85	3.97	18.44	0.04	0.73	0.40	4,389.09
April																			
Worker Vehicles[1]	28		35	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[7]	4		85	26	On-Road	0.26	1.24	5.74	0.01	0.23	0.12	1,366.57	6.86	32.14	149.26	0.34	5.93	3.22	35,530.71
Water Trucks (On-Site)[8]		2	60	26	On-Road	0.09	0.44	2.03	0.00	0.06	0.04	482.32	2.42	11.34	52.68	0.12	1.47	0.98	12,540.25
Concrete Trucks[4]	2		7	26	On-Road	0.01	0.05	0.24	0.00	0.01	0.01	56.27	0.28	1.32	6.15	0.01	0.24	0.13	1,463.03
May																			
Worker Vehicles[1]	28		35	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[7]	4		85	26	On-Road	0.26	1.24	5.74	0.01	0.23	0.12	1,366.57	6.86	32.14	149.26	0.34	5.93	3.22	35,530.71
June																			
Worker Vehicles[1]	28		35	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[7]	4		85	26	On-Road	0.26	1.24	5.74	0.01	0.23	0.12	1,366.57	6.86	32.14	149.26	0.34	5.93	3.22	35,530.71
July																			
Worker Vehicles[1]	28		35	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[7]	4		85	26	On-Road	0.26	1.24	5.74	0.01	0.23	0.12	1,366.57	6.86	32.14	149.26	0.34	5.93	3.22	35,530.71
August																			
Worker Vehicles[1]	112		35	26	On-Road	1.85	17.55	1.76	0.04	1.20	0.37	3,503.20	48.03	456.31	45.74	0.92	31.10	9.55	91,083.14
Delivery Trucks[7]	26		85	26	On-Road	1.71	8.03	37.31	0.08	1.48	0.81	8,882.68	44.58	208.88	970.18	2.20	38.56	20.95	230,949.60
Commissioning Trips[11]	6		35	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Concrete Trucks[4]	8		7	26	On-Road	0.04	0.20	0.95	0.00	0.04	0.02	225.08	1.13	5.29	24.58	0.06	0.98	0.53	5,852.12
September																			
Worker Vehicles[1]	112		35	26	On-Road	1.85	17.55	1.76	0.04	1.20	0.37	3,503.20	48.03	456.31	45.74	0.92	31.10	9.55	91,083.14
Delivery Trucks[7]	26		85	26	On-Road	1.71	8.03	37.31	0.08	1.48	0.81	8,882.68	44.58	208.88	970.18	2.20	38.56	20.95	230,949.60
Commissioning Trips[11]	6		35	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Concrete Trucks[4]	8		7	26	On-Road	0.04	0.20	0.95	0.00	0.04	0.02	225.08	1.13	5.29	24.58	0.06	0.98	0.53	5,852.12
October																			
Worker Vehicles[1]	112		35	26	On-Road	1.85	17.55	1.76	0.04	1.20	0.37	3,503.20	48.03	456.31	45.74	0.92	31.10	9.55	91,083.14
Delivery Trucks[7]	26		85	26	On-Road	1.71	8.03	37.31	0.08	1.48	0.81	8,882.68	44.58	208.88	970.18	2.20	38.56	20.95	230,949.60
Commissioning Trips[11]	6		35	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Concrete Trucks[4]	8		7	26	On-Road	0.04	0.20	0.95	0.00	0.04	0.02	225.08	1.13	5.29	24.58	0.06	0.98	0.53	5,852.12
November																			
Worker Vehicles[1]	112		35	26	On-Road	1.85	17.55	1.76	0.04	1.20	0.37	3,503.20	48.03	456.31	45.74	0.92	31.10	9.55	91,083.14
Delivery Trucks[7]	26		85	26	On-Road	1.71	8.03	37.31	0.08	1.48	0.81	8,882.68	44.58	208.88	970.18	2.20	38.56	20.95	230,949.60
Commissioning Trips[11]	6		35	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Concrete Trucks[4]	8		7	26	On-Road	0.04	0.20	0.95	0.00	0.04	0.02	225.08	1.13	5.29	24.58	0.06	0.98	0.53	5,852.12
												TOTAL 2015	**732.10**	**5236.93**	**8123.22**	**24.80**	**546.30**	**240.92**	**2,561,691.93**

Tierra del Sol Solar Farm Project
On-Road Motor Vehicle Emissions

Notes:

