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Supplement to the Imperial Valley Solar (formerly Solar Two) Application for Certification

Application for Certification (08-AFC-5)
Imperial Valley Solar, LLC

Submitted to:
Bureau of Land Management
1661 S. 4th Street, El Centro, CA 92243

Submitted to:
California Energy Commission
1516 9th Street , MS 15, Sacramento, CA 95814-5504

Submitted by:
Imperial Valley Solar, LLC
4800 N. Scottsdale Road, Suite 5500, Scottsdale, AZ 85251

With Support From:
URS Corporation

May 2010

URS

May 5, 2010

Mr. Christopher Meyer
Project Manager
Attn: Docket No. 08-AFC-5
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Imperial Valley Solar (formerly Solar Two) (08-AFC-5)
Supplement to the Application for Certification
URS Project No. 27657106.00806

Dear Mr. Meyer:

On behalf of Imperial Valley Solar (formerly Solar Two), LLC, URS Corporation Americas (URS) hereby submits this Supplement to the Application for Certification, dated May 5, 2010 and associated appendices.

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge. I also certify that I am authorized to submit on behalf of Imperial Valley Solar, LLC.

Sincerely,

Angela Leiba
Project Manager

AL: ml

URS Corporation
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AFC	Application for Certification
afy	acre-feet per year
BLM	Bureau of Land Management
CalARP	California Accidental Release Prevention Program
CDDSRC	Colorado Desert District Stout Research Center
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH4	Methane
CNPS	California Native Plant Society
CO2	Carbon dioxide
CURE	California Unions for Reliable Energy
DEIR/EIS	Draft Environmental Impact Report/Environmental Impact Study
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
GHG	greenhouse gas
gpd	gallons per day
GPS	Global Positioning System
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
IVS	Imperial Valley Solar
LACM	Natural History Museum of Los Angeles County
lbs	pounds
LORS	laws, ordinances, regulations, and standards
LOS	level of service
m/s	meters per second
mJ	millijoule
N2O	Nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
O&M	operation and maintenance
OCA	offsite consequence analysis
OCWGB	Ocotillo/Coyote Wells Groundwater Basin
PCE	passenger car equivalent
PCU	Power Conversion Unit
PFYC	Potential Fossil Yield Classification
RMP	Risk Management Plan
ROW	Right-of-way
RWQCB	Regional Water Quality Control Board
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
scf	standard cubic feet
scfh	standard cubic feet of hydrogen per hour
SCWD	Seeley County Water District
SDG&E	San Diego Gas & Electric
SDNHM	San Diego Natural History Museum
SF6	Sulfur hexafluoride
SIP	State Implementation Plan

SVP	Society of Vertebrate Paleontologists
SWWTF	Seeley Wastewater Treatment Facility
tpy	tons per year
U.S. DOE	United States Department of Energy
UCMP	University of California Museum of Paleontology
USG	United States Gypsum
ZOI	zone of influence

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SECTION 1 SUPPLEMENTAL PROJECT DESCRIPTION

1.1 INTRODUCTION

Imperial Valley Solar, LLC (formerly SES Solar Two, LLC [Applicant]) filed an Application for Certification (AFC) with the California Energy Commission (CEC) and Bureau of Land Management (BLM) for its proposed Imperial Valley Solar (formerly SES Solar Two) Project (Imperial Valley Solar or Project) in June 30, 2008. The Application was deemed adequate on October 8, 2008. Since then, the Applicant has continued to work with agencies and the public to assess potential Project improvements. A Supplement to the AFC was filed in June 2009 to describe changes to the AFC based on the use of the Seeley Wastewater Treatment Facility (SWWTF) as the primary water source for the Project and the construction of the associated 12-mile waterline to convey water to the Project site. This Supplement to the AFC includes proposed changes to the Project Description and Location, originally described in Section 3.0 of the Project AFC. This Supplement to the Project AFC also provides an environmental assessment of the environmental impacts resulting from the proposed Project changes, including minor modifications to the transmission line and water line alignments, an alternative water supply, and modifications to onsite hydrogen storage.

1.2 TRANSMISSION LINE ALIGNMENT MODIFICATIONS

1.2.1 Background

The transmission interconnection to the electrical grid was described in Section 3.6 of the Project AFC. Subsequent advances in the engineering for the transmission line have resulted in minor modifications to the alignment (Figure 1-1). San Diego Gas & Electric (SDG&E) requested modifications to the Imperial Valley Solar 230 kV transmission line tie-in to the Imperial Valley substation to accommodate the planned alignment of a new 500-kV SDG&E transmission line and tie-in at the Imperial Valley Substation. Portions of the new alignment would fall outside of the areas previously surveyed for cultural and paleontological resources. The western transmission line alignment modification is 760 feet long and was shifted approximately 120 feet to the southeast (Figure 1-1). The second segment modification is just north of the SDGE Substation. This modified alignment is 1,025 feet long and was shifted approximately 300 feet to the east. This Supplement to the AFC analyzes the impacts of the minor modifications in the transmission line alignment that were not previously identified.

1.3 WATERLINE ALIGNMENT MODIFICATIONS

1.3.1 Background

In a Supplement to the Project AFC, submitted in June 2009, the Seeley Wastewater Treatment Facility (SWWTF) was identified as the primary water source for the Imperial Valley Solar Project. The Supplement evaluated the potential environmental impacts of use of the SWWTF and construction of an approximately 12-mile long waterline to convey water to the Project site. Since the filing of the Supplement, the alignment of the waterline has been modified slightly to follow the Evan Hewes Highway right-of-way (ROW) where feasible, thereby reducing potential environmental impacts. Portions of the new alignment would fall outside of the areas previously surveyed for biological and cultural

resources. The waterline modifications involve two segments, the longest modification is 300 feet (western modification) and the shorter modification (eastern modification) is approximately 160 feet in length (Figure 1-2).

This Supplement to the AFC analyzes the impacts of the minor modifications in the waterline alignment that were not previously identified.

1.4 ALTERNATIVE WATER SUPPLY

1.4.1 Background

According to the original AFC filing, the Imperial Irrigation District (IID) would provide water to the Imperial Valley Solar Project. After extensive research of five water supply options, in June 2009 the Applicant filed a Supplement to the AFC evaluating the use and conveyance of water from SWWTF as the Project's primary water source. In order to provide tertiary effluent suitable for unrestricted recycled uses, Seeley County Water District (SCWD) is proposing upgrades to the existing SWWTF facility to meet Title 22 standards. Over the past several years, discharge from the facility has exceeded Regional Water Quality Control Board (RWQCB) effluent limits for a number of pollutants, and SCWD has received notices of violations. The planned upgrades are needed to help ensure that no discharges from the facility exceed established effluent limits in the future and to provide tertiary treated water to a variety of uses. Potential customers for the SWWTF water supply include the Imperial Valley Solar Project and several school and park municipal irrigation projects, though upgrades to the SWWTF facility are planned regardless of approval of the Imperial Valley Solar Project.

In February 2010, the Applicant provided additional information regarding the potential impacts of the SCWD project, as they relate to the Imperial Valley Solar Project. The CEC subsequently included a similar analysis as an Appendix to the Imperial Valley Solar Staff Assessment/Draft Environmental Impact Statement (SA/DEIS). SCWD is in the process of preparing an Environmental Impact Report (EIR) to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary results have been provided by Dudek as Appendix H to this report.

In the event that the SWWTF improvements have not been completed at the start of construction of the Imperial Valley Solar Project, the Applicant proposes to use a temporary, alternative water supply originating in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply.

1.4.2 Ocotillo Water Supply Overview

If the SWWTF water supply is not available at the start of construction of the Imperial Valley Solar Project, water would be available through the Dan Boyer Water Company in Ocotillo, California. The Dan Boyer Water Company is a private water purveyor located at 1108 Imperial Avenue, Ocotillo, California 92259, approximately 3.5 miles southwest of the Project site and seven miles by road (Figures 1-3 and 1-4). The company operates State well #16S/9E-36G4 with a current permitted pumping rate of 40 acre-feet per year (afy). The water source is potable and permitted for use by construction or personal consumption. Historically, the well has typically extracted over 100 afy for uses such as construction, dust

control, and personal use. Tessera Solar is currently involved in negotiations for a purchase agreement with the water company. Appendix A provides a will serve letter stating Dan Boyer Water Company's intent to temporarily furnish well water to the Project.

It is expected that the Imperial Valley Solar Project would require water from the Dan Boyer Water Company for approximately six months to three years. The water would be transported to the Project site by 7,000 gallon water trucks. Based on the expected construction demand of approximately 50 acre-feet-per-year (afy) on average, it is anticipated that up to 13 truck trips would be required per day. If the water supply would be used during Project operations, a maximum of seven truck trips per day would be required to supply the approximate 33 afy demand. Once onsite, the water would be stored for construction and/or operations use.

1.5 HYDROGEN STORAGE MODIFICATIONS

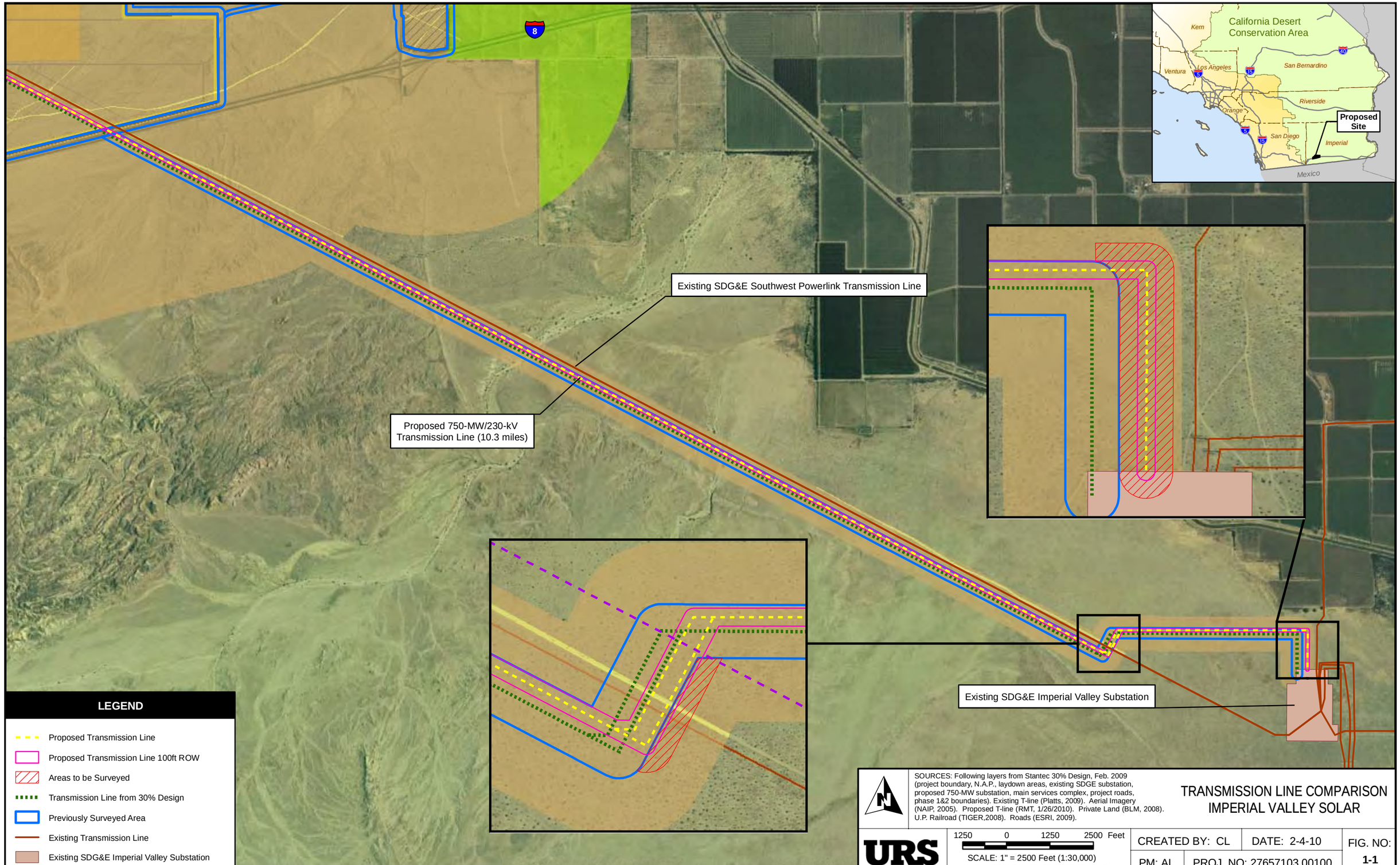
In the Supplement to the AFC filed in June 2009, the Project was updated to include a centralized hydrogen gas supply, storage and distribution system. The system included onsite generation of hydrogen through electrolysis by one hydrogen generator and the storage of that hydrogen in a steel storage tank. From the storage tank, the hydrogen will be piped to 87 individual compressor groups that include a compressor, a high pressure supply tank and a low pressure dump tank used to recover hydrogen from non operational Power Conversion Units (PCUs) through a return line. Hydrogen from the compressor groups will supply 30 individual high pressure storage tanks and each tank will supply hydrogen to a group of 12 SunCatchers.

The details of the centralized hydrogen system have evolved over time. The amount of hydrogen stored for each SunCatcher will be increased from 3.4 to 11 standard cubic feet (scf) which would accommodate PCU's operation. In order to support this increased hydrogen storage at each SunCatcher, the high pressure supply tanks and low pressure dump tanks at each compressor group would accommodate 29,333 scf and 9,900 scf, respectively. In the June 2009 Supplement to the AFC, each high pressure supply tank was anticipated to be 648 scf and each low pressure dump tank was also reported to be 648 scf (Table 1-1).

Each of the 30 high pressure tanks that supply hydrogen to the PCUs within a group of 12 SunCatchers under the current system design will have a capacity of 489 scf. The system described in the June 2009 Supplement included high pressure surge tanks with capacities of 21.5 scf.

Table 1-1
Hydrogen Storage Modifications

Feature		Centralized Hydrogen System described in the June 2009 Supplement	Centralized Hydrogen System under the Current Design
Steel tank storing hydrogen produced by generator		33,000 scf	33,000 scf
Compressor groups	High-pressure supply tank	648 scf	29,333 scf
	Low-pressure supply tank	648 scf	9,900 scf
Individual high-pressure surge tanks		21.5 scf	489 scf
Hydrogen stored at each SunCatcher		3.4 scf	11 scf



SOURCES: Following layers from Stantec 30% Design, Feb. 2009 (project boundary, N.A.P., laydown areas, existing SDGE substation, proposed 750-MW substation, main services complex, project roads, phase 1&2 boundaries). Existing T-line (Platts, 2009). Aerial Imagery (NAIP, 2005). Proposed T-line (RMT, 1/26/2010). Private Land (BLM, 2008). U.P. Railroad (TIGER,2008). Roads (ESRI, 2009).

TRANSMISSION LINE COMPARISON
IMPERIAL VALLEY SOLAR

URS

1250 0 1250 2500 Feet
SCALE: 1" = 2500 Feet (1:30,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 2-4-10	FIG. NO:
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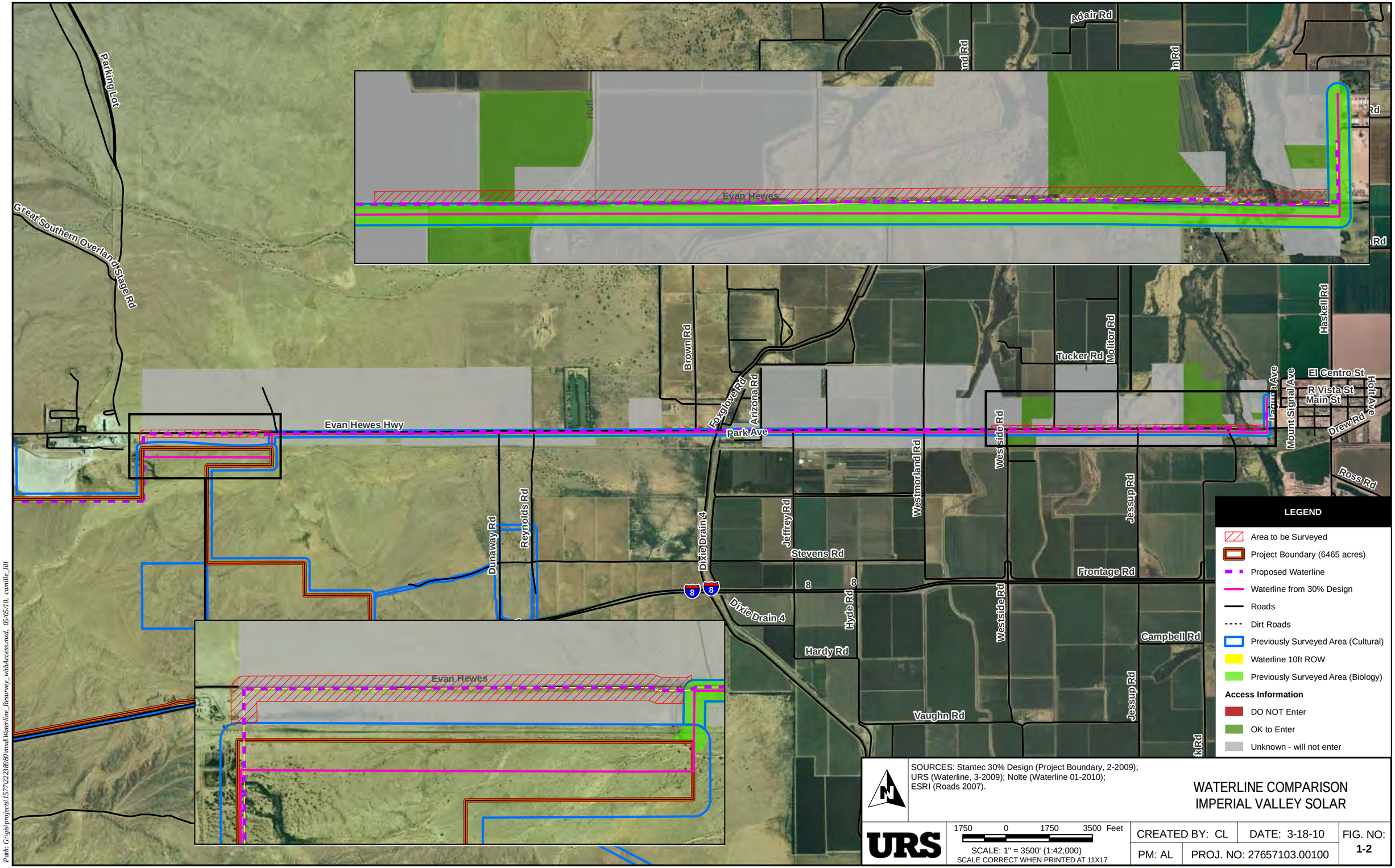

SOURCES: Stantec 30% Design (Project Boundary, 2-2009); URS (Waterline, 3-2009); Nolte (Waterline 01-2010); ESRI (Roads 2007).