1. Trips per day - assumes 70% of total worker trips due to carpooling
   Employee commute distance of 35 miles is assumed based on local workforce from Alpine and Boulevard
2. Gen-tie materials delivery coming from San Diego
3. Assumes water trucks during gen-tie construction will be operating at 15 mph for 2 hours per day = 30 mi/day
4. Assumes concrete trucks will be coming from Rugged solar site where concrete batch plant is located (approximately 7 miles)
5. Assumes bucket trucks will be operating intermittently at 10 mph for an equivalent of 2 hours per day = 20 mi/day
6. Assumes tensioners will be operating intermittently at 10 mph for an equivalent of 2 hours per day = 20 mi/day
7. Materials delivery coming from Rancho Bernardo, San Diego
8. Assumes on-site water trucks will be operating at 15 mph for 8 hours per day during site preparation (120 mi/day), and 4 hours per day following site preparation activities (60 mi/day)
9. Assumes 208,545 gallons/day of water is imported from Padre Dam Municipal Water District (approx. 58 miles) during October, November, and December for site preparation (clear and grub)
10. Assumes dump trucks will be operating at 15 mph for 4 hours per day = 60 mi/day
11. Employee commute/commissioning distance of 35 miles is assumed based on local workforce from Alpine and Boulevard

Tierra del Sol Solar Farm Project
EMFAC2011 Modeling Results and Emission Factor Calculations

LDA

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2014						
2014	43614	GAS	ROG	Total	10.173	Day
2014	190	DSL	ROG	Total	0.009	Day
2014	43614	GAS	NOx	Total Ex	8.915	Day
2014	190	DSL	NOx	Total Ex	0.133	Day
2014	43614	GAS	CO	Total Ex	97.134	Day
2014	190	DSL	CO	Total Ex	0.051	Day
2014	43614	GAS	SOx	Total Ex	0.178	Day
2014	190	DSL	SOx	Total Ex	0.001	Day
2014	43614	GAS	PM10	Total	2.271	Day
2014	190	DSL	PM10	Total	0.016	Day
2014	43614	GAS	PM2.5	Total	0.962	Day
2014	190	DSL	PM2.5	Total	0.010	Day
2014	43614	GAS	CO2	Total Ex	17646.734	Day
2014	190	DSL	CO2	Total Ex	78.503	Day
2015						
2015	44100	GAS	ROG	Total	9.172	Day
2015	194	DSL	ROG	Total	0.008	Day
2015	44100	GAS	NOx	Total Ex	8.145	Day
2015	194	DSL	NOx	Total Ex	0.123	Day
2015	44100	GAS	CO	Total Ex	87.928	Day
2015	194	DSL	CO	Total Ex	0.046	Day
2015	44100	GAS	SOx	Total Ex	0.180	Day
2015	194	DSL	SOx	Total Ex	0.001	Day
2015	44100	GAS	PM10	Total	2.287	Day
2015	194	DSL	PM10	Total	0.015	Day
2015	44100	GAS	PM2.5	Total	0.966	Day
2015	194	DSL	PM2.5	Total	0.009	Day
2015	44100	GAS	CO2	Total Ex	17836.977	Day
2015	194	DSL	CO2	Total Ex	80.267	Day

LDT1

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2014						
2014	6327	GAS	ROG	Total	3.052	Day
2014	7	DSL	ROG	Total	0.001	Day
2014	6327	GAS	NOx	Total Ex	2.478	Day
2014	7	DSL	NOx	Total Ex	0.006	Day
2014	6327	GAS	CO	Total Ex	26.716	Day
2014	7	DSL	CO	Total Ex	0.003	Day
2014	6327	GAS	SOx	Total Ex	0.030	Day
2014	7	DSL	SOx	Total Ex	0.000	Day
2014	6327	GAS	PM10	Total	0.346	Day
2014	7	DSL	PM10	Total	0.001	Day
2014	6327	GAS	PM2.5	Total	0.155	Day
2014	7	DSL	PM2.5	Total	0.001	Day
2014	6327	GAS	CO2	Total Ex	2951.180	Day
2014	7	DSL	CO2	Total Ex	2.890	Day
2015						
2015	6386	GAS	ROG	Total	2.849	Day
2015	7	DSL	ROG	Total	0.001	Day
2015	6386	GAS	NOx	Total Ex	2.276	Day
2015	7	DSL	NOx	Total Ex	0.005	Day
2015	6386	GAS	CO	Total Ex	24.337	Day
2015	7	DSL	CO	Total Ex	0.002	Day
2015	6386	GAS	SOx	Total Ex	0.030	Day
2015	7	DSL	SOx	Total Ex	0.000	Day
2015	6386	GAS	PM10	Total	0.347	Day
2015	7	DSL	PM10	Total	0.001	Day
2015	6386	GAS	PM2.5	Total	0.154	Day
2015	7	DSL	PM2.5	Total	0.001	Day
2015	6386	GAS	CO2	Total Ex	2981.868	Day
2015	7	DSL	CO2	Total Ex	3.010	Day