WATERLINE COMPARISON
IMPERIAL VALLEY SOLAR

CREATED BY: CL	DATE: 3-18-10	FIG. NO: 1-2
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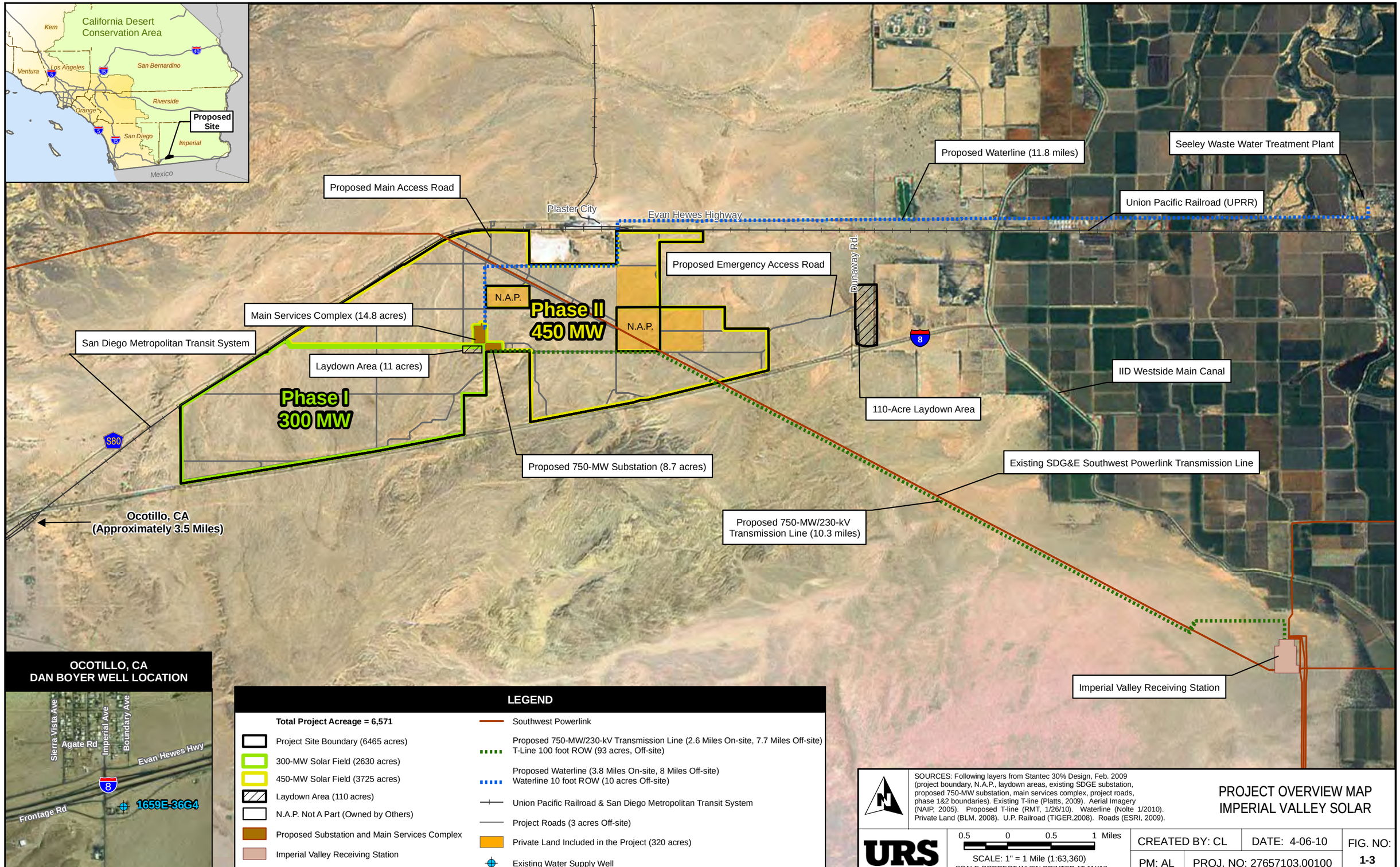

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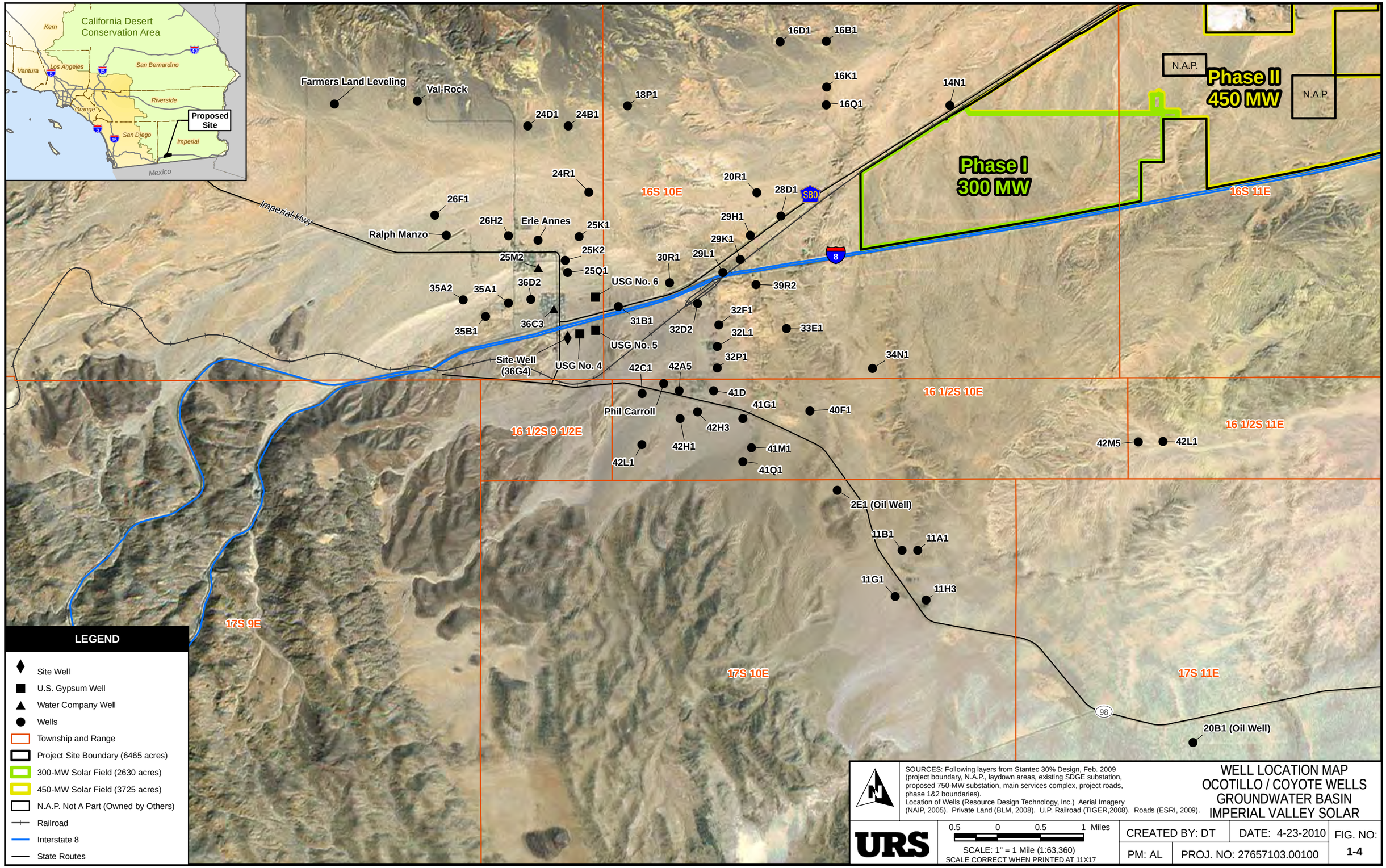

SOURCES: Following layers from Stantec 30% Design, Feb. 2009 (project boundary, N.A.P., laydown areas, existing SDGE substation, proposed 750-MW substation, main services complex, project roads, phase 1&2 boundaries).
Location of Wells (Resource Design Technology, Inc.) Aerial Imagery (NAIP, 2005). Private Land (BLM, 2008). U.P. Railroad (TIGER,2008). Roads (ESRI, 2009).

WELL LOCATION MAP
OCOTILLO / COYOTE WELLS GROUNDWATER BASIN
IMPERIAL VALLEY SOLAR

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Mile (1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: DT	DATE: 4-23-2010	FIG. NO:
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SECTION 2 ENVIRONMENTAL INFORMATION

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2.1 INTRODUCTION

This section presents a discussion of the potential impacts from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage. The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

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2.2 AIR QUALITY

This section presents a discussion of the potential impacts related to air quality from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.2.1 Affected Environment

The affected environment for Air Quality was originally discussed in Section 5.2.1 of the AFC, the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, Set 2, Parts 1 and 2, and in Section 2.2.1 of the Supplement to the AFC filed in June 2009. The only change to the affected environment is the use of a temporary, alternate water supply in Ocotillo. See Figure 1-3 and the description provided below.

2.2.2 Environmental Consequences

2.2.2.1 Transmission Line Alignment Modifications

For the minor modifications to the alignments to the transmission line, the affected environment is unchanged from that presented in Section 5.2 of the Project AFC, the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, Set 2, Parts 1 and 2, and Section 2.2 of the Supplement to the AFC filed in June 2009.

2.2.2.2 Waterline Alignment Modifications

For the minor modifications to the waterline alignment, the affected environment is unchanged from that presented in Section 5.2 of the Project AFC, the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, Set 2, Parts 1 and 2, and Section 2.2 of the Supplement to the AFC filed in June 2009.

2.2.2.3 Alternative Water Supply

The original air quality analysis presented in the AFC addressed the primary water supply from nearby canals transported to the site by truck. In the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, Set 2, Parts 1 and 2, and the AFC Supplement (filed in June 2009), the SWWTF was identified as the primary water source. In order to provide tertiary effluent suitable for unrestricted recycled uses, SCWD is proposing upgrades to the existing SWWTF facility to meet Title 22 standards. SCWD is in the process of preparing an EIR to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary results have been provided by Dudek as Appendix H to this report.

In the event that the SWWTF improvements have not been completed at the start of construction of the Imperial Valley Solar Project, the Applicant proposes to use a temporary, alternative water supply

originating in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply.

2.2.2.3.1 Project Construction Emissions

The construction emission sources presented in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2 remain unchanged except that water needed for construction will be delivered to the Project site in an additional 13 7,000 gallon water trucks and each truck would travel approximately seven miles one way. All emissions are estimated using the same techniques presented in the filing referenced above.

For the purposes of calculating Project construction emissions with water delivery by truck, up to 13 water truck trips would be made per day, seven days per week.

Peak daily and annual emission from all construction activities with water delivery via truck are presented in Tables 2.2-1 and 2.2-2. The maximum daily and annual construction emissions were predicted to occur during month 6 and the year including months 4-15, respectively. Table 2.2-10 provides a summary of maximum annual construction emissions of non-attainment pollutants compared with the federal conformity thresholds. The detailed emission calculations, emission factors and associated assumptions used in estimating the construction emissions are provided in Appendix B.

Table 2.2-1
Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day) (Month 6)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	16.81	15.48	246.02	48.11	277.35	0.26
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.34	1.20	18.96	5.30	22.12	0.03
Worker Vehicles	0.02	0.01	3.28	0.31	0.31	0.003
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Delivery Trucks from Dan Boyer Well	0.146	0.131	1.061	0.497	2.366	0.003
SunCatcher Delivery Trucks	0.77	0.69	5.63	2.64	12.56	0.01
Subtotal of On-site Combustion Emissions	19.09	17.53	275.73	56.88	314.71	0.31
On-Site Fugitive Emissions						
Construction Equipment	29.37	6.80				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	150.06	19.64				
Worker Vehicles	2.84	0.38				
Security Vehicles	3.90	0.54				
Water Delivery Trucks from Dan Boyer Well	8.25	1.23				
SunCatcher Delivery Trucks	57.46	8.56				
Subtotal of On-Site Fugitive Emissions	251.87	37.14				
Subtotal of On-Site Emissions	270.97	54.67	275.73	56.88	314.71	0.31
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.001
Worker Vehicles	1.22	0.63	225.86	9.04	26.65	0.13
Water Delivery Trucks from Dan Boyer Well	0.18	0.15	0.96	0.21	4.67	0.01
SunCatcher Delivery Trucks	5.63	4.80	30.41	6.59	148.51	0.16
Subtotal of Off-Site Combustion Emissions	7.04	5.59	258.76	15.90	180.40	0.29
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	41.39	0.70				
Water Delivery Trucks from Dan Boyer Well	10.58	1.55				
SunCatcher Delivery Trucks	130.86	18.32				
Subtotal of Off-Site Fugitive Emissions	185.12	20.90				
Subtotal of Off-Site Emissions	192.15	26.48	258.76	15.90	180.40	0.29
Total Maximum Daily Emissions	463.12	81.16	534.49	72.78	495.12	0.60

Table 2.2-2
Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)
(Month 4 to 15)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	2.24	2.07	32.25	6.56	34.58	0.03
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.223	0.199	3.278	0.891	3.679	0.005
Worker Vehicles	0.002	0.002	0.420	0.039	0.039	0.000
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Delivery Trucks from Dan Boyer Well	0.026	0.024	0.191	0.089	0.426	0.000
SunCatcher Delivery Trucks	0.113	0.102	0.824	0.386	1.839	0.002
Subtotal of On-site Combustion Emissions	2.61	2.39	37.10	7.97	40.56	0.04
On-Site Fugitive Dust Emissions						
Construction Equipment	4.52	0.96				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	23.19	3.08				
Worker Vehicles	0.36	0.05				
Security Vehicles	0.70	0.10				
Water Delivery Trucks from Dan Boyer Well	1.48	0.22				
SunCatcher Delivery Trucks	7.58	1.13				
Subtotal of On-Site Fugitive Emissions	37.84	5.54				
Subtotal of On-Site Emissions	40.45	7.93	37.10	7.97	40.56	0.04
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.28	0.01	0.10	0.00
Worker Vehicles	0.16	0.08	28.86	1.15	3.40	0.02
Water Delivery Trucks from Dan Boyer Well	0.03	0.03	0.17	0.04	0.84	0.00
SunCatcher Delivery Trucks	0.86	0.73	4.64	1.01	22.65	0.02
Subtotal of Off-Site Combustion Emissions	1.05	0.84	33.94	2.21	27.00	0.04
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.41	0.06				
Worker Vehicles	5.29	0.09				
Water Delivery Trucks from Dan Boyer Well	1.90	0.28				
SunCatcher Delivery Trucks	13.23	1.79				
Subtotal of Off-Site Fugitive Emissions	20.83	2.21				
Subtotal of Off-Site Emissions	21.88	3.05	33.94	2.21	27.00	0.04
Total Maximum Annual Emissions	62.33	10.98	71.04	10.18	67.56	0.08

The operational emission sources presented in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2 remain unchanged except that water will be delivered in an additional seven 7,000 gallon water trucks to the Project site from the Dan Boyer well each truck

traveling approximately seven miles one way. All emissions are estimated using the same techniques presented in the AFC and the subsequent filing referenced above.

For the purposes of calculating Project operational emissions under the worst-case truck transport option, the analysis assumed that seven truck trips would be made per day, seven days per week.

Total Project operational daily and annual emission estimates that include the delivery of water via trucks are presented in Tables 2.2-3 and 2.2-4. Table 2.2-10 provides a summary of the annual maximum operational emissions of non-attainment pollutants compared with the federal conformity thresholds. The detailed emission calculations, emission factors and associated assumptions used in estimating the operational emissions are provided in Appendix B.

Table 2.2-3
Estimated Daily Maximum Operational Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.17	0.16	102.24	13.49	13.02	0.04
Worker Vehicles	0.04	0.03	6.88	0.64	0.64	0.01
Water Delivery Trucks from Dan Boyer Well	0.08	0.07	0.57	0.27	1.27	0.00
Visitor Cars and Delivery Trucks	0.06	0.06	1.00	0.26	1.06	0.00
Subtotal of On-site Combustion Emissions	0.36	0.32	110.76	14.68	16.85	0.07
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	112.60	16.70				
Worker Vehicles	2.35	0.26				
Water Delivery Trucks from Dan Boyer Well	4.44	0.66				
Visitor Cars and Delivery Trucks	6.85	1.02				
Subtotal of On-Site Fugitive Emissions	126.24	18.64	0.00	5.05	0.00	0.00
Subtotal of On-Site Emissions	126.61	18.96	110.76	19.74	16.85	0.07
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.27	0.14	47.55	1.90	5.58	0.03
Water Delivery Trucks from Dan Boyer Well	0.10	0.08	0.51	0.11	2.51	0.00
Visitor Cars and Delivery Trucks	0.20	0.16	5.71	0.40	5.62	0.01
Subtotal of Off-Site Combustion Emissions	0.57	0.38	53.78	2.41	13.72	0.04
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	9.75	0.27				
Water Delivery Trucks from Dan Boyer Well	5.70	0.83				
Visitor Cars and Delivery Trucks	12.91	1.77				
Subtotal of Off-Site Fugitive Emissions	28.36	2.87				
Subtotal of Off-Site Emissions	28.92	3.25	53.78	2.41	13.72	0.04
Total Maximum Emissions	155.53	22.22	164.54	22.15	30.57	0.11

Table 2.2-4
Estimated Annual Maximum Operational Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.0003	0.0003	0.0019	0.0007	0.0221	0.0006
Maintenance & Security Vehicles and Equipment	0.03	0.03	18.40	2.43	2.34	0.01
Worker Vehicles	0.01	0.01	1.24	0.12	0.12	0.00
Water Delivery Trucks from Dan Boyer Well	0.01	0.01	0.10	0.05	0.23	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.09	0.01	0.04	0.00
Subtotal of On-site Combustion Emissions	0.05	0.05	19.83	2.61	2.75	0.01
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	20.27	3.01				
Worker Vehicles	0.42	0.05				
Water Delivery Trucks from Dan Boyer Well	0.80	0.12				
Visitor Cars and Delivery Trucks	0.22	0.03				
Subtotal of On-Site Fugitive Emissions	21.71	3.20	0.00	0.92	0.00	0.00
Subtotal of On-Site Emissions	21.77	3.25	19.83	3.53	2.75	0.01
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.05	0.02	8.56	0.34	1.01	0.01
Water Delivery Trucks from Dan Boyer Well	0.02	0.01	0.09	0.02	0.45	0.00
Visitor Cars and Delivery Trucks	0.01	0.01	0.65	0.03	0.23	0.00
Subtotal of Off-Site Combustion Emissions	0.07	0.05	9.30	0.39	1.68	0.01
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	1.75	0.05				
Water Delivery Trucks from Dan Boyer Well	1.03	0.07				
Visitor Cars and Delivery Trucks	0.48	0.88				
Subtotal of Off-Site FugitiveEmissions	3.26	1.00				
Subtotal of Off-Site Emissions	3.33	1.04	9.30	0.39	1.68	0.01
Total Maximum Emissions	25.10	4.29	29.14	3.92	4.43	0.02

2.2.2.3.2 Overlapping Construction and Operations Emissions

As discussed in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2, the first installed SunCatchers will be ready to come online and produce electricity while construction is still progressing. The revised overlapping daily and annual emissions estimates that incorporate the additional water delivery by truck are presented in Tables 2.2-5, 2.2-6a and 2.2-6b (Note: the maximum overlapping annual emissions occur in months 8-19 for CO, VOC, NO_x, and SO_x; the maximum overlapping annual emissions occur in months 13-24 for PM_{10} and $PM_{2.5}$. Table 2.2-10 provides a summary of maximum annual construction and operation overlapping emissions of non-attainment pollutants compared with the federal conformity thresholds. The detailed emission calculations, emission factors and associated assumptions used in estimating the overlapping emissions are provided in Appendix B.

Table 2.2-5
Estimated Maximum Daily Construction and Operations Overlapping Emissions for Month 8 (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
CONSTRUCTION						
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	13.33	12.28	173.12	38.63	201.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.64	0.25	0.25	0.00
Security Vehicles	0.00	0.00	0.76	0.02	0.01	0.00
Water Well Trucks	0.15	0.13	1.06	0.50	2.37	0.00
Suncatcher Delivery Trucks	0.63	0.56	4.57	2.14	10.19	0.01
Subtotal of On-site Combustion Emissions	15.35	14.08	200.27	46.44	234.90	0.24
On-Site Fugitive Dust Emissions						
Construction Equipment	22.23	5.34				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	126.80	17.01				
Worker Vehicles	2.28	0.31				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	39.61	5.89				
Subtotal of On-Site Fugitive Dust Emissions	203.08	30.32				
Subtotal of On-Site Emissions	218.44	44.40	200.27	46.44	234.90	0.24
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	0.00	0.00	1.54	0.07	0.58	0.00
Worker Vehicles	0.98	0.51	181.56	7.27	21.42	0.10
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.74	4.04	25.60	5.55	125.01	0.13
Subtotal of Off-Site Combustion Emissions	5.91	4.70	209.66	13.09	151.68	0.24
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	2.29	0.33				
Worker Vehicles	33.27	0.57				

Table 2.2-5
Estimated Maximum Daily Construction and Operations Overlapping Emissions for Month 8 (lbs/day)
(Continued)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	71.44	9.62				
Subtotal of Off-Site Fugitive Emissions	117.57	12.05				
Subtotal of Off-Site Emissions	123.48	16.76	209.66	13.09	151.68	0.24
Total Maximum Annual Emissions	341.92	61.16	409.93	59.53	386.58	0.48
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.00	0.00	2.45	0.32	0.31	0.00
Worker Vehicles	0.00	0.00	0.17	0.02	0.02	0.00
Water Delivery Trucks from Dan Boyer Well	0.00	0.00	0.01	0.01	0.03	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.02	0.01	0.03	0.00
Subtotal of On-site Combustion Emissions	0.02	0.02	2.73	0.38	1.24	0.02
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	2.70	0.40				
Worker Vehicles	0.06	0.01				
Water Delivery Trucks from Dan Boyer Well	0.11	0.02				
Visitor Cars and Delivery Trucks	0.16	0.02				
Subtotal of On-Site Fugitive Dust Emissions	3.03	0.45		5.05		
Subtotal of On-Site Emissions	3.05	0.47	2.73	5.43	1.24	0.02
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.00	1.14	0.05	0.13	0.00
Water Delivery Trucks from Dan Boyer Well	0.00	0.00	0.01	0.00	0.06	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.14	0.01	0.13	0.00
Subtotal of Off-Site Combustion Emissions	0.01	0.01	1.29	0.06	0.33	0.00
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.23	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Dan Boyer Well	0.14	0.02	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.31	0.04	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	0.68	0.07	0.00	0.00	0.00	0.00
Subtotal of Off-Site Emissions	0.69	0.08	1.29	0.06	0.33	0.00
Total Maximum Emissions	3.74	0.54	4.02	5.49	1.57	0.02
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	221.48	44.87	203.00	51.88	236.14	0.26
Total of Off-Site Emissions Construction & Operations	124.18	16.83	210.95	13.15	152.01	0.24
Construction & Operations Overlap Total	345.66	61.70	413.95	65.02	388.14	0.51

Table 2.2-6a
Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 8 – 19 (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
CONSTRUCTION						
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.73	1.59	27.16	5.29	25.37	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.20	0.18	3.06	0.82	3.37	0.004
Worker Vehicles	0.002	0.002	0.397	0.037	0.037	0.0003
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.102	0.092	0.742	0.347	1.655	0.002
Subtotal of On-site Combustion Emissions	2.07	1.89	31.68	6.59	30.86	0.03
On-Site Fugitive Dust Emissions						
Construction Equipment	3.68	0.80				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	20.26	2.73				
Worker Vehicles	0.34	0.05				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	6.43	0.96				
Subtotal of On-Site Fugitive Dust Emissions	32.91	4.85				
Subtotal of On-Site Emissions	34.97	6.74	31.68	6.59	30.86	0.03
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.26	0.01	0.10	0.00
Worker Vehicles	0.15	0.08	27.30	1.09	3.22	0.02
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.79	0.68	4.28	0.93	20.89	0.02
Subtotal of Off-Site Combustion Emissions	0.97	0.78	32.00	2.07	25.04	0.04
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.38	0.05				
Worker Vehicles	5.00	0.08				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	8.77	1.13				
Subtotal of Off-Site Fugitive Emissions	16.06	1.55				
Subtotal of Off-Site Emissions	17.04	2.33	32.00	2.07	25.04	0.04
Total Maximum Annual Emissions	52.01	9.07	63.69	8.65	55.90	0.07

Table 2.2-6a
Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 8 – 19 (tons/year)
(Continued)

OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.00	0.00	0.00	0.00	0.02	0.00
Maintenance & Security Vehicles and Equipment	0.00	0.00	2.89	0.38	0.37	0.00
Worker Vehicles	0.00	0.00	0.19	0.02	0.02	0.00
Water Delivery Trucks from Dan Boyer Well	0.00	0.00	0.02	0.01	0.04	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.01	0.00	0.01	0.00
Subtotal of On-site Combustion Emissions	0.01	0.01	3.12	0.41	0.45	0.00
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	3.18	0.47				
Worker Vehicles	0.07	0.01				
Water Delivery Trucks from Dan Boyer Well	0.13	0.02				
Visitor Cars and Delivery Trucks	0.03	0.01				
Subtotal of On-Site Fugitive Dust Emissions	3.41	0.50		0.92		
Subtotal of On-Site Emissions	3.42	0.51	3.12	1.33	0.45	0.00
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.00	1.34	0.05	0.16	0.00
Water Delivery Trucks from Dan Boyer Well	0.00	0.00	0.01	0.00	0.07	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.10	0.00	0.04	0.00
Subtotal of Off-Site Combustion Emissions	0.01	0.01	1.46	0.06	0.26	0.00
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.28	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Dan Boyer Well	0.16	0.01	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.07	0.14	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	0.51	0.16	0.00	0.00	0.00	0.00
Subtotal of Off-Site Emissions	0.52	0.16	1.46	0.06	0.26	0.00
Total Maximum Emissions	3.94	0.67	4.58	1.39	0.71	0.00
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	38.39	7.25	34.80	7.92	31.31	0.03
Total of Off-Site Emissions Construction & Operations	17.56	2.49	33.46	2.13	25.31	0.04
Construction & Operations Overlap Total	55.95	9.74	68.26	10.05	56.62	0.07

Table 2.2-6b
Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 13 - 24 (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
CONSTRUCTION						
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.16	1.07	21.88	3.48	19.46	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.18	0.16	2.53	0.70	2.91	0.004
Worker Vehicles	0.002	0.001	0.338	0.032	0.032	0.0003
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.112	0.100	0.814	0.381	1.816	0.002
Subtotal of On-site Combustion Emissions	1.48	1.35	25.89	4.69	24.64	0.02
On-Site Fugitive Dust Emissions						
Construction Equipment	3.57	0.65				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	17.81	2.38				
Worker Vehicles	0.29	0.04				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	7.70	1.15				
Subtotal of On-Site Fugitive Dust Emissions	31.57	4.53				
Subtotal of On-Site Emissions	33.05	5.89	25.89	4.69	24.64	0.02
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.18	0.01	0.07	0.00
Worker Vehicles	0.13	0.07	23.24	0.93	2.74	0.01
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.85	0.73	4.61	1.00	22.50	0.02
Subtotal of Off-Site Combustion Emissions	1.01	0.82	28.20	1.97	26.15	0.04
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.27	0.04				
Worker Vehicles	4.26	0.07				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	12.86	1.73				
Subtotal of Off-Site Fugitive Emissions	19.29	2.12				
Subtotal of Off-Site Emissions	20.30	2.94	28.20	1.97	26.15	0.04
Total Maximum Annual Emissions	53.35	8.83	54.09	6.66	50.79	0.06
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.00	0.00	0.00	0.00	0.02	0.00
Maintenance & Security Vehicles and Equipment	0.01	0.01	5.47	0.72	0.70	0.00
Worker Vehicles	0.00	0.00	0.37	0.03	0.03	0.00

Table 2.2-6b
Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 13 - 24 (tons/year)
(Continued)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Water Delivery Trucks from Dan Boyer Well	0.00	0.00	0.03	0.01	0.07	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.03	0.00	0.01	0.00
Subtotal of On-site Combustion Emissions	0.02	0.01	5.89	0.77	0.83	0.00
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	6.02	0.89				
Worker Vehicles	0.13	0.01				
Water Delivery Trucks from Dan Boyer Well	0.24	0.04				
Visitor Cars and Delivery Trucks	0.07	0.01				
Subtotal of On-Site Fugitive Dust Emissions	6.45	0.95		0.92		
Subtotal of On-Site Emissions	6.47	0.97	5.89	1.70	0.83	0.00
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.01	2.54	0.10	0.30	0.00
Water Delivery Trucks from Dan Boyer Well	0.01	0.00	0.03	0.01	0.13	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.19	0.01	0.07	0.00
Subtotal of Off-Site Combustion Emissions	0.02	0.01	2.76	0.12	0.50	0.00
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.52	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Dan Boyer Well	0.30	0.02	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.14	0.26	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	0.97	0.30	0.00	0.00	0.00	0.00
Subtotal of Off-Site Emissions	0.99	0.31	2.76	0.12	0.50	0.00
Total Maximum Emissions	7.45	1.28	8.65	1.81	1.33	0.01
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	39.51	6.85	31.78	6.38	25.47	0.03
Total of Off-Site Emissions Construction & Operations	21.29	3.25	30.96	2.09	26.65	0.04
Construction & Operations Overlap Total	60.80	10.10	62.74	8.48	52.13	0.07

2.2.2.3.3 Greenhouse Gas Emissions

The greenhouse gas (GHG) emissions associated with project construction and operation include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) from mobile engine combustion and sulfur hexafluoride (SF_6) from the leakage from circuit breakers. The GHG emissions associated with the onsite and offsite mobile sources during construction were estimated using the same emission factors and techniques presented in the AFC and the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2. Total construction GHG emissions with truck delivery of water are presented in Table 2.2-7. Total annual Project operational GHG emissions with water delivery via truck are presented in Tables 2.2-8. The detailed emission calculations, emission factors and associated assumptions used in estimating the GHG emissions are provided in Appendix B.

Table 2.2-7
Estimated Entire Construction Period Greenhouse Gases Emissions (metric tonnes)

Activity	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	4,940.70	2.05		4,983.73
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	1,111.79	0.03	0.03	1,122.84
Worker Vehicles	74.07	0.00	0.01	75.76
Security Vehicles	64.55	0.01	0.01	68.44
Water Delivery Trucks from Dan Boyer Well	148.01	0.00	0.00	148.79
SunCatcher Delivery Trucks	612.06	0.01	0.01	615.30
Subtotal of On-site Combustion Emissions	6,951.17	2.11	0.06	7,014.86
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)				
Worker Vehicles				
Security Vehicles				
Water Well Trucks				
SunCatcher Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	6,951.17	2.11	0.06	7,014.86
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)	44.80	0.01	0.01	47.92
Worker Vehicles	4,075.00	0.58	0.69	4,301.43
Water Delivery Trucks from Dan Boyer Well	286.43	0.01	0.01	289.30
SunCatcher Delivery Trucks	7,476.25	0.27	0.22	7,551.25
Subtotal of Off-Site Combustion Emissions	11,882.48	0.86	0.93	12,189.91
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, ...)				
Worker Vehicles				
Water Delivery Trucks from Dan Boyer Well				
SunCatcher Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	11,882.48	0.86	0.93	12,189.91
Total Entire Construction Period Emissions	18,833.66	2.97	1.00	19,204.77

Table 2.2-8
Estimated Annual Maximum Operational Greenhouse Gases Emissions
(metric tonnes/year)

Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
On-Site Operational Emissions					
On-Site Combustion Emissions					
Diesel Generator	2.64	0.00	0.00		2.65
Maintenance & Security Vehicles and Equipment	891.81	0.43	0.10		930.65
Worker Vehicles	98.79	0.01	0.01		100.69
Water Delivery Trucks from Dan Boyer Well	23.91	0.00	0.00		24.04
Visitor Cars and Delivery Trucks	8.55	0.00	0.00		8.68
Subtotal of On-site Combustion Emissions	1,025.71	0.44	0.10		1,066.71
On-Site Fugitive Emissions					
Potential sulfur hexafluoride (SF_6) emissions leakage emissions from proposed circuit breakers and other transmissions system equipment				0.01	271.83
Subtotal of On-Site Fugitive Emissions				0.01	271.83
Subtotal of On-Site Emissions	1,025.71	0.44	0.10	0.01	1,338.55
Off-Site On-Road Emissions					
Off-Site Combustion Emissions					
Worker Vehicles	593.01	0.08	0.08		618.33
Water Delivery Trucks from Dan Boyer Well	46.27	0.00	0.00		46.75
Visitor Cars and Delivery Trucks	52.89	0.01	0.01		54.84
Subtotal of Off-Site Combustion Emissions	692.17	0.08	0.08		719.92
Subtotal of Off-Site Emissions	692.17	0.08	0.08		719.92
Total Maximum Emissions	1,717.88	0.52	0.19	0.01	2,058.47

2.2.2.3.4 Air Quality Impacts Analysis

The results of air quality dispersion modeling performed for onsite emissions were discussed in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2. New dispersion modeling was not performed for this supplement for either construction or operational activities since the emissions from the onsite portion of the water delivery trucks will be very small in comparison with total project related emissions and the dispersion modeling already conducted contains a high degree of conservatism. The small increase in onsite emissions is expected to have a negligible change to the impacts already predicted from construction or operations emissions.

2.2.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to air quality considerations. The hydrogen storage modifications will result in minor changes that do not create additional construction or operation related impacts to air quality beyond those presented in Section 5.2 of

the Project AFC, the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, Set 2, Parts 1 and 2, and Section 2.2 of the Supplement to the AFC filed in June 2009..

2.2.3 Cumulative Impacts

Cumulative impacts are unchanged from the discussion presented in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2.

2.2.4 Mitigation Measures

Mitigation measures proposed are unchanged from the discussion presented in the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2.

2.2.5 LORS Compliance

The applicable laws, ordinances, regulations, and standards (LORS) related to the potential air quality effects from the Project are presented in the AFC in Section 5.2. These LORS are administered (either independently or cooperatively) by the Imperial County Air Pollution Control District, EPA Region IX, the CEC, and the California Air Resources Board. The Project, including the changes discussed herein, will comply with all LORS. Since there is an increase in emissions due to the addition of delivery trucks from the Dan Boyer well, the revised project are examined to determine applicability of the federal general conformity regulations and discussed below.

2.2.5.1 Conformity with Applicable Air Quality Plan

Regulations promulgated pursuant to the federal Clean Air Act provisions on General Conformity require that projects in federal non-attainment areas that will be permitted by a federal agency such as the BLM must demonstrate conformity with the applicable state or local attainment plan. Affected projects for which the total of direct and indirect annual emissions of non-attainment pollutants and precursors exceed certain thresholds must demonstrate that these emissions are consistent with the applicable attainment plan. According to the USEPA Green Book for January 6, 2010, Imperial County is classified as a "(moderate) non-attainment" area for ozone (NO_x and VOC) and a "serious non-attainment" area for PM_{10}. Based on the current attainment designations, the applicable thresholds (per 40 CFR §51.853) are included in Table 2.2-9. If the emissions of any pollutant are equal to or above its threshold, a Federal General Conformity Analysis is required.

Table 2.2-9
Applicable Federal General Conformity Thresholds
for Non-Attainment Pollutants

Pollutants	Federal General Conformity Threshold In Imperial County
NO_x	100 tpy
VOC (or ROC)	100 tpy
PM_{10}	70 tpy

Note:
Source: 40 CFR §51.853, 40 CFR Part 93 Subpart B, 40 CFR Part 51, Subpart W, and ICAPCD Rule 925

Pursuant to the "General Conformity Rule (40 CFR Part 93 Subpart B, and 40 CFR Part 51, Subpart W)", order for the project to conform it must demonstrate that:

- project emissions are specifically identified and accounted for in the State Implementation Plan (SIP's) attainment demonstration;
- project emissions will be completely offset through a revision in the SIP or similar mitigation measures so that there is no net emission increases in this area; or
- project emissions do not cause any new violation of any standard or increase the frequency or severity of any existing violation of standard in the area through an area-wide and/or local air quality modeling analysis.

Imperial County Air Pollution Control District (ICAPCD) Rule 925, General Conformity sets forth policy, criteria, and procedures for demonstrating and assuring conformity of such actions to the applicable implementation plan. Table 2.2-10 presents the federal conformity criterion for the Project construction and operation, and construction and operational overlap including the emissions from the trucks delivering water to the site. The table summarizes whether the Project would exceed the threshold for each non-attainment pollutant.

Table 2.2-10
Project Emissions of Non-Attainment Pollutant Thresholds (tpy)

	Construction	Operations	Construction and Operations Overlap	Federal General Conformity Threshold
NO_x	67.56 (below threshold)	4.43 (below threshold)	56.62 (below threshold)	100
VOC (or ROC)	10.18 (below threshold)	3.92 (below threshold)	10.05 (below threshold)	100
PM_{10}	62.33 (below threshold)	25.10 (below threshold)	60.80 (below threshold)	70

Since all of the emissions of non-attainment pollutants are below the conformity thresholds during construction, operation, and construction and operation overlap, the project does not need to demonstrate conformity with the applicable state or local attainment plans.

2.2.6 References

No additional references beyond those presented in Section 5.2 of the Project AFC, the Applicant's Response to CEC and BLM Data Requests Set 1, Parts 1 and 2, and Set 2, Parts 1 and 2, and Section 2.2 of the Supplement to the AFC were used for this supplemental analysis.

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2.3 GEOLOGIC HAZARDS AND RESOURCES

This section presents a discussion of the potential impacts related to geologic hazards and resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.3.1 Affected Environment

The affected environment for geologic hazards and resources was originally discussed in Section 5.3 of the AFC and section 2.3 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply, and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.3.2 Environmental Consequences

The environmental consequences for geologic hazards and resources during Project construction and operation remain unchanged from the AFC Section 5.3 and Section 2.3 of the Supplement to the AFC in June 2009.

2.3.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to geologic hazards and resource considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to geologic hazards and resources beyond those presented in Section 5.3 of the Project AFC, as supplemented in June 2009.

2.3.2.2 Waterline Alignment Modifications

The minor modifications to the water line alignment are not significant changes with regard to geologic hazards and resource considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to geologic hazards and resources beyond those presented in Section 5.3 of the Project AFC, as supplemented in June 2009.

2.3.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to geologic hazards and resource considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to geologic hazards and resources beyond those presented in Section 5.3 of the Project AFC, as supplemented in June 2009.

2.3.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen system are not significant changes with regard to geologic hazards and resource considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to geologic hazards and resources beyond those presented in Section 5.3 of the Project AFC, as supplemented in June 2009.

2.3.3 Cumulative Impacts

No additional cumulative impacts to geologic hazards and resources have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.3 of the Project AFC and Section 2.3. of the Supplement to the AFC are applicable to the proposed Project changes.

2.3.4 Mitigation Measures

The mitigation measures presented in Section 5.3 of the Project AFC and Section 2.3 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.3.5 LORS Compliance

The LORS presented in Section 5.3 of the Project AFC and Section 2.3 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.3 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.3 of the Project AFC.

2.3.6 References

No additional references beyond those presented in Section 5.3 of the Project AFC and Section 2.3 of the Supplement to the AFC were used for this supplemental analysis.

2.4 SOIL RESOURCES

This section presents a discussion of the potential impacts related to soil resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.4.1 Affected Environment

The affected environment for soil resources was originally discussed in Section 5.4.1 of the AFC and section 2.4 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply, and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.4.2 Environmental Consequences

The environmental consequences for soil resources during Project construction and operation remain unchanged from the AFC section 5.4 and Section 2.4 of the Supplement to the AFC in June 2009.

2.4.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to soil resource considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to soil resources beyond those presented in Section 5.4 of the Project AFC, as supplemented in June 2009.

2.4.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to soil resource considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to soil resources beyond those presented in Section 5.4 of the Project AFC, as supplemented in June 2009.

2.4.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to soil resource considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to geologic hazards and resources beyond those presented in Section 5.4 of the Project AFC, as supplemented in June 2009.

2.4.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to soil resource considerations. The hydrogen storage modifications will result in minor changes that do not create additional construction or operation related impacts to soil resources beyond those presented in Section 5.4 of the Project AFC, as supplemented in June 2009.

2.4.3 Cumulative Impacts

No additional cumulative impacts to soil resources have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.4 of the Project AFC and Section 2.4 of the Supplement to the AFC are applicable to the proposed Project changes.

2.4.4 Mitigation Measures

The mitigation measures presented in Section 5.4 of the Project AFC and Section 2.4 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.4.5 LORS Compliance

The LORS presented in Section 5.4 of the Project AFC and Section 2.4 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.4 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.4 of the Project AFC.

2.4.6 References

No additional references beyond those presented in Section 5.4 of the Project AFC and Section 2.4 of the Supplement to the AFC were used for this supplemental analysis.

2.5 WATER RESOURCES

This section presents a discussion of the potential impacts related to water resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.5.1 Affected Environment

For the minor modifications to the alignments to the transmission line and the waterline, the affected environment is unchanged from that presented in Section 5.5 of the Project AFC and Section 2.5 of the Supplement to the AFC filed in June 2009.

The SWWTF was identified as the primary water source in the Supplement to the AFC filed in June 2009. In order to provide tertiary effluent suitable for unrestricted recycled uses, SCWD is proposing upgrades to the existing SWWTF facility to meet Title 22 standards. SCWD is in the process of preparing an EIR to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary results have been provided by Dudek as Appendix H to this report.

In the event that the SWWTF improvements have not been completed at the start of construction of the Imperial Valley Solar Project, the Applicant proposes to use a temporary, alternative water supply located in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply.

The Dan Boyer Water Company will temporarily supply water to the Imperial Valley Solar Project using State Well No. 16S/9E-36G4 located in the Ocotillo/Coyote Wells Groundwater Basin (OCWGB). The OCWGB is described in Section 5.5 of the Project AFC based upon Department of Water Resources, Bulletin No. 118 data. Additional environmental setting data and a summary of findings from several groundwater studies for OCWGB is located in Section 3.3 of the Draft Environmental Impact Report/Environmental Impact Study (DEIR/EIS) prepared for the proposed expansion of the United States Gypsum (USG) plant in Plaster City (Appendix C of this report).

The OCWGB is characterized as an unconfined aquifer with 1,200,000 acre-feet of estimated storage (Bookman-Edmonston 2004). Runoff from the Coyote and Jacumba Mountains provides the majority of the recharge to OCWGB which is believed to occur in alluvial fans located along the mountain fronts. The groundwater flow direction is from the northwest toward the southeast. The USG DEIR/EIS indicates that the most recent estimate of groundwater recharge to OCWGB is approximately 1,100 to 1,200 afy. However, this is different than other studies that have estimated recharge for the OCWGB. Other estimates of recharge have ranged from approximately 536 to 7,200 afy (U.S. Gypsum 2006). Natural discharge from the OCWGB is estimated to be approximately 1,300 afy or higher. Comparing these estimates of loss with the total recharge estimate of 1,100 afy to 1,200 afy indicates that the rate of groundwater outflow from the OCWGB may have been greater than the rate of recharge prior to the initiation of pumping. Based upon the USG DEIR/EIS, current domestic use in OCWGB is estimated to be 120 to 125 afy, and reported commercial uses vary annually (typically around 400 to 500 afy or more).

Total estimated pumping in the OCWGB in 2002 was estimated to be approximately 556 afy (U.S. Gypsum 2006). The USG DEIR/EIS indicates that the static (non-pumping) water levels in the Ocotillo/Nomirage area have declined five to six feet over the last 30 years, for an average rate of water level decline of one foot every five years.

The groundwater quality within OCWGB varies by location. Groundwater in some areas of OCWGB is relatively good quality; however, groundwater is highly saline in some areas, particularly east of Coyote Wells where groundwater is present in Tertiary-age marine strata. These strata are generally fine-grained (silt and clay) and well yields are very low. Additional information on the OCWGB and other wells within the vicinity of the State Well No. 16S/9E-36G4 is provided in Appendix D of this report.

The OCWGB is designated as a sole source aquifer. The following information was provided in Section 3.3.2 of the USG DEIR/EIS:

"There are several communities in the Ocotillo/Coyote Wells Groundwater Basin, including Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. These communities, USG and several other commercial/industrial and agricultural users, depend on the Ocotillo/Coyote Wells Groundwater Basin as their source of potable water. Surface water is not present in the Basin and there are no water imports into the Basin. The Ocotillo/Coyote Wells Groundwater Basin was designated as a “sole source aquifer” by the Environmental Protection Agency (EPA) in 1996 (61 FR 47752, September 10, 1996) and is, thus, part of the Sole Source Aquifer Protection Program, authorized by Section 14245(e) of the Safe Drinking Water Act. The sole source aquifer designation requires U.S. EPA review of proposed federally assisted projects."

Designation of an aquifer as a sole source aquifer provides EPA with the authority to review federal financially assisted projects planned for the area to determine their potential for contaminating the aquifer. The Project would not introduce any contaminants into the aquifer, and an aquifer test performed for this well indicates that pumping of the well at the prescribed rates will have no significant impact on water levels and water quality in the area, as the zone of influence (ZOI) is considerably less than the distance to the closest well, approximately 500 feet away. The use of State Well No. 16S/9E-36G4 by the Imperial Valley Solar Project would be consistent with the sole source aquifer provisions included in Section 1424(e) of the Safe Drinking Water Act.

2.5.2 Environmental Consequences

2.5.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to water resource considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to water resources beyond those presented in Section 5.5 of the Project AFC, as supplemented in June 2009.