LDT2

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2014						
2014	16522	GAS	ROG	Total	4.125	Day
2014	7	DSL	ROG	Total	0.000	Day
2014	16522	GAS	NOx	Total Ex	5.104	Day
2014	7	DSL	NOx	Total Ex	0.006	Day
2014	16522	GAS	CO	Total Ex	42.486	Day
2014	7	DSL	CO	Total Ex	0.002	Day
2014	16522	GAS	SOx	Total Ex	0.092	Day
2014	7	DSL	SOx	Total Ex	0.000	Day
2014	16522	GAS	PM10	Total	0.858	Day
2014	7	DSL	PM10	Total	0.001	Day
2014	16522	GAS	PM2.5	Total	0.363	Day
2014	7	DSL	PM2.5	Total	0.000	Day
2014	16522	GAS	CO2	Total Ex	9110.407	Day
2014	7	DSL	CO2	Total Ex	2.967	Day
2015						
2015	16700	GAS	ROG	Total	3.851	Day
2015	7	DSL	ROG	Total	0.000	Day
2015	16700	GAS	NOx	Total Ex	4.568	Day
2015	7	DSL	NOx	Total Ex	0.005	Day
2015	16700	GAS	CO	Total Ex	38.554	Day
2015	7	DSL	CO	Total Ex	0.002	Day
2015	16700	GAS	SOx	Total Ex	0.093	Day
2015	7	DSL	SOx	Total Ex	0.000	Day
2015	16700	GAS	PM10	Total	0.865	Day
2015	7	DSL	PM10	Total	0.001	Day
2015	16700	GAS	PM2.5	Total	0.365	Day
2015	7	DSL	PM2.5	Total	0.000	Day
2015	16700	GAS	CO2	Total Ex	9209.495	Day
2015	7	DSL	CO2	Total Ex	2.978	Day

HHDT

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2014						
2014	1718	DSL	ROG	Total	0.740	Day
2014	1718	DSL	NOx	Total Ex	16.866	Day
2014	1718	DSL	CO	Total Ex	3.452	Day
2014	1718	DSL	SOx	Total Ex	0.033	Day
2014	1718	DSL	PM10	Total	0.484	Day
2014	1718	DSL	PM2.5	Total	0.344	Day
2014	1718	DSL	CO2	Total Ex	3455.453	Day
2015						
2015	1796	DSL	ROG	Total	0.697	Day
2015	1796	DSL	NOx	Total Ex	15.163	Day
2015	1796	DSL	CO	Total Ex	3.265	Day
2015	1796	DSL	SOx	Total Ex	0.034	Day
2015	1796	DSL	PM10	Total	0.422	Day
2015	1796	DSL	PM2.5	Total	0.283	Day
2015	1796	DSL	CO2	Total Ex	3609.401	Day

Source: EMFAC2011 online results for San Diego County

1. "Total Exhaust" emissions used for all pollutants, except ROG, PM10, and PM2.5. ROG iscalculated using the "Total" emissions. PM10 and PM2.5 emissions are calculated using "Total" emissions, which include exhaust, brake wear (BW) and tire wear (TW).

2014 Emission Factors

Reactive Organic Gases		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
ROG	tons/day	10.18	3.05	4.13	17.36	0.74
	g/mi	0.21	0.44	0.23	0.24	0.39

Oxides of Nitrogen		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
NOx	tons/day	9.05	2.48	5.11	16.64	16.87
	g/mi	0.19	0.36	0.28	0.23	8.91

Carbon Monoxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
CO	tons/day	97.19	26.72	42.49	166.39	3.45
	g/mi	2.01	3.83	2.33	2.26	1.82

Sulfur Oxides		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
SOx	tons/day	0.18	0.03	0.09	0.30	0.03
	g/mi	0.00	0.00	0.01	0.00	0.02