2.5.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to water resource considerations. The waterline alignment modifications will result in minor changes that do not

create additional construction or operation related impacts to water resources beyond those presented in Section 5.5 of the Project AFC, and Section 2.5 of the Supplement to the AFC filed in June 2009.

2.5.2.3 Alternative Water Supply

If the SWWTF water supply is not available at the start of construction of the Imperial Valley Solar Project, water would be available through the Dan Boyer Water Company in Ocotillo, California. The Dan Boyer Water Company is located at 1108 Imperial Avenue, Ocotillo, California 92259 (Figure 1-3). The water source is potable and permitted for use by construction or personal consumption.

The CEQA significance criteria for groundwater use from the CEQA Guidelines indicate that a Proposed Project would have a significant impact on hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements;
- Deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g. the production rate of pre existing nearby wells would drop to a level which would not support existing land uses or planned uses for which a permit has been granted); or
- Otherwise substantially degrade water quality.

2.5.2.3.1 Water Supply and Use

The proposed temporary, alternative water supply for the project will be water provided from the Dan Boyer Water Company in Ocotillo, California. This offsite water supply is permitted for construction and potable use. The water supply would be used temporarily until water was made available from the SWWTF, as described in the Supplement to the AFC, filed in June 2009.

The results of aquifer testing conducted in April 2010 demonstrate that State Well No. 16S/9E-36G4 can support the water demands for the Imperial Valley Solar Project during construction and the lifespan of operations (if needed). Detailed results of the aquifer testing are provided in Appendix D of this report.

In order to achieve the peak construction water demand (such as prior to large amounts of concrete mixing/pouring during construction), the Project would temporarily store water onsite. The projected average annual construction water use is approximately 50 afy, and operational water use is estimated to average 33 afy. Maximum peak demand is estimated to be 90,000 gallons per day (gpd). Additionally, the Project would employ water management Best Management Practices in order to supply the needs for construction.

2.5.2.3.2 Water Quality

The proposed temporary, alternative water supply from the Dan Boyer Water Company is permitted for construction and potable use. Detailed water quality data are included in Appendix D of this report.

An aquifer test performed for this well indicates that pumping of the well at the prescribed rates will have no significant impact on water levels and water quality in the area, as the ZOI is considerably less than the distance to the closest well, approximately 500 feet away.

2.5.2.3.3 Storm Water Runoff and Flooding Hazards

The use of the temporary, alternative water supply is not a significant change with regards to storm water runoff and flooding hazard considerations. The temporary use of the alternative Ocotillo water supply would not create additional construction or operation related impacts to storm water runoff and flooding hazards beyond those presented in Section 5.5 of the Project AFC, and Section 2.5 of the Supplement to the AFC filed in June 2009.

2.5.2.3.4 Hydrogen Storage Modifications

The modifications to the onsite hydrogen storage are not significant changes with regard to water resource considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to water resources beyond those presented in Section 5.5 of the Project AFC, and Section 2.5 of the Supplement to the AFC filed in June 2009.

2.5.3 Cumulative Impacts

2.5.3.1 Transmission Line Alignment Modifications

No additional cumulative impacts to water resources have been identified due to the minor modifications to the transmission line alignment. Cumulative impacts discussed in Section 5.5 of the Project AFC and Section 2.5 of the Supplement to the AFC are applicable to the proposed Project changes.

2.5.3.2 Waterline Alignment Modifications

No additional cumulative impacts to water resources have been identified due to the minor modifications to the waterline alignment. Cumulative impacts discussed in Section 5.5 of the Project AFC and Section 2.5 of the Supplement to the AFC are applicable to the proposed Project changes.

2.5.3.3 Alternative Water Supply

No additional cumulative impacts to water resources have been identified due to the use of State Well No. 16S/9E-36G4 as an alternative water supply. A drawdown analysis performed for this well indicates that pumping of the well at the prescribed rates will have no significant impact on water levels and water quality in the area, as the ZOI is considerably less than the distance to the closest well, approximately 500 feet away.

2.5.3.4 Hydrogen Storage Modifications

No additional cumulative impacts to water resources have been identified due to the modifications to the hydrogen storage onsite. Cumulative impacts discussed in Section 5.5 of the Project AFC and Section 2.5 of the Supplement to the AFC are applicable to the proposed Project changes.

2.5.4 Mitigation Measures

The mitigation measures and other discussion presented in Section 5.5 of the Project AFC and Section 2.5 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based upon the proposed Project modifications.

With implementation of the mitigation measures outlined in Section 5.5 of the Project AFC, impacts to water resources as a result of construction and operation will be reduced to less than significant levels.

2.5.5 LORS Compliance

The Project will comply with all applicable LORS. An update to the LORS Compliance Table (AFC Table 5.5-5, Supplement to the AFC Table 2.5-2) and Contact List Table (AFC Table 5.5-6, Supplement to the AFC Table 2.5-3) from the Project AFC and the Supplement to the AFC filed in June 2009 are provided below as Table 2.5-2 and 2.5-3, respectively. The updates include new RWQCB contact information and addition of the sole source aquifer provisions from the Safe Drinking Water Act of 1974, and the Imperial County Groundwater Ordinance.

2.5.5.1 Safe Drinking Water Act

The OCWGB is designated as a sole source aquifer. The following information was provided in Section 3.3.2 of the USG DEIR/EIS:

> There are several communities in the Ocotillo/Coyote Wells Groundwater Basin, including Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. These communities, USG and several other commercial/industrial and agricultural users, depend on the Ocotillo/Coyote Wells Groundwater Basin as their source of potable water. Surface water is not present in the Basin and there are no water imports into the Basin. The Ocotillo/Coyote Wells Groundwater Basin was designated as a "sole source aquifer" by the Environmental Protection Agency (EPA) in 1996 (61 FR 47752, September 10, 1996) and is, thus, part of the Sole Source Aquifer Protection Program, authorized by Section 14245(e) of the Safe Drinking Water Act. The sole source aquifer designation requires U.S. EPA review of proposed federally assisted projects.

Under the Sole Source Aquifer program of the Safe Drinking Water Act, no commitment for federal funds may be made for any project which the EPA regional "administrator determines may contaminate [a designated] aquifer through a recharge zone so as to create a significant hazard to public health." Safe Drinking Water Act § 14224(e).

The Imperial Valley Solar Project is in compliance with the Sole Source Aquifer program because it would not contaminate the aquifer. First, the Project construction footprint lies entirely outside of the designated recharge zone of the aquifer. Second, although the project would use water from State Well No. 16S/9E-36G4 located in the basin, this activity also would introduce no contaminants into the aquifer, and there is no evidence of existing contamination and so no plumes State Well No. 16S/9E-36G4 could affect.

2.5.6 Imperial county groundwater ordinance

Imperial County has enacted a Groundwater Ordinance (Title 9 of the Imperial County Land Use Ordinance) which regulates the extraction and export of groundwater within Imperial County. County Code section 92203.01 generally prohibits export of water outside the basin without a permit. A permit would issue only upon a showing that "there is an excess supply of water that can be withdrawn without resulting in or aggravating conditions of overdraft." County Code §§ 92203.03 & 99201.04.

As noted above, State Well No. 16S/9E-36G4 operates under an existing Conditional Use Permit and is permitted for the extraction of water. Water from that well would be delivered to a point inside the basin and used for a project that lies primarily over the basin, so that no export permit is required. Moreover, even if the small portion along the eastern edge of Phase II of the project, which overlies the neighboring groundwater basin, were deemed to constitute s separate location that required an export permit, the permit should issue. The incremental amount of water demanded for that portion is so small as to provide no reasonable scientific basis for concluding that it would cause or exacerbate any overdraft. The temporary nature of the use, which would last only until water is made available from the Seeley Waste Water Treatment Facility, confirms this conclusion

Table 2.5-2
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
CWA §402; 33 USC §1342; 40 CFR Parts 110, 112, 116	Requires NPDES Permits for construction and industrial storm water discharges. Requires preparation of a SWPPP and Monitoring Program.	Coverage under NPDES industrial storm water permit maybe required. NOI for coverage under NPDES construction storm water permit will be filed before construction.	SWRCB and RWQCB	J. Carmona
CWA §311; 33 USC §1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	Project will conform by proper management of oils and hazardous substances both during construction and operation. If an accidental release or unintended spill occurs it will promptly be reported.	RWQCB and DTSC	J. Carmona
CFR, Title 40, Parts 124, 144 to 147	Requires protection of underground water resources	Underground water resources will be protected due to the lined evaporation pond.	Environmental Protection Agency	
Safe Drinking Water Act of 1974, (Public Law 93-523, 42 U.S.C. 300 et seq.), §1424(e)	Requires protection of drinking water supplies in areas where there are few or no alternative sources to the ground water resource	Project will not introduce contaminants into the aquifer and pumping of the aquifer would not adversely affect the aquifer water quality.	Environmental Protection Agency	

Table 2.5-2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
State Jurisdiction				
CWC §13552.6	Use of potable domestic water for cooling towers and air conditioning is unreasonable use if suitable recycled water is available.	Recycled water will be the sole source of water for the project. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona / J. Snyder
California Constitution Article 10 §2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	Project includes appropriate water conservation measures, both during construction and operation.	SWRCB and RWQCB	J. Carmona
State Water Resources Control Board, Resolution No. 75-58	Addresses sources and use of cooling water supplies for power plants that depend on inland waters for cooling and in areas subject to general water shortages.	Recycled water will be the long term operational supply source of water for the project. Groundwater may be used for potable water supply and temporary construction water supply. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona (RWQCB), J. Kassel (SWRCB)
Porter-Cologne Water Quality Act of 1972; CWC § 13000-14957, Division 7, Water Quality	Requires State and Regional Water Quality Control Boards to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative and numerical water quality standards.	Project will conform to applicable state water standards, both qualitative and quantitative, before and during operation. Applicable permits will be obtained from Regional Water Quality Control Board.	SWRCB and RWQCB	J. Carmona
Title 22, CCR	Addresses the use of recycled water for cooling equipment	Recycled water will be the long-term operational supply source of water for the project. Groundwater may be used for potable water supply and temporary construction water supply. No cooling towers are proposed.	California Department of Health Services and RWQCB	J. Stone (DEH) / J. Snyder (RWQCB)
The Safe Drinking Water and Toxic Enforcement Act of 1986 (proposition 65), Health and Safety Code 25241.5 *et seq.*	Prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.	Project will conform to all state water quality standards, both qualitative and quantitative. Project will not discharge into any drinking water source. If an unintended spill occurs, reporting of spill will be prompt.	California Department of Health Services	J. Crisologo

Table 2.5-2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	Recycled water will be the long-term operational supply source of water for the project. Groundwater may be used for potable water supply and temporary construction water supply. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona / J. Snyder
CWC Section 5002	Requires a "Notice of Extraction and Diversion of Water" to be filed with the State Water Resources Control Board on or before 1 March of the succeeding year.	Notice will be filed as required by state law.	SWRCB and RWQCB	J. Snyder (RWQCB), J. Kassel (SWRCB)
CWC Section 13751	Requires a "Report of Completion" to be filed with the State Water Resources Control Board within 60 days of well construction.	A groundwater well is not proposed onsite. Groundwater may be purchased from a licensed water purveyor.	SWRCB and RWQCB	J. Snyder / J. Carmona
California Public Resources Code §25523(a); 20 CCR §§1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part 1	The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC and RWQCB	J. Snyder / J. Carmona (RWQCB)
CWC §§ 13271 – 13272; 23 CCR §§2250 – 2260	Reporting of releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products.	No releases of hazardous substances are anticipated; however, Project will conform to all State water quality standards, both qualitative and quantitative. If an unintended spill occurs, reporting of spill will be prompt.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)

Table 2.5-2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
CWC §13260 – 13269; 23 CCR Chapter 9	Requires the filing of a Report of Waste Discharge and provides for the issuance of WDRs with respect to the discharge of any waste that can affect the quality of the waters of the state.	An ROWD will be filed for the RO Unit discharge waste. The RO Unit will be constructed and monitored in accordance with RWQCB requirements.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)
CEQA, Public Resources Code §21000 *et seq*.; CEQA Guidelines, 14 CCR §15000 *et seq*.; Appendix G	The CEQA Guidelines (Appendix G) contain definitions of projects that can be considered to cause significant effects to water resources.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC	
Title 27, CCR Division 2, §20375, SWRCB – Special Requirements for Surface Impoundments (C15: §2548)	This regulation governs the design requirements for surface impoundments.	The evaporation pond for wastewater disposal will be designed and operated in accordance with the requirements of this section.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)
Local Jurisdiction				
Imperial County Ordinance, Title 9, §91605.00 – 91605.06	These codes regulate flood hazard reduction.	The Project will be designed by a licensed engineer and meet all floodplain design standards.	Imperial County	P. Valenzuela
Imperial County Ordinance, Title 9, §90515.00 – 90515.11	The codes classify the Project as light industrial development and regulates its uses.	The Project will conform to all code standards.	Imperial County	P. Valenzuela
Imperial County APCD, Regulation VIII, Fugitive Dust Rules		The Project will conform to all code standards	Imperial County	
Imperial County Municipal Code, Title 9, "Land Use," Division 22, which grants the planning commission over groundwater use	This code regulates groundwater use	The Project will conform all code standards as they apply to project groundwater use.	Imperial County	

Table 2.5-2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact

Source: URS Corporation, 2008.

Notes:

APCD = Air Pollution Control District
CEQA = California Environmental Quality Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
CWC = California Water Code
LORS = laws, ordinances, regulations, and standards
NOI = Notice of Intent
NPDES = National Pollutant Discharge Elimination System
RWQCB = Regional Water Quality Control Board
SWRCB = State Water Resources Control Board
SWPPP = Storm Water Pollution Prevention Plan
USC = United States Code

Table 2.5-3
Agency Contact List for LORS

Agency	Contact	Title	Telephone
California Regional Water Quality Control Board, Colorado River Basin Region	John Carmona	NPDES, 401 Certification, Storm Water	760-346-7491
California Regional Water Quality Control Board, Colorado River Basin Region	Jennie Snyder	Chapter 15 and Non-Chapter 15	760-776-8962
State Water Resources Control Board	Jim Kassel	Water Rights	916-341-5446
California Department of Health Services	Jeff Stone	Recycled Water	805-566-9767
California Department of Health Services	Joseph Crisologo	Water Security	213-580-5723
Imperial County Planning/Building Development Department	Patricia A. Valenzuela	Planner II	760-482-4320
California Department of Water Resources, Division of Planning and Local Assistance, Southern District	Tim Ross		818-500-1645

Sources: Colorado River Basin RWQCB, 208; CDPH, 2008a; CDPH, 2008b (References per Section 5.5 of Project AFC).

2.5.7 References

Bookman-Edmonston 2004. Ocotillo/Coyote Wells Hydrology and Groundwater Modeling Study. Prepared for United States Gypsum Company. Included as Appendix B to the United States Gypsum Company Expansion/Modernization Project Draft Environmental Impact Report/Draft Environmental Impact Statement, April 2006. State Clearinghouse No. 2001121133.

California Unions for Reliable Energy (CURE) Data Requests Set One, Dated April 6, 2009, CEC Docket Number 08-AFC-05

Salton Sea Ecosystem Restoration Program Programmatic Environmental Impact Report, Chapter 5, Surface Water Resources, last accessed April 29, 2009 at: http://www.saltonsea.water.ca.gov/PEIR/draft/

State Water Resources Control Board website last accessed on April 29, 2009 at: http://www.swrcb.ca.gov/rwqcb7/water_issues/programs/salton_sea/watershed.shtml

United States Gypsum Company, April 2006. Expansion/Modernization Project Draft Environmental Impact Report/Environmental Impact Statement, State Clearinghouse No. 2001121133.

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2.6 BIOLOGICAL RESOURCES

This section presents a discussion of the potential impacts related to biological resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to hydrogen storage onsite.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.6.1 Affected Environment

The affected environment for biological resources was originally discussed in Section 5.6.1 of the AFC and in Section 2.6.1 of the Supplement to the AFC filed in June 2009. For the minor modifications to the alignments to the transmission line and the waterline, the affected environment is unchanged from that presented in Section 5.6 of the Project AFC and Section 2.6 of the Supplement to the AFC filed in June 2009.

The SWWTF was identified as the primary water source in the Supplement to the AFC filed in June 2009. In order to provide tertiary effluent suitable for unrestricted recycled uses, SCWD is proposing upgrades to the existing SWWTF facility to meet Title 22 standards. SCWD is in the process of preparing an EIR to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary results have been provided by Dudek as Appendix H to this report.

In the event that the SWWTF improvements have not been completed at the start of construction of the Imperial Valley Solar Project, the Applicant proposes to use a temporary, alternative water supply originating in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply.

2.6.2 Environmental Consequences

2.6.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to biological resource considerations. The modified transmission line alignment occurs within the areas previously surveyed for biological resources (Figure 1-1). The changes in alignment of the transmission line will result in small-scale modifications that do not create additional construction or operation related impacts to biological resources beyond those presented in Section 5.6 of the Project AFC, as supplemented in June 2009.

The CEC and BLM have requested that the Applicant conduct additional botanical surveys in 2010 for the entire Imperial Valley site and all auxiliary, linear facilities, including the modified transmission line alignment. In addition, flat-tailed horned lizard surveys were conducted for the modified transmission line segments (Figure 1-1). These surveys are being conducted during the appropriate species-specific survey periods, using agency-approved staff and methodologies.

Botanical Surveys

The early spring botanical surveys were conducted in April 2010. The surveys resulted in no detection of special status plant species within the modified transmission line alignments. The survey report for the early spring botanical surveys in included as Appendix E.

The results from a second round of botanical surveys of the entire Project site, inclusive of the modified transmission line alignment are expected to be available in May 2010. CEC and BLM have requested late season (fall) surveys to be conducted to verify that impacts to state and federally listed Threatened, Endangered, Proposed, Petitioned, and Candidate or California Native Plant Society List 1A, 1B, or 2 plants will be minimized and mitigated. The results of these surveys will be made available once the surveys have been conducted.

Flat-Tailed Horned Lizard Surveys

Additional focused FTHL surveys were conducted in April 2010 for the modified transmission line corridor segments (Figure 1-1). During transect survey protocol surveys, four transects were surveyed on each side of the linear Project feature center-line. All horned lizard sign, including live and deceased flat-tailed and desert horned lizards, scat, and tracks were mapped and recorded with handheld GPS units. The transmission line corridor surveys had negative results, with no flat-tailed horned lizard detection. A survey report will be available in May 2010.

2.6.2.2 Waterline Alignment Modifications

The survey corridor for the new waterline alignment includes approximately 80 acres of land that were previously un-surveyed for biological resources. Of these 80 acres, Evan Hewes Highway ROW and the properties for which the Applicant had access rights (Figure 1-2) comprised approximately 33 acres.

The CEC and BLM have requested that the Applicant conduct additional botanical surveys in 2010 for the entire Imperial Valley site and all auxiliary, linear facilities, including the modified waterline alignment. In addition, flat-tailed horned lizard surveys were conducted for the modified waterline segments (Figure 1-2). These surveys are being conducted during the appropriate species-specific survey periods, using agency-approved staff and methodologies.

Botanical Surveys

The early spring botanical surveys were conducted in April 2010. The surveys resulted in no detection of special status plant species within the modified waterline alignment. The survey report for the early spring botanical surveys in included as Appendix E.

The results from a second round of botanical surveys of the entire Project site, inclusive of the modified transmission line alignment are expected to be available in May 2010. CEC and BLM have requested late season (fall) surveys to be conducted to verify that impacts to state and federally listed Threatened, Endangered, Proposed, Petitioned, and Candidate or California Native Plant Society List 1A, 1B, or 2 plants will be minimized and mitigated. The results of these surveys will be made available once the surveys have been conducted.

The results from a second round of botanical surveys of the entire Project site, inclusive of the modified waterline alignment (for those areas where access rights are granted) are expected to be available in May 2010. CEC and BLM have requested late season (fall) surveys to be conducted to verify that impacts to state and federally listed Threatened, Endangered, Proposed, Petitioned, and Candidate or California Native Plant Society List 1A, 1B, or 2 plants will be minimized and mitigated. The results of these surveys will be made available once the surveys have been conducted.

Flat-Tailed Horned Lizard Surveys

Additional focused FTHL surveys were conducted in April 2010 for the waterline corridor. During transect survey protocol surveys, four transects were surveyed on each side of the linear Project feature center-line. All horned lizard sign, including live and deceased flat-tailed and desert horned lizards, scat, and tracks were mapped and recorded with handheld GPS units. The waterline corridor surveys had negative results, with no flat-tailed horned lizard detection. A survey report will be available in May 2010.

2.6.2.3 Alternative Water Supply

The temporary, alternative water supply would be used, anticipating that the SWWTF improvements will not be completed at the start of construction of the Imperial Valley Solar Project. SCWD is in the process of preparing an EIR to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary findings have been provided by Dudek as Appendix H to this report.

The Applicant proposes to use a temporary, alternative water supply originating in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply. The use of a temporary, alternate water supply is not a significant change with regards to biological resources. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to biological resources beyond those presented in Section 5.6 of the Project AFC, as supplemented in June 2009.

2.6.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to biological resource considerations. The hydrogen storage modifications will result in minor changes that do not create additional construction or operation related impacts to soil resources beyond those presented in Section 5.6 of the Project AFC, as supplemented in June 2009.

2.6.3 Cumulative Impacts

No additional cumulative impacts to biological resources have been identified due to the minor modifications to the transmission line alignment, waterline alignment or temporary use of the alternate water supply. Cumulative impacts discussed in Section 5.6 of the Project AFC and Section 2.6 of the Supplement to the AFC are applicable to the proposed Project changes.