Particulate Matter (PM10)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
PM10	tons/day	2.29	0.35	0.86	3.49	0.48
	g/mi	0.05	0.05	0.05	0.05	0.26

Particulate Matter (PM2.5)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
PM2.5	tons/day	0.97	0.16	0.36	1.49	0.34
	g/mi	0.02	0.02	0.02	0.02	0.18

Carbon Dioxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
CO2	tons/day	17,725.24	2,954.07	9,113.37	29,792.68	3,455.45
	g/mi	367.10	423.10	500.18	405.41	1,824.64

2015 Emission Factors

Reactive Organic Gases		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
ROG	tons/day	9.18	2.85	3.85	15.88	0.70
	g/mi	0.19	0.40	0.21	0.21	0.35

Oxides of Nitrogen		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
NOx	tons/day	8.27	2.28	4.57	15.12	15.16
	g/mi	0.17	0.32	0.25	0.20	7.66

Carbon Monoxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
CO	tons/day	87.97	24.34	38.56	150.87	3.26
	g/mi	1.80	3.45	2.09	2.03	1.65

Sulfur Oxides		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
SOx	tons/day	0.18	0.03	0.09	0.30	0.03
	g/mi	0.00	0.00	0.01	0.00	0.02

Particulate Matter (PM10)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
PM10	tons/day	2.30	0.35	0.87	3.52	0.42
	g/mi	0.05	0.05	0.05	0.05	0.21

Particulate Matter (PM2.5)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
PM2.5	tons/day	0.97	0.16	0.37	1.50	0.28
	g/mi	0.02	0.02	0.02	0.02	0.14

Carbon Dioxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total	HHDT
					(Worker Trucks)	(Delivery Trucks)
VMT	1000 mi/day	44,294	6,393	16,707	67,394	1796
CO2	tons/day	17,917.24	2,984.88	9,212.47	30,114.59	3,609.40
	g/mi	366.96	423.56	500.23	405.37	1,823.16

Tierra del Sol Solar Farm Project
Diesel Engine-Generator Emissions

No. of Units	2	
Engine Rating	680	kW
	960	HP
Operating Schedule (per unit)*	1.0	hr/day
	50	hr/year

	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2
gm/BHP-hr	0.24	4.56	2.60	0.005	0.15	0.15	526.18
Data Source	1,2	1,2	1	3	1	1,4	5
Pounds/hour	1.02	19.30	11.01	0.02	0.63	0.62	2,227
Pounds/day	1.02	19.30	11.01	0.02	0.63	0.62	2,227
Pounds/year	50.79	965.08	550.26	1.06	31.75	30.99	111,360
Metric tons/year							50.5

Notes:
*Assumed 50 hours per year for testing and maintenance.
Sources:
1. Current ARB and USEPA engine standards for Tier 2 equipment, except SOx and CO2.
2. Fraction of NOx and ROG based on Table B-26 in California Air Resources Board. 2008. The Carl Moyer Program Guidelines, Part IV of IV (Appendices). April. http://www.arb.ca.gov/msprog/moyer/guidelines/cmp_guidelines_part4.pdf
3. Based on 15 ppm (0.0015%) sulfur by weight.
4. PM2.5 fraction = 97.6% of PM10 (http://www.arb.ca.gov/ei/speciate/pmsize_07242008.xls for "stationary IC engine - diesel")
5. AP-42, Section 3.4, Table 3.4-1.

Tierra del Sol Solar Farm Project
Operational Emissions[1]

						2015 Emissions (lbs/day)							tons/year[4]
	Trips/day	Days/Year	# of Units	Distance (mi)	Vehicle Type	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CO2
Solar Farm													
Employee Vehicles[2]	14	264		35	LDA/LDT	0.23	2.19	0.22	0.00	0.15	0.05	437.90	57.80
Personnel Transport Vehicles[3]		264	2	10	LDT2	0.01	0.09	0.01	0.00	0.01	0.00	22.06	2.91
Washing Vehicles[3]		36	1	10	HHDT	0.01	0.04	0.17	0.00	0.01	0.00	40.19	0.72
Satellite Washing Vehicles[3]		36	2	10	LDT2	0.01	0.09	0.01	0.00	0.01	0.00	22.06	0.40
Service Trucks[3]		264	1	10	LDT2	0.00	0.05	0.01	0.00	0.00	0.00	11.03	1.46
Emergency Generators		N/A	2		N/A	1.02	11.01	19.30	0.02	0.63	0.62	2,227.20	55.68
Gen-Tie Line													
Pole/Structure Brushing[2]	6	24	3	41	LDA/LDT	0.12	1.10	0.11	0.00	0.08	0.02	439.69	5.28
Herbicide Application[2]	6	24	3	41	LDA/LDT	0.12	1.10	0.11	0.00	0.08	0.02	439.69	5.28
Equipment Repair[2]	8	24	3	41	LDA/LDT	0.15	1.47	0.15	0.00	0.10	0.03	586.25	7.03
Equipment Repair[2]		36	3	41	HHDT	0.10	0.45	2.08	0.00	0.08	0.04	494.38	8.90
Helicopter Inspection	2	2	1	67	Helicopter	0.99	19.09	11.89	1.08	0.00	0.00	7,614.46	3.81
												Total	**149.26**