2.6.4 Mitigation Measures

The mitigation measures and other discussion presented in Section 5.6 of the Project AFC and Section 2.6 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.6.5 LORS Compliance

The LORS presented in Section 5.6 of the Project AFC and Section 2.6 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.6 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.6 of the Project AFC.

2.6.6 References

No additional references beyond those presented in Section 5.6 of the Project AFC and Section 2.6 of the Supplement to the AFC were used for this supplemental analysis.

2.7 CULTURAL RESOURCES

Consistent with the recently released California Desert District Special Permit Conditions Continuation Sheet for all BLM California State Permit for Archaeological Investigations Standard Permit Conditions, and BLM California supplemental State Permit Conditions, this section remains the sole property of the United States of America and will not be released without the written approval of the BLM.

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2.8 PALEONTOLOGICAL RESOURCES

This section presents a discussion of the potential impacts related to paleontological resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.8.1 Affected Environment

The affected environment for paleontological resources was originally discussed in Section 5.8 of the AFC and in Section 2.8 of the Supplement to the AFC filed in June 2009. For paleontological resources, the affected environment would be changed to include the portions of the new transmission line alignment that would fall outside of the areas previously surveyed for paleontological resources. Because the waterline will be buried less than three feet (approximately 30 inches) deep, the paleontological environment is unchanged with regards to the waterline alignment. The affected paleontological environment is unchanged due to the temporary, alternate water supply or the modifications to the onsite storage of hydrogen. This Supplement to the AFC analyzes the impact of the minor modifications in the transmission line alignment that were not previously identified.

2.8.1.1 Resource Survey Methods

Methods used to develop the paleontological resource inventory of the Imperial Valley Solar site and surrounding area were described in Section 5.8 of the AFC. These procedures follow guidelines from the CEC (2007) and the Society of Vertebrate Paleontologists (SVP) (1995) and included both a literature search and field investigation.

A field survey for any visible fossil remains within transmission line parcels was conducted. This survey included including a 250-foot buffer on either side of the proposed alignment.

2.8.2 Environmental Consequences

2.8.2.1 Transmission Line Alignment Modifications

Previously unrecorded fossils sites were discovered during the field survey. The discovered fossils plus those reported by Fisk and Blakeley (2008) and those from these units recorded in paleontological literature suggest that there is the potential for fossil remains to be uncovered by excavations during Project construction.

2.8.2.2 Waterline Alignment Modifications

As discussed above, the waterline alignment modifications will be buried less than three feet (approximately 30 inches) deep and paleontological surveys are not necessary. The waterline alignment modifications (Figure 1-2) will result in minor changes that do not create additional construction or

operation related impacts to paleontological resources beyond those presented in Section 5.8.2 of the Project AFC and Section 2.8.2 of the June 2009 Supplement to the AFC.

2.8.2.3 Alternative Water Supply

The use of a temporary, alternate water supply is not a significant change with regards to paleontological resources. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to paleontological resources beyond those presented in Section 5.8 of the Project AFC, as supplemented in June 2009.

2.8.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to paleontological resource considerations. The hydrogen storage modifications will result in minor changes that do not create additional construction or operation related impacts to paleontological resources beyond those presented in Section 5.8 of the Project AFC, as supplemented in June 2009.

2.8.3 Cumulative Impacts

The potential for cumulative impacts exists if paleontological finds were to be encountered during Project construction. The mitigation measures preserved in Section 5.8 of the Project AFC would effectively preserve the value to science of any significant fossils uncovered during Project-related excavations.

2.8.4 Mitigation Measures

The mitigation measures presented in Section 5.8 of the Project AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.8.5 LORS Compliance

Paleontological resources are included among nonrenewable scientific resources by governmental agencies. Protections of such resources are provided by federal and state legislation and by some local ordinances. As mentioned in Section 5.8, the SVP has developed guidelines and professional standards for assessing the impact of projects on paleontological resources and for mitigation of adverse impacts (SVP 1995, 1996). The proponent intends for construction and operation of the Proposed Project to take place in a manner consistent with all laws, ordinances, regulations, and standards (LORS) relevant to paleontological resources.

2.8.6 References

Fisk, L. H., and S. J. Blakeley. 2008. Paleontological Resources Technical Report for the Solar Two Project. Prepared for: SES Solar Two, LLC, Biltmore Lakes Corporate Center, 2920 E Camelback Rd., Suite 150, Phoenix, AZ 5016. Prepared by: PaleoResource Consultants, 550 High Street, Suite 108, Auburn, CA 95603.

2.9 LAND USE

This section presents a discussion of the potential impacts related to land use from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.9.1 Affected Environmental

The affected environment for land use was originally discussed in Section 5.9.1 of the AFC and section 2.9 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the alternative water supply and the modifications to the onsite storage of hydrogen is unchanged from that presented in the AFC and its June 2009 Supplement.

2.9.2 Environmental Consequences

The environmental consequences for land use during Project construction and operation remain unchanged from the AFC section 5.9.2 and Section 2.9.2 of the Supplement to the AFC in June 2009.

2.9.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line are not significant changes with regard to land use considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to land use beyond those presented in Section 5.9 of the Project AFC, as supplemented in June 2009.

2.9.2.2 Water Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to land use considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to land use beyond those presented in Section 5.9 of the Project AFC, as supplemented in June 2009.

2.9.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to land use considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to land use beyond those presented in Section 5.9 of the Project AFC, as supplemented in June 2009.

2.9.2.4 Hydrogen Storage Modifications

The modifications to the onsite hydrogen storage are not a significant change with regard to land use considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to land use beyond those presented in Section 5.9 of the Project AFC, as supplemented in June 2009.

2.9.3 Cumulative Impacts

No additional cumulative impacts to land use have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.9 of the Project AFC and Section 2.9 of the Supplement to the AFC are applicable to the proposed Project changes.

2.9.4 Mitigation Measures

The mitigation measures presented in Section 5.9 of the Project AFC and Section 2.9 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.9.5 LORS Compliance

The LORS presented in Section 5.9 of the Project AFC and Section 2.9 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.9 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.9 of the Project AFC.

2.9.6 References

No additional references beyond those presented in Section 5.9 of the Project AFC and Section 2.9 of the Supplement to the AFC were used for this supplemental analysis.

2.10 SOCIOECOMONICS

This section presents a discussion of the potential impacts related to socioeconomics from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.10.1 Affected Environmental

The affected environment for socioeconomics was originally discussed in Section 5.10 of the AFC and section 2.10 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply, and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.10.2 Environmental Consequences

The environmental consequences for socioeconomics during Project construction and operation remain unchanged from the AFC section 5.10 and Section 2.10 of the Supplement to the AFC in June 2009.

2.10.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignments are not significant changes with regard to socioeconomic considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to socioeconomics beyond those presented in Section 5.10 of the Project AFC, as supplemented in June 2009.

2.10.2.2 Waterline Alignment Modifications

The minor modifications to waterline alignments and are not significant changes with regard to socioeconomic considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to socioeconomics beyond those presented in Section 5.10 of the Project AFC, as supplemented in June 2009.

2.10.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to socioeconomic considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to socioeconomics beyond those presented in Section 5.10 of the Project AFC, as supplemented in June 2009.

2.10.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to socioeconomic considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to socioeconomics beyond those presented in Section 5.10 of the Project AFC, as supplemented in June 2009.

2.10.3 Cumulative Impacts

No additional cumulative impacts to socioeconomics have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.10 of the Project AFC and Section 2.10 of the Supplement to the AFC are applicable to the proposed Project changes.

2.10.4 Mitigation Measures

The mitigation measures presented in Section 5.10 of the Project AFC and Section 2.10 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.10.5 LORS Compliance

The LORS presented in Section 5.10 of the Project AFC and Section 2.10 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.10 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.10 of the Project AFC.

2.10.6 References

No additional references beyond those presented in Section 5.10 of the Project AFC and Section 2.10 of the Supplement to the AFC were used for this supplemental analysis.

2.11 TRAFFIC AND TRANSPORTATION

This section presents a discussion of the potential impacts related to traffic and transportation from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to hydrogen storage onsite.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.11.1 Affected Environment

The affected environment for traffic and transportation was originally discussed in Section 5.11 of the Application for Certification (AFC). The only change to the affected environment is the use of the Ocotillo Well as the primary water supply source for the Project.

The Dan Boyer Water Company's State well #16S/9E-36G4 is an existing well located approximately seven driving miles west from the Imperial Valley Solar (IVS) site. It is located in the southeast quadrant of Imperial Avenue and I-8 EB On-Ramp in the Coummunity of Ocotillo. Water from State well #16S/9E-36G4 will be transported by truck to the IVS Site, the water supply transport is considered in this analysis of traffic and transportation.

2.11.2 Environmental Consequences

2.11.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to traffic and transportation considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to traffic and transportation beyond those presented in Section 5.11 of the Project AFC, as supplemented in June 2009.

2.11.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to traffic and transportation considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to traffic and transportation beyond those presented in Section 5.11 of the Project AFC, as supplemented in June 2009.

2.11.2.3 Alternative Water Supply

The potential change of the water source from an offsite location (State well #16S/9E-36G4 in Ocotillo, CA) is not anticipated to appreciably change construction or operation-related impacts to traffic and transportation and will be consistent with the findings presented in Section 5.11 of the Project AFC.

Project Construction Trip Generation

During the peak months in the Project construction schedule, the Project study area will experience short-term increases in traffic associated primarily with construction worker commute and material and equipment delivery trips. The traffic analysis evaluated the worst-case Project construction scenario by analyzing the peak months where the combined trip total between worker commute and material and equipment delivery trips is highest.

Construction Workers

The construction trade projections provided by the Project design engineer estimated that, during the peak construction month, there will be 731 workers on-site working on a daily basis. To evaluate the worst-case scenario, the traffic analysis assumed no workers would carpool and all workers would arrive during the morning peak period (0700 to 0900) and depart during the evening peak period (1600 to 1800). This assumption will remain unchanged in this supplement.

Construction Equipment and Material Deliveries

The construction equipment and material delivery projections provided by the Project design engineer estimated that during the peak construction months, there will be 1,099 truck trips per month. These trips were subsequently converted into passenger car equivalent (PCE) trips at three PCE per truck. Most deliveries will occur between 0700 and 1700 on weekdays. Because truck deliveries will likely arrive and depart throughout the day, 30 percent of the total daily truck trips were conservatively assumed to occur during the morning and evening peak hours. This assumption has been updated with the addition of 13 trucks per day offsite water supply deliveries and has been analyzed in this supplement.

The Project construction trip generation data in Table 2.11-1 show the resultant trips that would be generated by construction personnel and delivery trucks including offsite water supply.

Table 2.11-1
Project Construction Trip Generation

Vehicle Type	Peak Daily Round Trips	Morning Peak Trips			Evening Peak Trips		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Construction Worker Vehicles[1]	1,462	731	0	731	0	731	731
Truck Deliveries[2]	274	41	0	41	0	41	41
Offsite Water Supply delivery[3]	78	24	0	24	0	24	24

Source: SES, 2008. Updated 2010

Notes:

1 Peak workforce was conservatively analyzed at 731 worker trips conservatively assumed to drive alone during both the morning (0700 to 0900) and evening (1600 to 1800) peak hours.

2 Trucks deliveries shown in the table were adjusted into PCE vehicles (3 PCE per month). 1,099 truck trips per month = 3,297 PCEs divided by 24 working days = 137 PCE one-way trips or 274 round trips per day on average. It was also assumed that 30 percent of the truck delivery trips arrive during the morning peak hour and leave during the evening peak hour while the remaining deliveries (70 percent would arrive and leave during off-peak hours.

3 Offsite water supply deliveries shown in the table were adjusted into PCE vehicles (3 PCE per truck). 13 truck trips day = 39 PCE one-way trips or 78 round trips per day during peak construction. It was also assumed that 30 percent of the water supply truck delivery trips arrive during the morning peak hour and leave during the evening peak hour while the remaining deliveries (70 percent) would arrive and leave during off-peak hours.

PCE = passenger car equivalent

Project Operations Trip Generation

During Project operations, the Project study area will experience minor increases in traffic associated primarily with operation worker commute and operation and maintenance (O&M) trips and some minimal visitor trips. The traffic analysis evaluated the worst-case Project operations scenario by accounting for both planned (operations and delivery) and future visitor trips within the Project study area.

Operations

The operational workforce projections provided by the Project design engineer estimated that by Year 7 of Project operations, up to 164 workers will be working on-site on a daily basis. The estimated vehicle requirements for operational workers include 100 cars and four van pool vehicles. The operational projections also included eight daily visitor trips for sales, deliveries, and other services. To evaluate the worst case scenario, these vehicle trips were assumed to arrive during the morning peak period (0700 to 0900) and depart during the evening peak period (1600 to 1800).

Deliveries

To sustain and support Project operations, five weekly delivery trips of O&M supplies, waste management, and hazardous waste handling are anticipated at the Project Site. In addition, one weekly tractor trailer trip is anticipated for spare parts, building supplies, and temporary rental equipments. It is estimated that there will be an average of 12 truck round trips or 36 PCE operational delivery round trips on a daily basis accessing the Project Site during operations. Delivery trips will likely arrive and depart throughout the day. The analysis assumed the worst-case scenario: that these trips occur on the same day.

This assumption has been updated with the addition of seven trucks per day offsite water supply deliveries and has been analyzed in this supplement.

The Project trip generation data in Table 2.11-2 show the resultant trips that would be generated by operations, deliveries, and Project Site trips.

Table 2.11-2
Project Operations Trip Generation

Vehicle Type	Peak Daily Round Trips[1]	Morning Peak Trips			Evening Peak Trips		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Operations	224	112	0	112	0	112	112
Deliveries[2]	36	9	5	14	0	4	4
Offsite Water Supply delivery[3]	42	6	0	6	0	6	6
Visitors	20	5	5	10	5	5	10

Source: SES, 2008; URS Corporation, 2008. Updated 2010
Notes:
[1]Peak workforce was conservatively analyzed at 731 worker trips conservatively assumed to drive alone during both the morning (0700 to 0900) and evening (1600 to 1800) peak hours.
[2] Trucks deliveries shown in the table were adjusted into PCE vehicles (3 PCE per month).
PCE = passenger car equivalent
[3] Offsite water supply deliveries shown in the table were adjusted into PCE vehicles (3 PCE per truck). 7 truck trips day = 21 PCE one-way trips or 42 round trips per day during project operation. It was also assumed that 30 percent of the water supply truck delivery trips arrive during the morning peak hour and leave during the evening peak hour while the remaining deliveries (70 percent) would arrive and leave during off-peak hours.
PCE = passenger car equivalent

Project Trip Distribution

Trip Distribution and Assignment

It is assumed that workers will come from San Bernardino County and adjoining counties. Solar equipment components will also be transported and fabricated on-site. As shown in Table 2.11-3 it is anticipated that the construction and operation workforces will be originating from both east and west I-8:

Table 2.11-3
Workforce/Delivery Trips Distribution

Origin of Workforce Vehicle Travel to Project Site	Construction Workforce	Operation Workforce	Offsite Water Supply Delivery
I-8 East (Imperial County)	60.0%	65.0%	–
I-8 East (Outside of Imperial County)	5.0%	1.0%	–
Evan Hewes Highway East (Local)	15.0%	23.0%	–
I-8 West (Imperial County)	5.0%	5.0%	100.00% [1]
I-8 West (Outside of Imperial County)	10.0%	5.0%	–
Evan Hewes Highway West (Local Road)	5.0%	1.0%	100.00% [2]
Totals	100.0%	100.0%	

Source: SES, 2008; URS Corporation, 2008. Updated 2010
Notes:
% = percent
I-8 = Interstate 8
[1] – At the worst case during project construction 100% of the offsite water supply will travel farthest via the I-8 freeway to access the eastern part of the project site.
[2] – Project operations.

Project Construction Effects

Construction of the Project will occur over an estimated 40-month period with varying levels of manpower, construction delivery, and equipment use. The majority of Project construction activities are anticipated to occur during normal daytime work hours. Possible exceptions may include limited night construction activities which are considered time critical or continuous in nature (such as concrete pours), and that may require extension of work hours based on inherent process requirements or material driven characteristics. These nighttime construction activities are considered nonrecurring events that would generate a minimal number of trips, retain a small number of workers on-site, and would likely have minimal effect on evening peak hour traffic. Therefore, nighttime work is anticipated to be a non-critical trip generation factor in the Project construction phase, with no significant effects.

During the Project construction, small quantities of hazardous materials will be delivered and construction waste products will be hauled to and from the Project Site. A more detailed discussion on Project waste management and handling of hazardous materials is presented in Section 5.14, Waste Management, and Section 5.15, Hazardous Materials Handling, respectively. All applicable LORS will be observed during the course of Project construction.

Roadway Level of Service During Project Construction

Table 2.11-4 shows the roadway LOS for Year 2010 No Project conditions.

Table 2.11-4
Roadway Level of Service – Year 2010 No Project Conditions

Roadway	Location	Classification	Average Daily Traffic	Truck Percent	LOS
I-8	West of Imperial Highway	Freeway	16,100	14	A
I-8	East of Dunaway Road	Freeway	14,100	17	A
US-98	West of Imperial Highway	State Highway	1,575	7	A
Imperial Highway	North of US-98	Collector	330	--	A
Evan Hewes Highway	East of Imperial Highway	Collector	1,300	--	A
Evan Hewes Highway	West of Dunaway Road	Collector	535	29	A
Dunaway Road	North of I-8 Westbound Ramps	Collector	810	19	A

Source: URS Corporation, 2008.
Notes:
[1] Future forecasted average daily traffic volumes on I-8 were calculated by applying a 2.5 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service in the AFC Traffic and Transportation Section.
[2] Future forecasted average daily traffic volumes on all other roads were calculated by applying a 2.0 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service in the AFC Traffic and Transportation Section.

-- = not available
I-8 = Interstate 8
LOS = level of service
US = United States Highway

As shown in Table 2.11-4, all traffic study roadway segments are forecast to operate at LOS A under Year 2010 No Project conditions.

Table 2.11-5 shows the roadway LOS for Year 2010 Project Construction conditions.

Table 2.11-5
Roadway Level of Service – Year 2010 Project Construction Conditions

Roadway	Location	Classification	Average Daily Traffic	Truck Percent	LOS
I-8	West of Imperial Highway	Freeway	16,515	14	A
I-8	East of Dunaway Road	Freeway	15,300	17	A
US-98	West of Imperial Highway	State Highway	1,590	7	A
Imperial Highway	North of US-98	Collector	445	--	A
Evan Hewes Highway	East of Imperial Highway	Collector	1,535	--	A
Evan Hewes Highway	West of Dunaway Road	Collector	1,170	29	A
Dunaway Road	North of I-8 Westbound Ramps	Collector	2,320	13	B

Source: URS Corporation, 2008. Updated 2010
Notes:
[1]Future forecasted average daily traffic volumes on I-8 were calculated by applying a 2.5 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service in the AFC Traffic and Transportation Section.
[2]Future forecasted average daily traffic volumes on all other roads were calculated by applying a 2.0 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service in the AFC Traffic and Transportation Section.
-- = not available
I-8 = Interstate 8
LOS = level of service
US = United States Highway

As shown in Table 2.11-5, all traffic study intersections are forecast to operate at LOS B or better under Year 2010 Project Construction conditions. No study roadway segments will be significantly affected by Project construction activities.

Intersection Level of Service During Project Construction

Table 2.11-6 presents peak hour intersection LOS and average vehicle delay results under Year 2010 No Project conditions. The LOS calculation worksheets are provided in Appendix G. Figure 2.11-1 shows Year 2010 No Project morning and evening peak hour turning movement volumes at each study area intersection.

Table 2.11-6
Peak Hour Intersection Level of Service – Year 2010 No Project Conditions

Intersection	Morning Peak Hour		Evening Peak Hour	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-8 WB Ramp/Imperial Highway	1.7	A	3.3	A
2. I-8 EB Ramp/Imperial Highway	5.6	A	3.3	A
3. US 98/Imperial Highway	0.9	A	0.8	A
4. I-8 WB Ramp/Dunaway Road	2.6	A	2.1	A
5. I-8 EB Ramp/Dunaway Road	6.9	A	6.9	A

Source: URS Corporation, 2008. Updated 2010.
Notes:
EB = eastbound
I-8 = Interstate 8
LOS = level of service
sec = seconds
US = United States Highway
veh = vehicle
WB = westbound

As shown in Table 2.11-6, all study intersections are forecasted to operate at LOS A under Year 2010 No Project conditions.

Table 2.11-7 presents peak hour intersection LOS and average vehicle delay results under Year 2010 Project Construction conditions. The LOS calculation worksheets are provided in Appendix G. Figure 2.11-2 shows Year 2010 Project Construction conditions for morning and evening peak hour turning movement volumes at each study area intersection.

Table 2.11-7
Peak Hour Intersection Level of Service – Year 2010 Project Construction Conditions

Intersection	Morning Peak Hour		Evening Peak Hour	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-8 WB Ramp/Imperial Highway	1.6	A	18	A
2. I-8 EB Ramp/Imperial Highway	4.4	A	2.2	A
3. US 98/Imperial Highway	1.3	A	1.6	A
4. I-8 WB Ramp/Dunaway Road	16.4	C	0.2	A
5. I-8 EB Ramp/Dunaway Road	9.8	A	8.8	A

Source: URS Corporation, 2008. Updated 2010.
Notes:
EB = eastbound
I-8 = Interstate 8
LOS = level of service
sec = seconds
US = United States Highway
veh = vehicle
WB = westbound

As shown in Table 2.11-7, all study intersections are forecast to operate at LOS C or better under Year 2010 Project Construction conditions. No study intersections will be significantly affected by Project construction activities.

The study intersections are anticipated to experience short-term increases in construction traffic during the peak construction period. However, traffic volume is expected to return to pre-project levels upon completion of project construction.

Project Operations Effects

The Project is projected to be completed by 2017. During the normal O&M of the Project, a planned 164 employee workforce will oversee its O&M. Occasional deliveries and maintenance-related trips are anticipated as part of normal operations. The following sections describe the operational effects of the Project.

During Project operations, small quantities of hazardous materials will be delivered and operational waste products will be hauled to and from the Project Site. A more detailed discussion on Project waste management and handling of hazardous materials is presented in Section 5.14, Waste Management, and Section 5.15, Hazardous Materials Handling, respectively. Applicable LORS will be observed during Project operations.

Roadway Level of Service During Project Operations

Table 2.11-8 shows the roadway LOS for Year 2017 No Project conditions.

Table 2.11-8
Roadway Level of Service – Year 2017 No Project Conditions

Roadway	Location	Classification	Traffic Volumes	Truck Percent of ADT	LOS
I-8	West of Imperial Highway	Freeway	19,125	14	A
I-8	East of Dunaway Road	Freeway	16,750	17	A
US-98	West of Imperial Highway	State Highway	1,875	7	A
Imperial Highway	North of US-98	Collector	380	--	A
Evan Hewes Highway	East of Imperial Highway	Collector	1,565	--	A
Evan Hewes Highway	West of Dunaway Road	Collector	645	29	A
Dunaway Road	North of I-8 Westbound Ramps	Collector	975	17	A

Source: URS Corporation, 2008. Updated 2010.
Notes:
[1]Future forecasted average daily traffic volumes on I-8 were calculated by applying a 2.5 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service.
[2]Future forecasted average daily traffic volumes on all other roads were calculated by applying a 2.0 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service.
-- = not available
I-8 = Interstate 8
LOS = level of service
US = United States Highway

As shown in Table 2.11-8, all study roadway segments are forecast to operate at LOS A under Year 2017 No Project conditions.

Table 2.11-9 shows the roadway LOS for Year 2017 Project Operations conditions.

Table 2.11-9
Roadway Level of Service – Year 2017 Project Operations Conditions

Roadway	Location	Classification	Traffic Volumes	Truck Percent of ADT	LOS
I-8	West of Imperial Highway	Freeway	19,165	14	A
I-8	East of Dunaway Road	Freeway	16,970	17	A
US-98	West of Imperial Highway	State Highway	1,880	7	A
Imperial Highway	North of US-98	Collector	430	--	A
Evan Hewes Highway	East of Imperial Highway	Collector	1,660	--	A
Evan Hewes Highway	West of Dunaway Road	Collector	880	29	A
Dunaway Road	North of I-8 Westbound Ramps	Collector	1,090	14	A

Source: URS Corporation, 2008. Updated 2010.
Notes:
[1] Future forecasted average daily traffic volumes on I-8 were calculated by applying a 2.5 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service.
[2] Future forecasted average daily traffic volumes on all other roads were calculated by applying a 2.0 percent annual growth rate to the existing average daily traffic volumes shown in Table 5.11-4, Existing Roadway Level of Service.
-- = not available
I-8 = Interstate 8
LOS = level of service
US = United States Highway

As shown in Table 2.11-9, all study roadway segments are forecast to operate at LOS A under Year 2017 Project Operations conditions.

Intersection Level of Service During Project Operations

Table 2.11-10 presents peak hour intersection LOS and average vehicle delay under Year 2017 No Project conditions. The LOS calculation worksheets are provided in Appendix G. Figure 2.11-3 shows Year 2017 No Project conditions for morning and evening peak hour turning movement volumes for each traffic study area intersection.

Table 2.11-10
Peak Hour Intersection Level of Service – Year 2017 No Project Conditions

Intersection	Morning Peak Hour		Evening Peak Hour	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-8 WB Ramp/Imperial Highway	1.7	A	3.3	A
2. I-8 EB Ramp/Imperial Highway	5.7	A	3.2	A
3. US 98/Imperial Highway	0.8	A	0.8	A
4. I-8 WB Ramp/Dunaway Road	1.0	A	0.4	A
5. I-8 EB Ramp/Dunaway Road	8.3	A	9.5	A

Source: URS Corporation, 2008. Updated 2010.
Notes:
EB = eastbound
I-8 = Interstate 8
LOS = level of service
sec = seconds
US = United States Highway
veh = vehicle
WB = westbound

As shown in Table 2.11-10, all study intersections are forecast to operate at LOS A or better under Year 2017 No Project conditions.

Table 2.11-11 presents peak hour intersection LOS and average vehicle delay results under Year 2017 Project Operations conditions. The LOS calculation worksheets are provided in Appendix G. Figure 2.11-4 shows Year 2017 Project Operations morning and evening peak hour turning movement volumes for each study area intersection.

Table 2.11-11
Peak Hour Intersection Level of Service –Year 2017 Project Operations Conditions

Intersection	Morning Peak Hour		Evening Peak Hour	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1. I-8 WB Ramp/Imperial Highway	1.5	A	2.7	A
2. I-8 EB Ramp/Imperial Highway	5.9	A	3.0	A
3. US 98/Imperial Highway	0.9	A	0.9	A
4. I-8 WB Ramp/Dunaway Road	3.3	A	0.4	A
5. I-8 EB Ramp/Dunaway Road	8.3	A	10.9	B

Source: URS Corporation, 2008. Updated 2010.
Notes:
EB = eastbound
I-8 = Interstate 8
LOS = level of service
sec = seconds
US = United States Highway
veh = vehicle
WB = westbound

As shown in Table 2.11-11, all traffic study area intersections are forecast at LOS B or better under Year 2017 Project Operations conditions.

There would be a minimal increase in intersection delay because of the minimal number of added trips associated with Year 2017 Project Operations. The minimal increase in intersection delay would not cause degradation of LOS to unacceptable levels or a significant effect.

Based on these findings, no significant traffic effects would occur at the traffic study area intersections during Project operations.

2.11.2.4 Project Effects Summary

Effects of Construction Traffic on Roadways

The roadways that will experience a short-term increase in traffic due to construction worker and truck deliveries will be I-8, US-98, Dunaway Road, Evan Hewes Highway, and Imperial Highway. The projected added trips along these roadways, however, would not result in degradation of their current LOS to unacceptable levels.

Based on these findings, no significant traffic effects would occur at the traffic study area roadways during Project construction.

Effects of Construction Traffic on Intersections

The results of the intersection LOS analysis shown in Table 2.11-7 indicate that all study intersections would continue to operate at an acceptable LOS C or better during both morning and evening peak hour analysis periods. These good intersection operating conditions are attributed to the low baseline pre-construction traffic in the study area which provided sufficient intersection capacity to handle short-term construction traffic.

Based on these findings, no significant traffic effects would occur at the traffic study intersections during Project construction.

Effects of Project Operations Traffic on Roadways

Similar to construction conditions, the roadways that will experience Project operational traffic will be I-8, US-98, Dunaway Road, Evan Hewes Highway, and Imperial Highway. The projected added trips from operational workers, maintenance deliveries and visitors along these roadways, however, would not result in degradation of the future pre-operational roadway LOS to unacceptable levels.

Based on these findings, no significant traffic effects would occur at the traffic study area roadways during Project operations.

Effects of Project Operations on Intersections

The results of the intersection LOS analysis, shown in Table 2.11-9 indicate that all study intersections would continue to operate at an acceptable LOS B or better during both morning and evening peak hour analysis periods. These good intersection operating conditions are attributed to the low future pre-operational traffic in the study area which provided sufficient intersection capacity to handle Project operations traffic.

Based on these findings, no significant traffic effects would occur at the traffic study intersections during Project operation.

2.11.2.5 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to traffic and transportation considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to traffic and transportation beyond those presented in Section 5.11 of the Project AFC, as supplemented in June 2009.

2.11.3 Cumulative Effects

Based on available information, the Project's construction traffic would not coincide with known potential future projects, so its contribution to cumulative traffic effects during construction would not be cumulatively considerable, and cumulative effects of the Project would therefore be less than significant.

During Project operations, the traffic analysis conservatively included the forecast traffic generation of the proposed Desert Springs Resort located northeast of the Project Site as part of the future baseline (Year 2017 No Project) conditions. The result of the traffic analysis showed that the proposed IVS Project operational traffic combined with future ambient traffic growth and the cumulative traffic generated by the proposed Desert Springs Resort would not be cumulatively considerable, and cumulative effects of the Project would therefore be less than significant.

Based on the above findings it is anticipated that the Project will not result in cumulative construction and operational Project effects.

2.11.4 Mitigation Measures

The mitigation measures and other discussion presented in Section 5.11 of the Project AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

Consistent with the mitigation discussion presented in Section 5.11 of the Project AFC, the project does not exceed the threshold of significance for traffic and transportation impacts.

2.11.5 LORS Compliance

The LORS presented in Section 5.11 of the Project AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.11 of the Project AFC is unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.11 of the Project AFC

2.11.6 References

No additional references beyond those presented in Section 5.11 of the Project AFC were used for this supplemental analysis.

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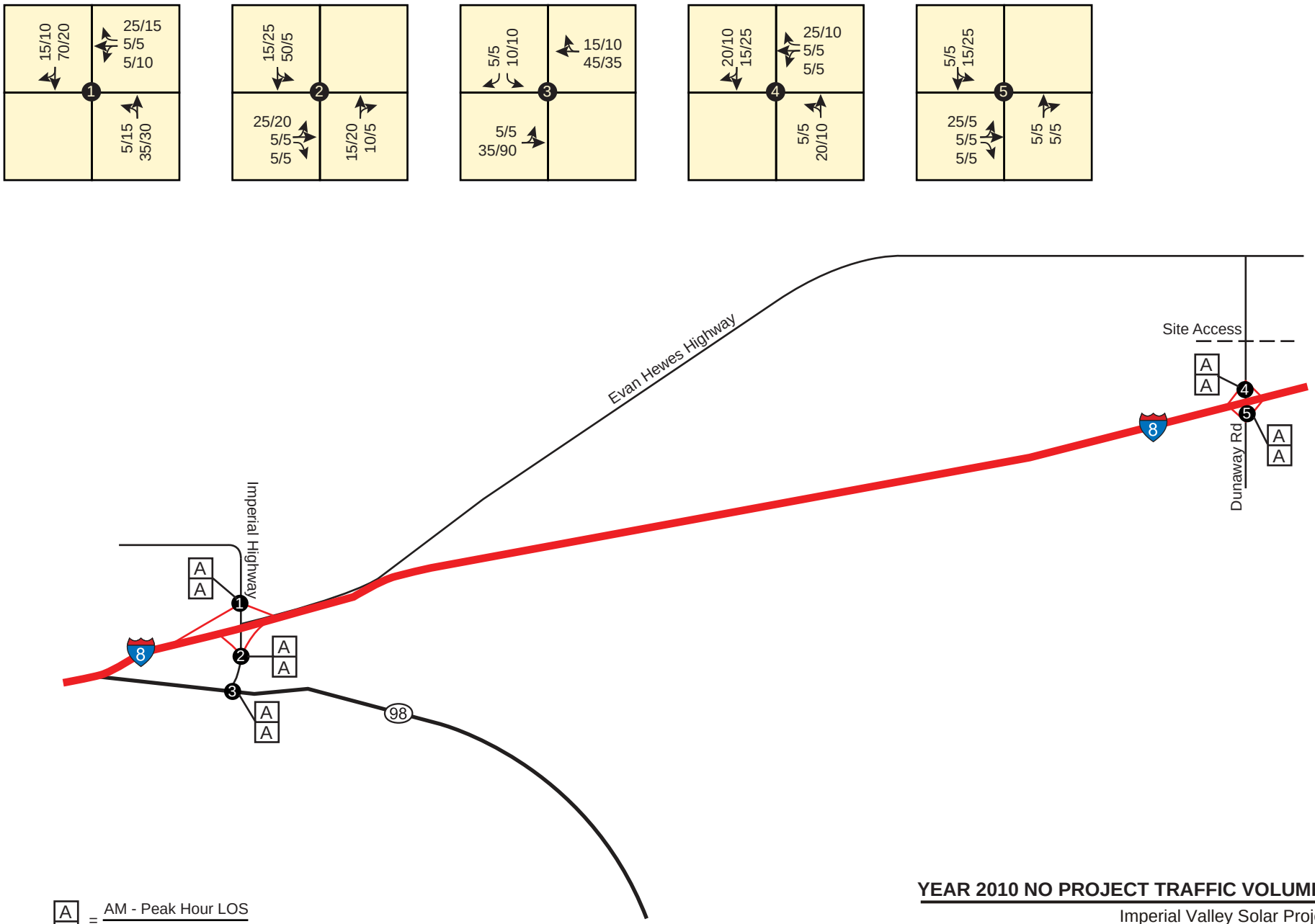

A/A = AM - Peak Hour LOS / PM - Peak Hour LOS

● Numbers rounded to nearest five.

YEAR 2010 NO PROJECT TRAFFIC VOLUMES

Imperial Valley Solar Project

April 2010
27657102

URS

FIGURE 2.11-1

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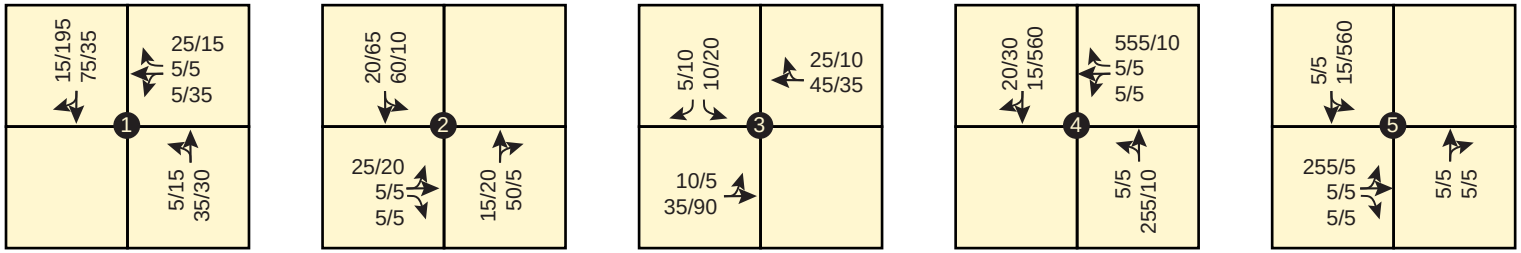

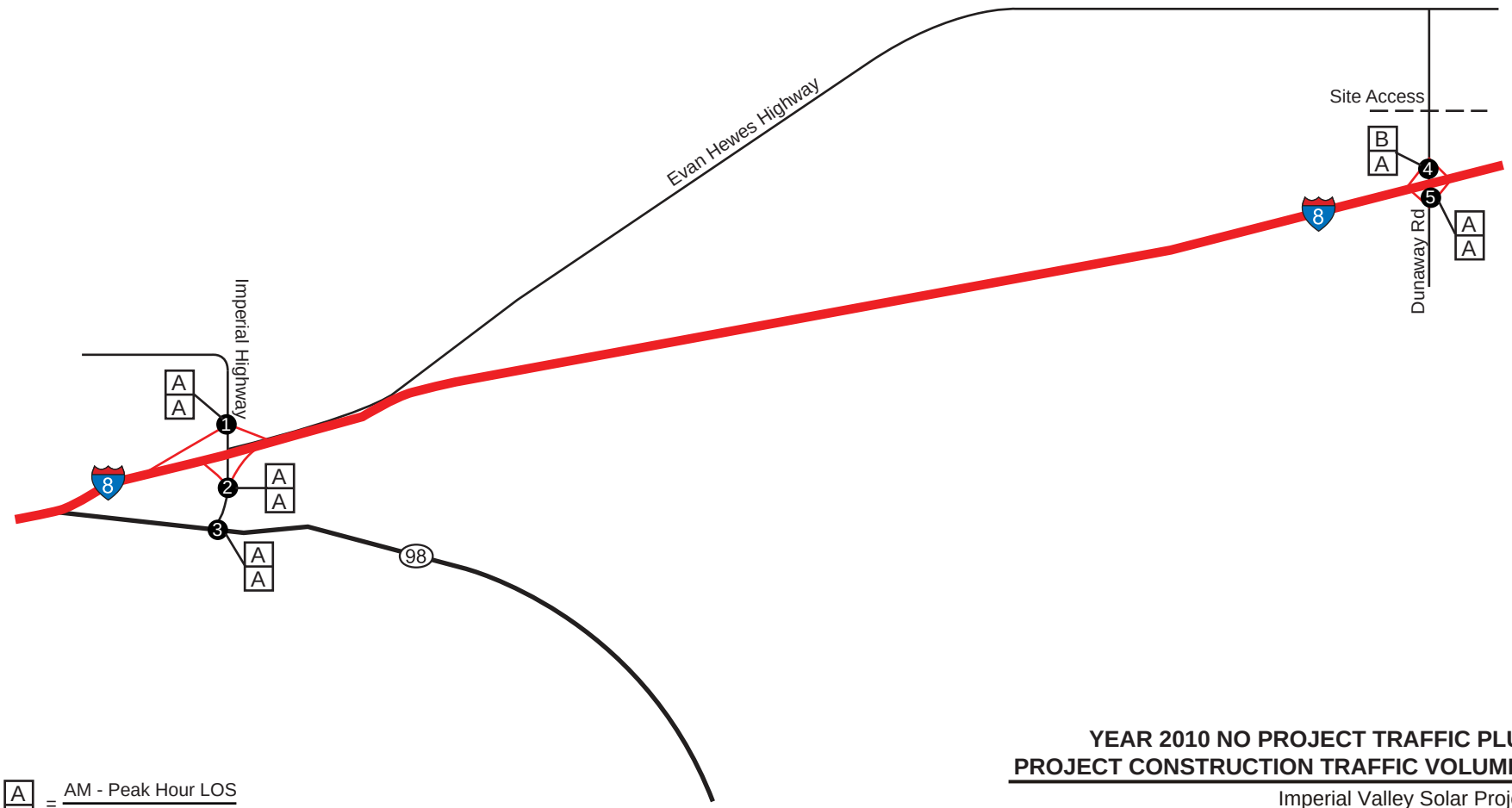

A/A = AM - Peak Hour LOS / PM - Peak Hour LOS

● Numbers rounded to nearest five.

YEAR 2010 NO PROJECT TRAFFIC PLUS PROJECT CONSTRUCTION TRAFFIC VOLUMES

Imperial Valley Solar Project

April 2010
27657102

URS

FIGURE 2.11-2

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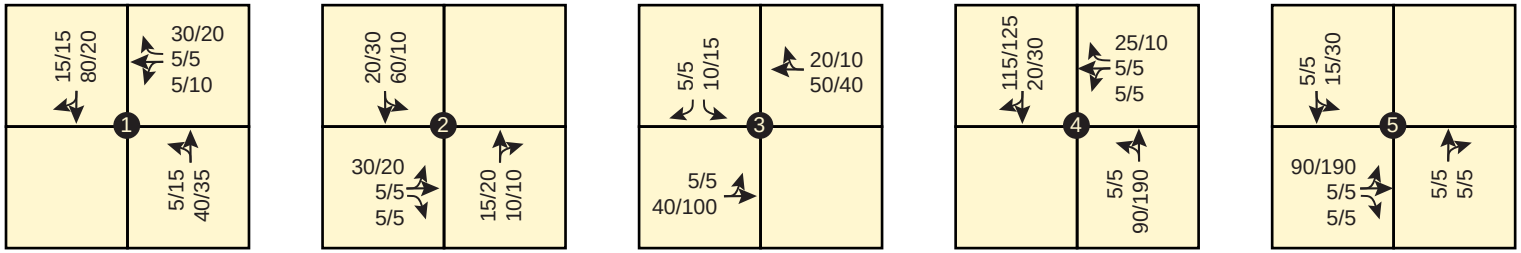

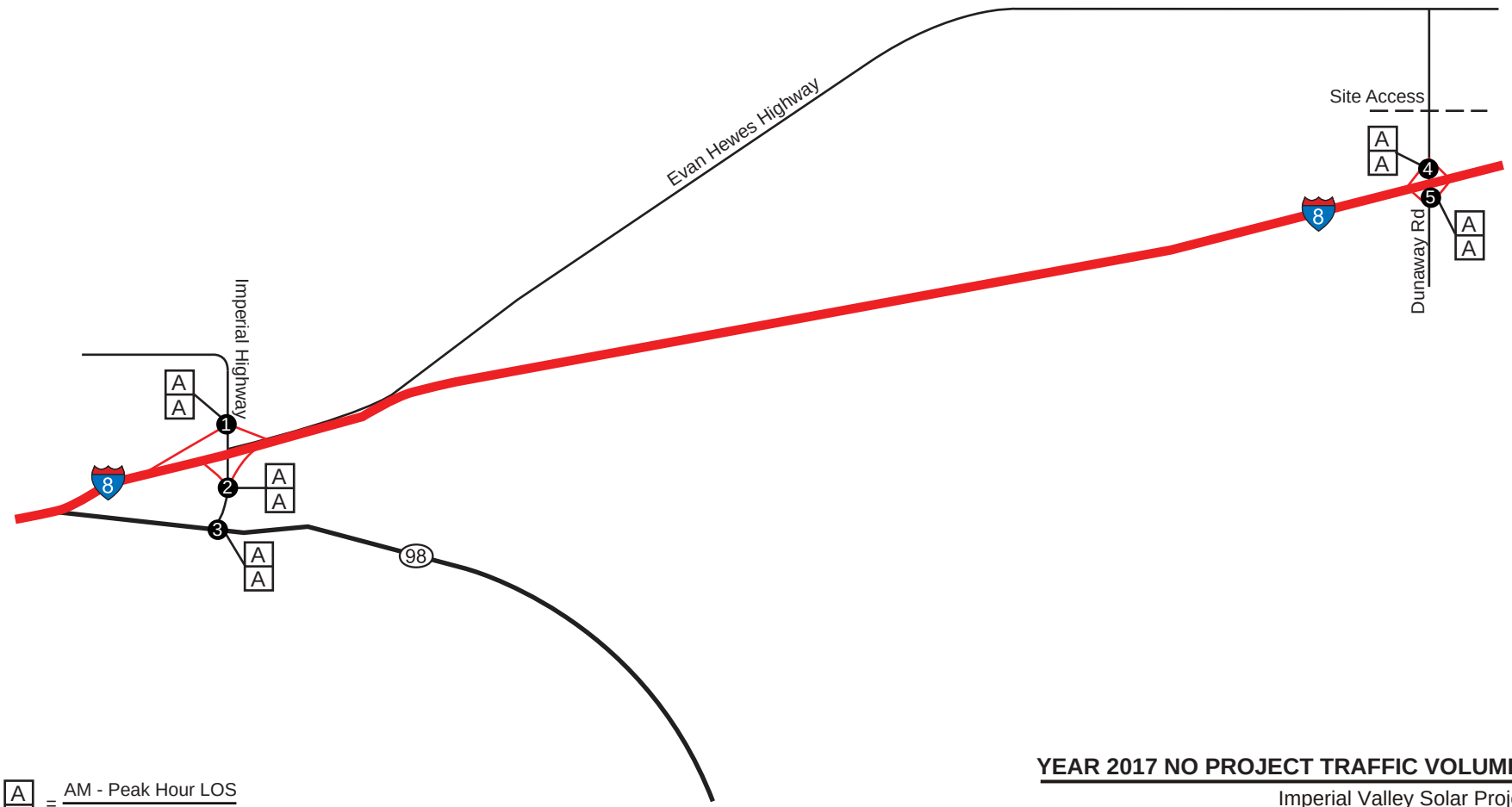

A/A = AM - Peak Hour LOS / PM - Peak Hour LOS

● Numbers rounded to nearest five.