1. Operational Emissions would result primarily from mobile sources including all operation and maintenance vehicles. It was assumed operation of the O&M building and Substation would not result in area source emissions generated from natural gas or landscaping.
2. Employees for O&M would be coming from Alpine, El Centro, and surrounding areas
Gen-tie - maintenance/repair workers would be coming from Alpine + length of the gen-tie line = 41 miles one-way
3. For the purposes of modeling, it was assumed O&M vehicles would travel 10 miles per day
4. Assumed 22 work days per month for 12 months = 264 days/year for worker vehicles
Assumed washing would occur every 6-8 weeks or 9 washings per year, 4 days/wash = 36 days/year for washing vehicles

Helicopter Criteria Pollutant Emissions

Model[5]	Fuel Consumption[6] (gal/hr)	Engine Type	Daily Useage (hrs/day)	Annual Usage (days/yr)
Bell 206	**26**	**250B17B**	**8**	**2**

Emission Factors (lb/min)[7]:

Mode	CO	HC	NOx	SOx	PM	Mins/LTO [8]
Approach	0.0686777	0.007566187	0.0032011	0.0007857	0	6.50
Climb	0.0368677	0.001634931	0.0243605	0.0022072	0	4.33
Take-off	0.0345047	0.001325406	0.0291589	0.0023857	0	2.17
Idle	0.1013631	0.020899608	0.001045	0.0005643	0	7.00
Total (lbs/day)	**19.08695509**	**0.990199734**	**11.88991793**	**1.083247295**	**0**	

Helicopter GHG Emissions

Model[5]	Fuel Consumption[6] (gal/hr)	Emission Factor (kg CO2/gal)[9]	CO2 Emissions (lbs/hr)	Useage (hrs/day)	(days/yr)
Bell 206	**26**	**8.32**	**475.904**	**8**	**2**

5. Bell 206 helicopter is representative of type of helicopter for use during operation and maintenance
6. Source: Interagency Aviation Training. 2010. Aircraft Identification Library. (https://www.iat.gov/aircraft_library/index.asp). U.S. Department of Interior, National Business Center, Aviation Management Directive accessed November 28, 2012 at (http://amd.nbc.gov/akro/akflight/pdf/ex2.pdf)
7. Source: Emissions and Dispersion Modeling System (EDMS). 2010.
8. LTO = Landing/Take-off time
9. Source: California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, Tables C.3 and C.6.*

Tierra del Sol Solar Farm Project
GHG Emissions Summary

	CO_2 (tons/yr)	CO_2E (Mtons/yr)
CONSTRUCTION		
2014		
Off-Road Diesel	507.53	464.64
Diesel Trucks	840.79	763.60
Passenger Vehicles	104.01	99.33
Total for 2014	1,452.33	**1,327.56**
2015		
Off-Road Diesel	415.84	380.70
Diesel Trucks	925.05	840.13
Passenger Vehicles	355.79	339.76
Total for 2015	1,696.69	**1,560.59**
Annualized Construction Emissions		*96.27*
OPERATION		
Light-Duty Vehicles	80.15	76.54
Heavy-Duty Diesel Trucks	9.62	8.74
Helicopter	3.81	3.53
Emergency Generators	55.68	50.97
Gas-Insulated Switchgear	4.48	4.07
Electrical Generation		275.04
Water Supply		2.07
Wastewater		0.13
Total Operational	149.26	**421.10**