YEAR 2017 NO PROJECT TRAFFIC VOLUMES

Imperial Valley Solar Project

April 2010
27657102

URS

FIGURE 2.11-3

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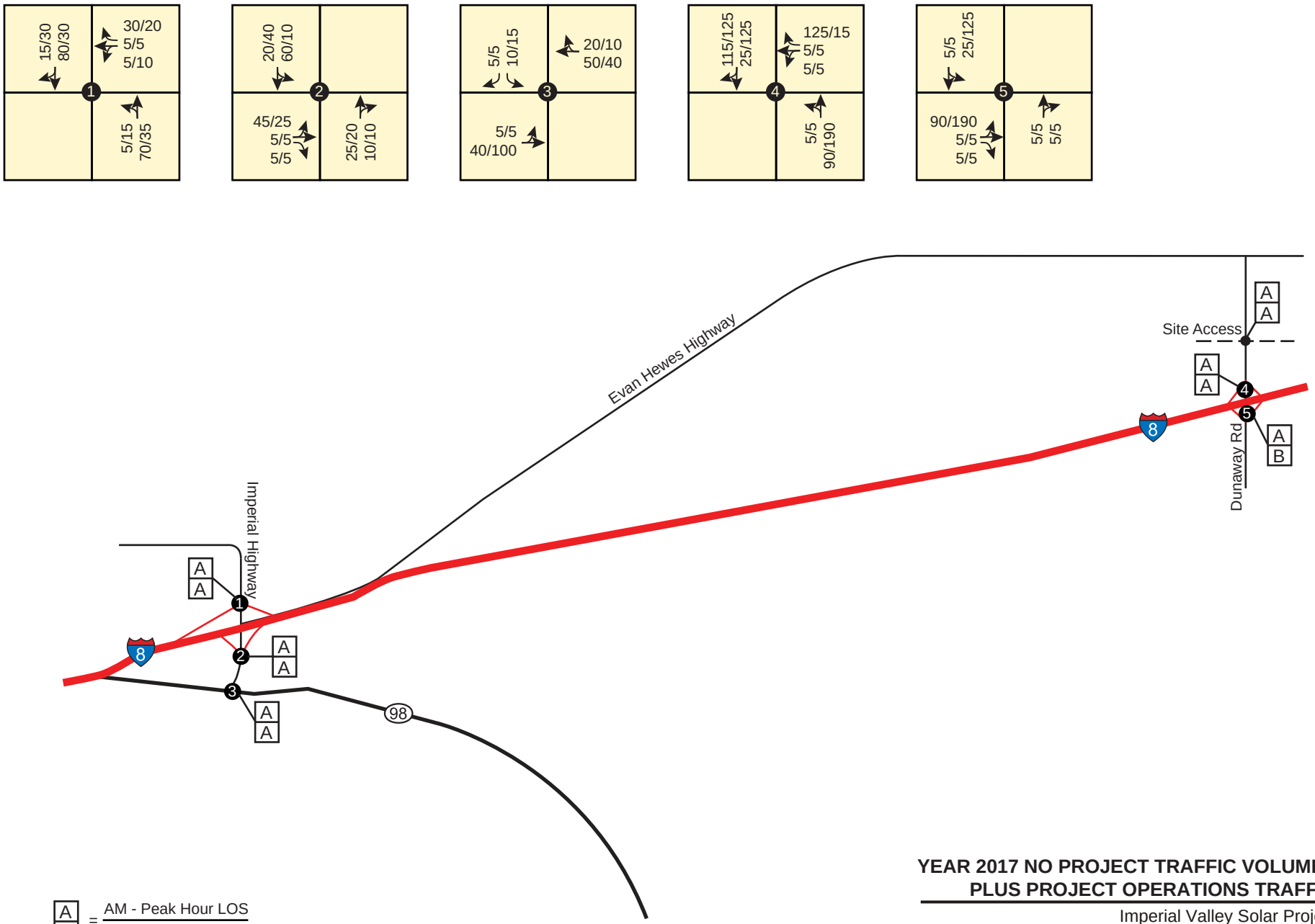

A/A = AM - Peak Hour LOS / PM - Peak Hour LOS

● Numbers rounded to nearest five.

YEAR 2017 NO PROJECT TRAFFIC VOLUMES PLUS PROJECT OPERATIONS TRAFFIC

Imperial Valley Solar Project

April 2010
27657102

URS

FIGURE 2.11-4

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2.12 NOISE

This section presents a discussion of the potential impacts related to noise from the modifications to the transmission line and waterline alignments, and the use of an alternative water supply.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.12.1 Affected Environment

The affected environment for noise was originally discussed in Section 5.12.1 of the AFC and section 2.12 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, waterline alignment modifications, and modification to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

The SWWTF was identified as the primary water source in the Supplement to the AFC filed in June 2009. In order to provide tertiary effluent suitable for unrestricted recycled uses, SCWD is proposing upgrades to the existing SWWTF facility to meet Title 22 standards. SCWD is in the process of preparing an EIR to evaluate potential impacts of the SWWTF upgrades. The environmental review methodology and preliminary results have been provided by Dudek as Appendix H to this report.

In the event that the SWWTF improvements have not been completed at the start of construction of the Imperial Valley Solar Project, the Applicant proposes to use a temporary, alternative water supply originating in Ocotillo, California until the time SWWTF water is available. This Supplement to the Project AFC analyzes the potential impacts associated with use of that temporary, alternative water supply. The affected environment would change to include the receptors affected by the production, transport and delivery of the temporary, alternate water supply.

2.12.2 Environmental Consequences

2.12.2.1 Transmission Line Alignment Modifications

The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to noise beyond those presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC.

2.12.2.2 Waterline Alignment Modifications

The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to noise beyond those presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC.

2.12.2.3 Alternative Water Supply

As briefly described in Section 1.4.2, during construction of the Project up to thirteen daily 7,000-gallon truck trips would be expected to transport water from Dan Boyer Water Company in Ocotillo, California

to storage tanks on the Project site. Travel on Evan Hewes Highway is expected for the water truck route during construction of the eastern portion of the Project area, with travel along I-8 and Dunaway Road expected for transporting water to the western construction activities.

There will be an additional 13 water truck trips during peak daily construction truck delivery traffic to the Project site, Tables 5.11-9 and 5.11-10 of the AFC suggest that the overall increase in predicted traffic flows on Imperial Highway (north of US 98) and two other potentially impacted collectors—Evan Hewes Highway (east of Imperial Highway) and Dunaway Road—associated with the eastern and western delivery routes, respectively, are expected to be acoustically minor and result in no additional construction traffic related impacts presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC.

Likewise, the seven water truck trips during peak daily operation truck delivery traffic to the Project site, Tables 5.11-13 and 5.11-14 of the AFC suggest that the overall increase in predicted traffic flows Imperial Highway (north of US 98) and two other potentially impacted collectors—Evan Hewes Highway (east of Imperial Highway) and Dunaway Road—associated with the eastern and western delivery routes, respectively, are expected to be acoustically minor and result in no additional operation traffic related impacts presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC.

2.12.2.4 Hydrogen Storage Modifications

The onsite hydrogen storage modifications will result in minor changes that do not create additional construction or operation related impacts to noise beyond those presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC

2.12.3 Cumulative Impacts

No additional cumulative impacts to noise have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.12 of the Project AFC and Section 2.12 of the Supplement to the AFC are applicable to the proposed Project changes.

2.12.4 Mitigation Measures

The mitigation measures presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.12.5 LORS Compliance

The LORS presented in Section 5.12 of the Project AFC and Section 2.12 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.12 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.12 of the Project AFC.

2.12.6 References

No additional references beyond those presented in Section 5.12 of the Project AFC and Section 2.12 of the Supplement to the AFC were used for this supplemental analysis.

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2.13 VISUAL RESOURCES

This section presents a discussion of the potential impacts related to visual resources from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.13.1 Affected Environment

The affected environment for visual resources was originally discussed in Section 5.13.1 of the AFC and section 2.13 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply and modifications to onsite storage of hydrogen is unchanged from that presented in the AFC and its June 2009 Supplement.

2.13.2 Environmental Consequences

The environmental consequences for Visual Resources during Project construction and operation remain unchanged from the AFC section 5.13.1, as supplemented in June 2009.

2.13.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line are not significant changes with regard to visual resource considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to visual resources beyond those presented in Section 5.13 of the Project AFC, as supplemented in June 2009.

2.13.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to visual resource considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to visual resources beyond those presented in Section 5.13 of the Project AFC, as supplemented in June 2009.

2.13.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to visual resource considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to visual resources beyond those presented in Section 5.13 of the Project AFC, as supplemented in June 2009.

2.13.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to visual resource considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to visual resources beyond those presented in Section 5.13 of the Project AFC, as supplemented in June 2009.

2.13.3 Cumulative Impacts

No additional cumulative impacts to visual resources have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.13 of the Project AFC and Section 2.13 of the Supplement to the AFC are applicable to the proposed Project changes.

2.13.4 Mitigation Measures

The mitigation measures presented in Section 5.13 of the Project AFC and Section 2.13 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.13.5 LORS Compliance

The LORS presented in Section 5.13 of the Project AFC and Section 2.13 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.13 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.13.5 of the Project.

2.13.6 References

No additional references beyond those presented in Section 5.13 of the Project AFC and Section 2.13 of the Supplement to the AFC were used for this supplemental analysis.

2.14 WASTE MANAGEMENT

This section presents a discussion of the potential impacts related to waste management from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.14.1 Affected Environment

The affected environment for waste management was originally discussed in Section 5.14 of the AFC and section 2.14 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.14.2 Environmental Consequences

The environmental consequences for waste management during Project construction and operation remain unchanged from the AFC section 5.14, as supplemented in June 2009.

2.14.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line are not significant changes with regard to waste management considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to waste management beyond those presented in Section 5.14 of the Project AFC, as supplemented in June 2009.

2.14.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to waste management considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to waste management beyond those presented in Section 5.14 of the Project AFC, as supplemented in June 2009.

2.14.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to waste management considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to waste management beyond those presented in Section 5.14 of the Project AFC, as supplemented in June 2009.

2.14.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to waste management considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to waste management beyond those presented in Section 5.14 of the Project AFC, as supplemented in June 2009.

2.14.3 Cumulative Impacts

No additional cumulative impacts to waste management have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.14 of the Project AFC and Section 2.14 of the Supplement to the AFC are applicable to the proposed Project changes.

2.14.4 Mitigation Measures

The mitigation measures presented in Section 5.14 of the Project AFC and Section 2.14 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.14.5 LORS Compliance

The LORS presented in Section 5.14 of the Project AFC and Section 2.14 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.14 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.14 of the Project.

2.14.6 References

No additional references beyond those presented in Section 5.14 of the Project AFC and Section 2.14 of the Supplement to the AFC were used for this supplemental analysis.

2.15 HAZARDOUS MATERIALS HANDLING

This section presents a discussion of the potential impacts related to hazardous materials handling from the modifications to the transmission line and waterline alignments, the use of an alternative water supply and modifications to the hydrogen storage onsite.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.15.1 Affected Environment

The affected environment for hazardous materials handling was originally discussed in Section 5.15.1 of the AFC and section 2.15 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply and the modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.15.2 Environmental Consequences

The environmental consequences for hazardous materials handling during Project construction and operation remain unchanged from the AFC section 5.15, as supplemented in June 2009.

2.15.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to hazardous materials handling considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to hazardous materials handling beyond those presented in Section 5.15 of the Project AFC, as supplemented in June 2009.

2.15.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to hazardous materials handling considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to hazardous materials handling beyond those presented in Section 5.15 of the Project AFC, as supplemented in June 2009.

2.15.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to hazardous materials handling considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to hazardous materials handling beyond those presented in Section 5.15 of the Project AFC, as supplemented in June 2009.

2.15.2.4 Hydrogen Storage Modifications

In the Supplement to the AFC filed in June 2009, the Project was updated to include a centralized hydrogen gas supply, storage and distribution system. The system included onsite generation of hydrogen through electrolysis by one hydrogen generator and the storage of that hydrogen in a steel storage tank. From the storage tank, the hydrogen will be piped to 87 individual compressor groups that include a compressor, a high pressure supply tank and a low pressure dump tank used to recover hydrogen from non operational Power Conversion Units (PCUs) through a return line.

Hydrogen from the compressor groups will supply 30 individual high pressure storage tanks and each tank will supply hydrogen to a group of 12 SunCatchers.

The details of the centralized hydrogen system have evolved over time. The amount of hydrogen stored for each SunCatcher will be increased from 3.4 to 11 standard cubic feet (scf) which would accommodate PCU's operation. In order to support this increased hydrogen storage at each SunCatcher, the high pressure supply tanks and low pressure dump tanks at each compressor group would accommodate 29,333 scf and 9,900 scf, respectively. In the June 2009 Supplement to the AFC, each high pressure supply tank was anticipated to be 648 scf and each low pressure dump tank was also reported to be 648 scf (Table 2.15-1).

The 30 high pressure tanks that each supply hydrogen to the PCUs within a group of 12 SunCatchers under the current system design will have a capacity of 489 scf. The system described in the June 2009 Supplement included high pressure surge tanks with capacities of 21.5 scf.

Table 2.15-1
Hydrogen Storage Modifications

Feature		Centralized Hydrogen System described in the June 2009 Supplement	Centralized Hydrogen System under the Current Design
Steel tank storing hydrogen produced by generator		33,000 scf	33,000 scf
Compressor groups	High-pressure supply tank	648 scf	29,333 scf
	Low-pressure supply tank	648 scf	9,900 scf
Individual high-pressure surge tanks		21.5 scf	489 scf
Hydrogen stored at each SunCatcher		3.4 scf	11 scf

Centralized Hydrogen System Description

The hydrogen gas will be produced through electrolysis by a single hydrogen generator. The hydrogen generator will be capable of producing 1,065 standard cubic feet of hydrogen per hour (scfh). The electrolysis process will require approximately 146 watts/scf of electricity and 2.58 cubic inches of

water/scf/hour during operation. The Project will require an approximate 100 kilowatts per day of power consumption to meet the hydrogen production needs.

Although the hydrogen generator could run full time if needed to supply sufficient amount of hydrogen to the SunCatchers, the generator will be operated at off-peak electric hours using grid power and generated hydrogen will be stored onsite. Hydrogen gas produced by the onsite generator will be compressed to liquid form and stored in a steel storage tank. The hydrogen tank, at approximately 9 feet in diameter by 30 feet long, will be capable of storing approximately two (2) days supply of hydrogen (i.e. approximately 33,000 scf).

The hydrogen storage tank will distribute hydrogen fuel to 87 individual compressor groups. Each compressor group will be electrically operated and will consist of a compressor and a high pressure supply tank with a 29,333 scf capacity, delivering gas at approximately 2,760 psi. Each compressor group will also be equipped with a low pressure dump tank with the same 9,900 scf capacity and used to recover hydrogen from non-operational PCUs through a ¼" stainless steel return line.

Hydrogen from the compressor groups will then be supplied to 30 individual high pressure surge tanks, each with a 489 scf capacity. Each surge tank will be responsible to supply hydrogen to the SCEs within a group of 12 SunCatchers. As previously mentioned, any potential escaped hydrogen from the SunCatchers will be captured by low pressure dump tanks within the compressor groups. In addition, each SunCatchers will store 11 scf of hydrogen to accommodate operation of each PCU.

Offsite Consequence Analysis

The Project consists of up to 31,200 SunCatchers and will use hydrogen gas as the working fluid in the PCU. Because of the hazardous nature of hydrogen there is a risk that it may cause an offsite consequence upon uncontrolled release. That aspect of the project is presented in this section, and the Project conducted an offsite consequence analysis (OCA) based RMP regulatory criteria for a worst case scenario release to evaluate the potential hazard posed by the hydrogen at the Project Site.

Accidental Release Process

The OCA conducted for the Project evaluated uncontrolled worst-case release scenarios, based on the conditions recommended in state and federal RMP. The accidental release scenarios evaluated consist of the following:

- The release and ignition of the entire contents of the hydrogen storage tank;
- The release and ignition of the entire contents of one high pressure supply tank in a compressor group;
- The release and ignition of the entire contents of one low pressure dump tank in a compressor group; and
- The release and ignition of the maximum potential quantity of hydrogen found at the Project Site.

It is important to note that the OCAs for the Project provide conservative evaluations for accidental hydrogen releases. The OCAs were performed following the methodology provided in the RMP guidance

(U.S. EPA 1999) and evaluated the total impact from a vapor cloud explosions generated from each release scenario. The following section provides further details of the vapor cloud explosion events examined for the worst case scenario event.

Worst Case Scenario – Vapor Cloud Explosion

Based on RMP guidance criteria (U.S. EPA 1999), the worst case scenario for a flammable substance such as hydrogen consists of a vapor cloud explosion (where the total quantity of hydrogen released is assumed to form a vapor cloud). The following characteristics of a vapor cloud explosion are assumed for the OCA.

- The entire hydrogen content is assumed to participate in the formation of a vapor cloud.
- Ten percent of the flammable vapors in the cloud will participate in the explosion.

The impact for this worst case scenario vapor cloud explosion is then measured by the distance from the source of the explosion to a 1 pound per square inch (psi) overpressure level.

The evaluation of a worst case scenario for a flammable substance presents the effects of the blast from a vapor cloud explosion as the most significant hazard from an accidental hydrogen release. The 1.0 psi overpressurization endpoint selected by the U.S. Environmental Protection Agency (EPA) provides an impact that may cause partial demolition of houses and can result in serious injuries to any population present within the area of impact.

Although a vapor cloud explosion presents the greatest potential impact from an accidental hydrogen release, its probability of occurrence is remote based on historical data. The release and scenario characteristics required to achieve a worst case scenario vapor cloud explosion are unlikely to present themselves. Figure 2.15-1 shows the necessary sequence of events for a vapor cloud explosion to occur.

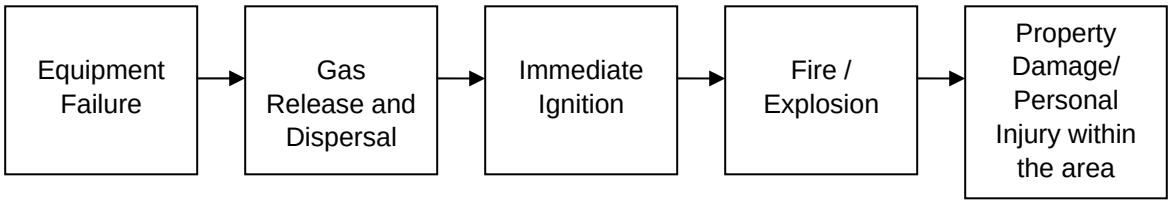

Figure 2.15-1. Hydrogen Gas Release Sequence

Hydrogen Release and Ignition Sequence of Events

When liquid hydrogen is released into the ambient conditions, the liquid hydrogen will spontaneously boil and its vapor will expand rapidly by a factor of 845 in volume as it warms to ambient temperature (Airproducts 2007). It is then mixed with air and forms a combustible gas cloud. The dispersion of the cloud is affected by wind speed and direction and can be influenced by atmospheric turbulence and nearby structures.

Since its minimum ignition energy in air at atmospheric pressure is about 0.2 millijoule (mJ) (Hattwig and Steen 2004), hydrogen gas is easily ignited by any ignition sources or even friction and static discharges.