Tierra del Sol Solar Farm Project
CO_2-to-CO_2 Equivalent Factors

	Source	Units	CO_2	CH_4	N_2O	CO_2E/CO_2
Global Warming Potential			1	21	310	
Diesel Equipment	1	kg/gal	10.15	0.00058	0.00026	1.009
Diesel Trucks	2	g/mi	1,450.00	0.0051	0.0048	1.001
Passenger Vehicles	3					1.053
Helicopters	4	g/gal	8,320.00	7.04	0.11	1.022
Electrical Generation	5	lb/MWh	550.18	0.0302	0.0081	1.006

Serving Utility: SDG&E

1. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.6 and C.7.
2. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.3 and C.4.
3. US EPA, Office of Transportation and Air Quality. 2005. *Greenhouse Gas Emissions from a Typical Passenger Vehicle* (EPA420-F-05-004), p. 4.
4. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.3 and C.6.
5. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls adjusted to reflect an increase in renewables from 10% in 2009 to 33% in 2020 and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Table C.2.

Tierra del Sol Solar Farm Project
Greenhouse Gas Emissions from Project Electrical Demand

Land Use	Units	Electrical Demand Factor[1] (kW-hr/unit/yr)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[2] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
Miscellaneous (O&M Bldg.)	7.50 ksf	9,720	72,900	0.553	18.30
Trackers/Inverters/Other			1,022,959	0.553	256.75
Total			1,095,859		275.04

Utility Region: SDG&E

Sources:
1. Itron, Inc. 2006. *California Commercial End-Use Survey*. Prepared for California Energy Commission, CEC-400-2006-005. March
2. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls adjusted to reflect an increase in renewables from 10% in 2009 to 33% in 2020 and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions,* Version 3.1, Table C.2.

Notes:
CO_2E Carbon dioxide equivalent

Electrical Usage Rate

Land Use Type	Units	Usage Rate
Residential	kw-hr/unit/yr	5,626.50
Food Store	kw-hr/sq ft/yr	53.30
Restaurant	kw-hr/sq ft/yr	47.45
Hospital	kw-hr/sq ft/yr	21.70
Retail	kw-hr/sq ft/yr	13.55
College/University	kw-hr/sq ft/yr	11.55
High School	kw-hr/sq ft/yr	10.50
Elementary School	kw-hr/sq ft/yr	5.90
Office	kw-hr/sq ft/yr	12.95
Hotel/Motel	kw-hr/sq ft/yr	9.95
Warehouse	kw-hr/sq ft/yr	4.35
Miscellaneous	kw-hr/sq ft/yr	10.50

Source: SCAQMD, *CEQA Air Quality Handbook*, Table A9-11-A
Average for Southern California Edison and Los Angeles Dept.
of Water and Power

Tierra del Sol Solar
Other Operational Electricity Usage

Equipment (per tracker)	Electrical Draw (watts)	Notes	Daily Operating Hours	Annual Electricity Usage (kWh)
Tracker Control Unit	50	Control unit uses energy during sunlight hours only.	12	219
Tracker Motor	250	Tracker motor runs for 1 minute every hour	12	18
Air Drying Unit	192	Air drying unit runs 1 hour per day and 10 hours every 3 weeks		103
Total per Tracker				341
Number of Trackers	2,657			
Total Annual Electricity Usage				**905,001**

Equipment (per Building Block)	Electrical Draw (watts)	Notes	Daily Operating Hours	Annual Energy Usage (kWh)
Field Communications	300	Operates during sunlight hours	12	1,314
Inverters	100	Operates at night	12	438
PV Box Ventilation	173	Operates during sunlight hours	12	758
Total per Building Block				2,510
Number of Building Blocks	47			
Total Annual Electricity Usage				**117,958**
Grand Total Annual Elecricity				**1,022,959**

Tierra del Sol Solar
Gas-Insulated Switchgear

SF_6 Capacity [1]	lbs	75
Leakage Rate [2]	%/year	0.5%
Annual Leakage	lbs SF_6/year	0.375
GWP SF_6		23,900
Annual Emissions	tons CO_2E/year	4.48
	MT CO_2E/year	4.07

1. Per estimate by CARB staff (pers. communication 3/6/13).
2. Typical upper-bound leakage rate for new devices.
   NEMA Guideline - 0.1%/year
   IEC Specification - 0.5%/year

Notes:

CO_2E Carbon dioxide equivalent

MT metric tons (= 2,204.623 lbs)

Tierra del Sol Solar Farm Project
Greenhouse Gas Emissions from Project Water Supply

Land Use	Units	Acre-Feet per Year[1]	Electrical Demand Factor[2] (kW-hr/AF)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[3] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
N/A	N/A	3.90	2,117	8,256	0.553	2.07

Sources:
1. Chapter 2.9, Hydrology and Water Quality, Soitec Solar Development Program EIR.
2. California Energy Commission. 2006. *Refining Estimates of Water Related Energy Use in California.*
   (Northern California factor for water supply and conveyance for local (non-SWP) water)
   http://www.energy.ca.gov/2006publications/CEC-500-2006-118/CEC-500-2006-118.PDF
3. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector.
   http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls
   and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*
   Version 3.1, Table C.2.

Notes:

CO_2E	Carbon dioxide equivalent
kW-hr	kilowatt-hour
Mtons	metric tons (= 2,204.62 lbs)

Tierra del Sol Solar Farm Project
Greenhouse Gas Emissions from Project Wastewater Treatment

Gallons/Day	Liters/Day	Liter/Year	CH_4 Emission Factor[2] (MT/liter)	Annual CH_4 Emissions (Mton CH_4/yr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
105	397	104,920	6.00E-08	0.006	0.13

Sources:
1. Daily wastewater generation from County of San Diego. 2010. Design Manual for Onsite Wastewater Treatment Systems, p. 38. (15 gal/person for day workers at offices per shift, 7 employees)
2. CH_4 emission factor from Environ. 2011. CalEEMod User's Guide, p. 33.

Notes:

CH_4	methane
CO_2E	Carbon dioxide equivalent
Mtons	metric tons (= 2,204.62 lbs)

APPENDIX B

SCREEN 3 Model Results and Cancer Risk Calculations

08/07/13
16:30:27

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

C:\Lakes\Screen View\Projects\TDS construction.scr

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	VOLUME
EMISSION RATE (G/S)	=	0.101657E-03
SOURCE HEIGHT (M)	=	5.0000
INIT. LATERAL DIMEN (M)	=	33.0800
INIT. VERTICAL DIMEN (M)	=	1.1600
RECEPTOR HEIGHT (M)	=	2.0000
URBAN/RURAL OPTION	=	RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 0.000 M**4/S**2.

*** STABILITY CLASS 4 ONLY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	0.9687E-01	4	1.0	1.0	320.0	5.00	39.75	5.46	NO
200.	0.6430E-01	4	1.0	1.0	320.0	5.00	46.26	9.24	NO
300.	0.4448E-01	4	1.0	1.0	320.0	5.00	52.69	12.63	NO
400.	0.3280E-01	4	1.0	1.0	320.0	5.00	59.03	15.78	NO
500.	0.2532E-01	4	1.0	1.0	320.0	5.00	65.30	18.79	NO
600.	0.2024E-01	4	1.0	1.0	320.0	5.00	71.51	21.69	NO
700.	0.1660E-01	4	1.0	1.0	320.0	5.00	77.67	24.50	NO
800.	0.1391E-01	4	1.0	1.0	320.0	5.00	83.77	27.23	NO
900.	0.1185E-01	4	1.0	1.0	320.0	5.00	89.82	29.91	NO
1000.	0.1034E-01	4	1.0	1.0	320.0	5.00	95.83	32.21	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 100. M:

100.	0.9687E-01	4	1.0	1.0	320.0	5.00	39.75	5.46	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
34.	0.000	0	0.0	0.0	0.0	0.00	0.00	0.00	

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN     0.9687E-01      100.        0.


***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

Tierra del Sol Construction
Cancer Risk Calculations

			1 Year Exposure Adult	1 Year Exposure Children	70-Year Exposure 80% Percentile
CPF	Cancer Potency Factor	$(mg/kg\text{-}day)^{-1}$	1.1	1.1	1.1
C_{air}	Concentration	$\mu g/m^3$	0.0097	0.0097	0.0097
DBR	Daily Breathing Rate	L/kg-day	302	581	302
A	Absorption Factor	unitless	1	1	1
EF	Exposure Frequency	days	350	350	350
ED	Exposure Duration	years	1.2	1	70
AT	Averaging Time	days	25,550	25,550	25,550
	Dosage - Inhalation		4.8E-08	7.7E-08	2.8E-06
	Cancer Risk		5.3E-08	8.5E-08	3.1E-06

Cancer Risk = CPF*Dosage 0.0000001

Dose Inhalation = C_{air}*DBR*A*EF*ED*10^{-6} / AT