The ignition is considered to be occurring almost spontaneously as the gas disperses in a plume. The flame will propagate through deflagration at subsonic speed relative to the unburned gas. Typical flame speeds (i.e. relative to a stationary observer) are from the order of 1 to 1000 meter per second (m/s) (GexCon 2003). Although the hydrogen cloud is colorless, water vapor clouds will form as a product of the combustion to indicate the rough contour of the flammable hydrogen clouds. A detonation (i.e. a supersonic combustion wave) can occur if the hydrogen and air mixture is within its explosion range and an appropriate ignition source is available. This does not occur in unconfined space unless high explosives or very strong shockwaves are present.

At the Project Site, hydrogen storage tanks are situated in an open area, the flame from an ignited release will propagate through a flammable hydrogen-air cloud and will burn within seconds. Flame acceleration will not occur unless the hydrogen cloud flows into a confined space, where the increasing temperature expands the gas and generates a turbulent flow of unburned gas. Under a confined space release situation, the unburned gas will increase the burning rate and cause high explosion pressures and eventually a detonation.

Historical Data Analysis

In order to properly evaluate the consequences of a potential hydrogen explosion at the Project Site, historical accident records of similar hydrogen storage systems are analyzed in this section. H_2 Incidents is an online database, supported by the United States Department of Energy (U.S. DOE), which serves as a voluntary reporting tool for all accidents involving hydrogen or hydrogen-related technologies. It is used as the primary sources of records as discussed below (U.S. DOE 2009).

There have been 140 hydrogen accidents reported between 1972 to the present time or an average of approximately 3.8 accidents per year. Of the 140 hydrogen-related accidents, 23 were liquid hydrogen-related, which are the focus of this study as a worst case scenario.

URS has reviewed the 23 accidents and found that there are several hazards that are commonly associated with liquid hydrogen accidents, ranging from respiratory ailment, component failure, ignition, and burning. Although a combination of hazards occurs in most instances, the typical release is attributed to leakage caused by defective seals or gaskets, valve misalignment, or failures of flanges or other equipment. According to the H_2 Incidents database, 78 percent of the accidents released an uncertain amount of hydrogen into the atmosphere, while 56 percent of those releases sparked an ignition. The causes of these accidental releases are categorized in Figure 2.15-2 below.

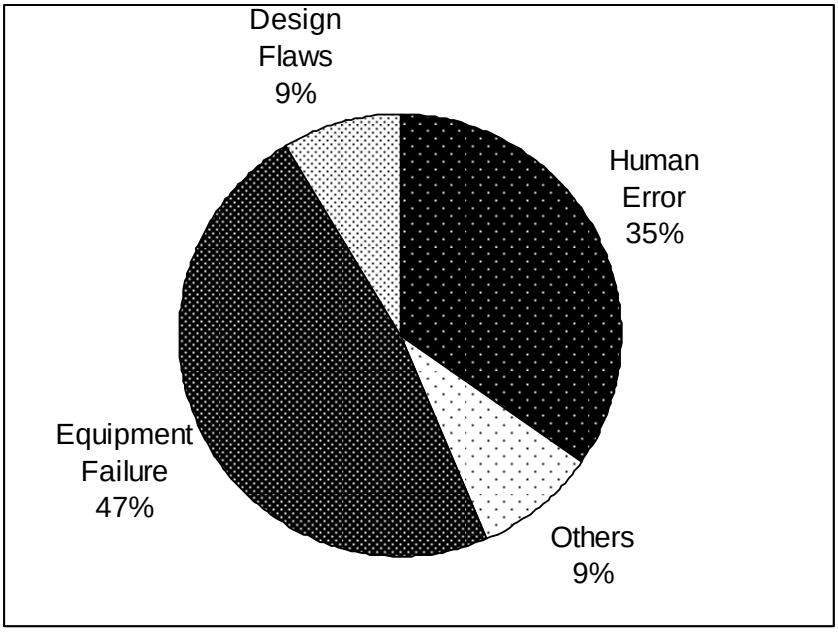

Figure 2.15-2. Contributing Causes of Hydrogen Release Accidents

It is found that 47 percent of these accidents are caused by equipment failure, such as valve malfunction and storage tank leakage. Human errors, mainly transportation accidents caused by drivers, constituted for 35 percent of the overall accident causes. It should be noted that most of these accidents can be prevented with better standard operating procedure protocols and operation awareness and training.

Offsite Consequence Analysis

The OCA evaluation conducted for the various scenarios was performed through the application of two methods: (1) EPA approved modeling program RMP*COMP; and (2) EPA RMP OCA Guidance (EPA 1999a, 1999b, 1999c) documents. The OCA evaluations for each scenario were conducted based on worst case scenario criteria, defined as a vapor cloud explosion event from each release. As mentioned earlier, the accidental release scenarios evaluated consist of: (1) the release and ignition of the entire contents of the hydrogen storage tank, (2) the release and ignition of the entire contents of one high pressure supply tank in a single compressor group, (3) the release and ignition of the entire contents of one low pressure dump tank in a single compressor group, (4) the release and ignition of the maximum potential quantity of hydrogen found at the Project Site. Further details regarding each scenario and its OCA evaluation are provided within the following subsections.

Release Scenarios

The accidental release scenarios below were considered in the analysis of the off-site consequence. The scenarios were evaluated based on EPA's RMP worst case scenario criteria discussed above.

Scenario 1: The content of one hydrogen storage tank (approximately 185 pounds) at the Project Site is instantaneously released into the atmosphere. The released hydrogen forms a vapor cloud and 10 percent of the flammable vapor in the cloud participates in the explosion.

Scenario 2: The hydrogen content of one high pressure supply tank (approximately 164 pounds) is instantaneously released into the atmosphere. The released hydrogen forms a vapor cloud and 10 percent of the flammable vapor in the cloud participates in the explosion.

Scenario 3: The hydrogen content of one low pressure dump tank (approximately 55 pounds) is instantaneously released into the atmosphere. The released hydrogen forms a vapor cloud and 10 percent of the flammable vapor in the cloud participates in the explosion.

Scenario 4: The maximum hydrogen quantity at the Project Site, i.e. the hydrogen storage tank, compressor groups, and surge tank groups, (approximately 28,400 pounds) is instantaneously released into the atmosphere. All of the released hydrogen forms a single vapor cloud and 10 percent of the flammable vapor in the cloud participates in the explosion.

As previously presented, the worst case scenario evaluations performed for each hypothetical scenario were applied to produce conservative results. Each of the scenarios provided above is unrealistic, due to their extremely low probability of occurrence. However, the evaluation of these scenarios under worst case criteria was performed by the Project to determine the furthest extent of impact from a release and ignition of hydrogen at the Project Site.

Methodology of Modeling

Two methods were used to evaluate the impact distances for the scenarios described above.

(1) RMP* COMP

RMP* COMP is an EPA recommended risk management program developed by the Office of Response and Restoration, National Ocean Service, National Oceanic and Atmospheric Administration (NOAA), and the EPA Office of Emergency Management. Based on the total release amount, the program models the potential impact from an accidental release by estimating the distance to endpoint according to EPA's recommended procedures in the offsite consequence analysis--both worst-case and alternative scenarios. By inputting the release amount and selecting the modeling scenario, the program will complete the calculation based on OCA Guidance and automatically generate the endpoint distance to 1.0 psi overpressure.

(2) RMP OCA Guidance

In the RMP OCA Guidance, the total quantity of hydrogen is assumed to form a vapor cloud. The entire cloud is assumed to be within the flammability limits, and the cloud is assumed to explode. Ten percent of the flammable vapor in the cloud is assumed to participate in the explosion. The effect is measured as the distance to the 1.0 psi overpressure level. This is determined using the following equation:

$$D = 0.0081\left(0.1\,W_f\,\frac{H_{Cf}}{H_{CTNT}}\right)^{1/3}$$

Where:

D = distance to overpressure of 1 psi (miles)

W_f = weight of flammable substance (pounds)

H_{Cf} = heat of combustion of flammable substance (kjoules/kilogram)

H_{CTNT} = heat of combustion of trinitrotoluene (4,600 kjoules/kilogram)

Evaluation Parameters

A vapor cloud explosion is used to model the hazard of explosion from a hydrogen release event. The following section explains the parameters used for each effect evaluation. Table 2.15-2 presents the parameters used, while Table 2.15-3 shows the scenarios used in the analysis.

Table 2.15-2
Chemical Physical Parameters

Chemical	H_c(1) (kjoules/kilogram)	Density(2) (lb/scf)	References
Hydrogen	119,950	0.0056	1, 2

Sources: 1 - EPA Risk Management Plan Off-site Consequence Analysis Guidance Exhibit C-2, Appendix C, 1999
2 Perry's Chemical Engineering Handbook 6th Edition, 1984.
Note:
H_c = Heat of Combustion
Density of hydrogen at standard conditions (i.e. 60°F, 14.696 psia)

Table 2.15-3
Scenario Definitions

Scenario	Source of Release	Approximate Volume (scf)	Total Mass (lbs)
1	Hydrogen Storage Tank	33,000	185
2	High Pressure SupplyTank in one Compressor Group	29,333	164
3	Low Pressure Dump Tank in one Compressor Group	9,900	55
4	Hydrogen Storage Tank & Compressor Groups (87 units) & Surge Tank Groups (30 units)	5,000,000	28,400

Analysis Results

The off-site consequence results are summarized in Table 2.15-4.

Table 2.15-4
Explosion Distance to Endpoint (overpressure of 1.0 psi)

Scenario	Volume (scf)	Chemical	Weight (lbs)	Modeling Endpoint Distance (miles)	Calculated Endpoint Distance (miles)
1	33,000	Hydrogen	185	0.06	0.06
2	29,333	Hydrogen	164	0.06	0.06
3	9,900	Hydrogen	55	0.04	0.04
4	5,000,000	Hydrogen	28,400	0.30	0.34

Note:
psi = pounds per square inch
scf = standard cubic feet

Conclusion

OCAs were performed using the EPA approved RMP*Comp modeling program and confirmed through RMP OCA Guidance calculations. The purpose of conducting these OCAs was to evaluate any potential offsite hazards that may occur from the storage and use of hydrogen at the Project Site. As described above, four separate accident scenarios were evaluated using worst-case scenario criteria. The distances from the point of release to each respective scenario endpoint are provided in Table 2.15-4.

As shown in Table 2.15-4, based on the OCA modeling, the maximum potential extent of impact in the event of a worst-case release from the largest vessel (hydrogen storage tank), as defined by the RMP OCA Guidance, would be equivalent to 0.06 mile. However, in the event of the worst case scenario induced from cumulative releases at the site, the maximum impacted distance is 0.3 mile. These distances are derived from an unrealistic hypothetical situation where all potential hydrogen present at the Project Site participates in a vapor cloud explosion.

Results from the OCA modeling demonstrated that an accidental release of hydrogen, under conservative worst-case scenario conditions, will not impact the public or environmental receptors in the vicinity of the site. From the evaluation of the four release scenarios explained above, the impact distance from the point of release to each respective scenario endpoint is estimated to range from 0.04 to 0.3 mile. Based on the location of the Project Site, the major portion of the impact derived from any of the analyzed scenarios shall not affect any sensitive receptors in the event of such a release at the Project Site. Additionally, the Project will provide fire protection measures to mitigate the impact from an accidental hydrogen release further reducing the overall area of impact.

2.15.3 Cumulative Impacts

No additional cumulative impacts to hazardous materials handling have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.15 of the Project AFC and Section 2.15 of the Supplement to the AFC are applicable to the proposed Project changes.

2.15.4 Mitigation Measures

The mitigation measures presented in Section 5.15 of the Project AFC are applicable to the proposed Project changes. **HAZMAT-7** from the Project AFC requires a Risk Management Potential Plan for hydrogen. Condition for Certification **HAZ-2** for the project would be expanded to include an RMP for hydrogen storage, as shown below. No additional mitigation measures are recommended based on the Project modifications.

"**HAZ-2** The project owner shall concurrently provide a Hazardous Materials Business Plan <u>and a Risk Management Plan (RMP)</u> to the Imperial County Department of Toxic Substances Control, BLM's authorized officer and the CPM for review. After receiving comments from the Imperial County, BLM's authorized officer and the CPM, the project owner shall reflect all received recommendations in the final documents. If no comments are received from the county within 30 days of submittal, the project owner may proceed with preparation of final documents upon receiving comments from BLM's authorized officer and the CPM. . Copies of the final Hazardous Materials Business Plan shall then be provided to the Imperial County Department of Toxic Substances Control for information and to the BLM's authorized officer and CPM for approval.

2.15.5 LORS Compliance

The LORS presented in Section 5.15 of the Project AFC and Section 2.15 of the June 2009 Supplement to the AFC are applicable to the revised Project.

The maximum amount of hydrogen that could be stored onsite within the hydrogen storage tank, high pressure supply tanks, low pressure dump tanks, compressor groups and high pressure surge tank groups, is estimated to be 28,400 pounds. Hydrogen is identified as a hazardous substance by both the California Accidental Release Prevention Program (CalARP) [19 CCR 2735 et seq.] and the federal Chemical Accident Prevention Provisions [40 CFR 68], based on its flammable characteristics. The regulatory requirements for the storage of hydrogen at the site are presented in Table 2.15-5 below:

Table 2.15-5
Regulatory Program Applicability

Hazardous Chemical	Federal RMP Threshold (lbs)	State CalARP Threshold (lbs)	Regulatory Program Applicability
Hydrogen	10,000	10,000	The Project will store approximately 28,400 lbs of hydrogen, which will not be subject to either state CalARP or federal RMP program enforcement.

Notes:
CalARP = California Accidental Release Prevention
CFR = Code of Federal Regulations
lbs = pounds
RMP = Risk Management Plan

As shown in Table 2.15-5, due to the maximum amount of hydrogen expected to be present at the Project Site, the Project will be subject to either state or federal requirements for the hydrogen storage.

2.15.6 References

AirProducts, *Liquid Hygroden Safety Sheet*. 2007, USA. http://www.airproducts.com/NR/rdonlyres/780E8A00-F1BF-435C-8219-6601DA6632F0/0/safetygram9.pdf (Accessed on June 3, 2009.)

GexCon. *Gas Explosion Handbook*. 2003, Sweden. http://www.gexcon.com/ (Accessed on June 3, 2009).

Hattwig, Martin and Steen, Henrikus. *Handbook of Explosion Prevention and Protection*. 2004.

U.S. Department of Energy, Pacific Northwest National Laboratory. *H2 Incidents*. http://h2incidents.org/ (Accessed on June 3, 2009.)

U.S. Environmental Protection Agency Risk Management Program Guidance for Offsite Consequence Analysis Guidance (April 1999).

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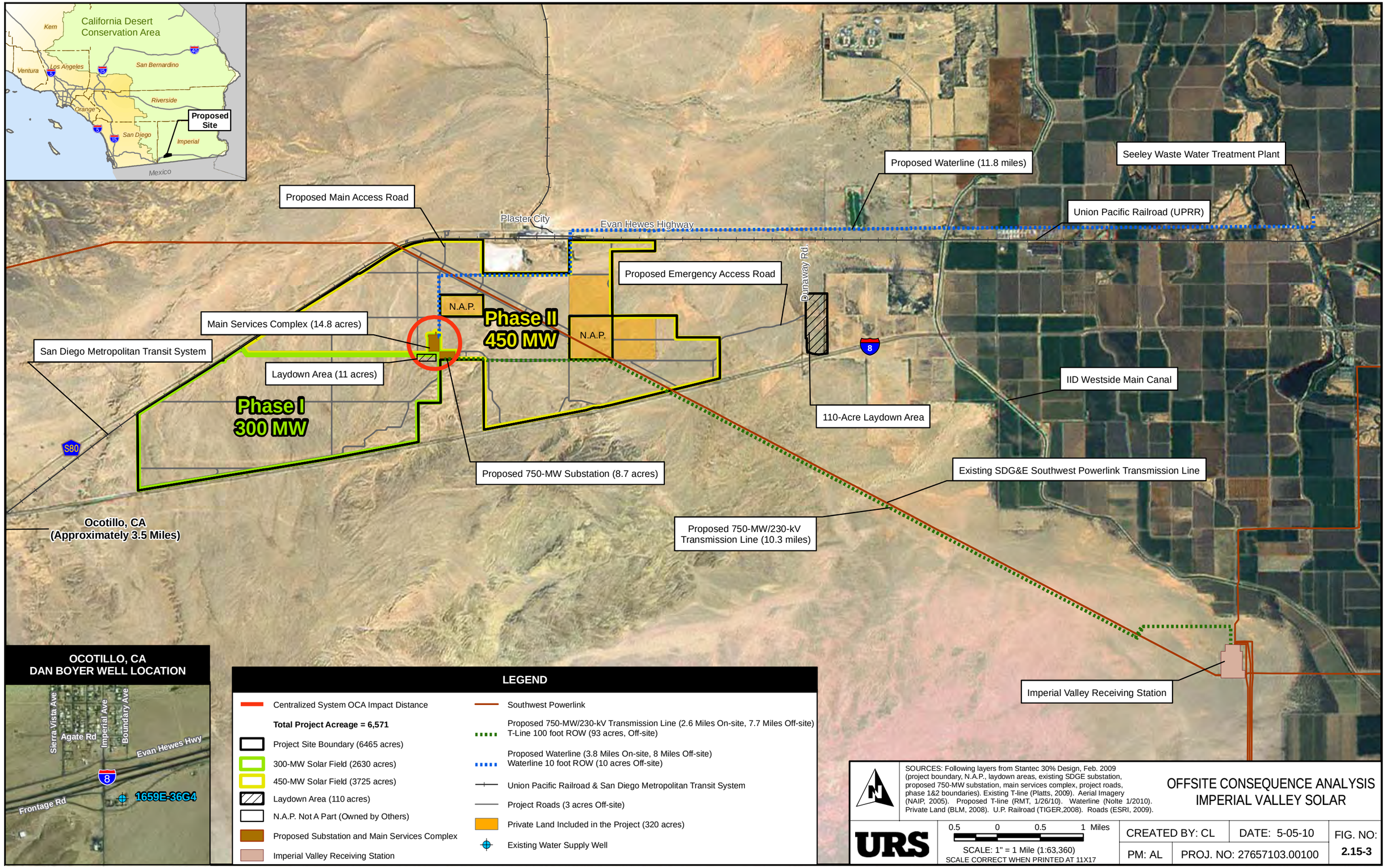

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2.16 PUBLIC HEALTH AND SAFETY

This section presents a discussion of the potential impacts related to public health and safety from the modifications to the transmission line and waterline alignments, the use of an alternative water supply and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.16.1 Affected Environment

The affected environment for public health and safety was originally discussed in Section 5.16.1 of the AFC and section 2.16 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.16.2 Environmental Consequences

The environmental consequences for public health and safety during Project construction and operation remain unchanged from the AFC section 5.16, as supplemented in June 2009.

2.16.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line alignment are not significant changes with regard to public health and safety considerations. The transmission alignment modifications will result in minor changes that do not create additional construction or operation related impacts to public health and safety beyond those presented in Section 5.16 of the Project AFC, as supplemented in June 2009.

2.16.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to public health and safety considerations. The waterline alignment modifications will result in minor changes that do not create additional construction or operation related impacts to public health and safety beyond those presented in Section 5.16 of the Project AFC, as supplemented in June 2009.

2.16.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to public health and safety considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to public health and safety beyond those presented in Section 5.16 of the Project AFC, as supplemented in June 2009.

2.16.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to public health and safety considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to public health and safety beyond those presented in Section 5.16 of the Project AFC, as supplemented in June 2009.

2.16.3 Cumulative Impacts

No additional cumulative impacts to public health and safety have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.16 of the Project AFC and Section 2.16 of the Supplement to the AFC are applicable to the proposed Project changes.

2.16.4 Mitigation Measures

The mitigation measures presented in Section 5.16 of the Project AFC and Section 2.16 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.16.5 LORS Compliance

The LORS presented in Section 5.16 of the Project AFC and Section 2.16 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.16 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.16 of the Project.

2.16.6 References

No additional references beyond those presented in Section 5.16 of the Project AFC and Section 2.16 of the Supplement to the AFC were used for this supplemental analysis.

2.17 WORKER SAFETY

This section presents a discussion of the potential impacts related to worker safety from the modifications to the transmission line and waterline alignments, the use of an alternative water supply, and modifications to onsite hydrogen storage.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.17.1 Affected Environment

The affected environment for worker safety was originally discussed in Section 5.17.1 of the AFC and section 2.17 of the Supplement to the AFC, submitted in June 2009. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, the use of an alternative water supply, and modifications to onsite hydrogen storage is unchanged from that presented in the AFC and its June 2009 Supplement.

2.17.2 Environmental Consequences

The environmental consequences for worker safety during Project construction and operation remain unchanged from the AFC section 5.17, as supplemented in June 2009.

2.17.2.1 Transmission Line Alignment Modifications

The minor modifications to the transmission line are not significant changes with regard to worker safety considerations. The transmission line alignment modifications will result in minor changes that do not create additional construction or operation related impacts to worker safety beyond those presented in Section 5.17 of the Project AFC, as supplemented in June 2009.

2.17.2.2 Waterline Alignment Modifications

The minor modifications to the waterline alignment are not significant changes with regard to worker safety considerations. The alignment modifications will result in minor changes that do not create additional construction or operation related impacts to worker safety beyond those presented in Section 5.17 of the Project AFC, as supplemented in June 2009.

2.17.2.3 Alternative Water Supply

The use of the Ocotillo alternative water supply is not a significant change with regard to worker safety considerations. The alternative water supply and associated activities will result in minor changes that do not create additional construction or operation related impacts to worker safety beyond those presented in Section 5.17 of the Project AFC, as supplemented in June 2009.

2.17.2.4 Hydrogen Storage Modifications

The modifications to onsite hydrogen storage are not significant changes with regard to worker safety considerations. The modifications will result in minor changes that do not create additional construction or operation related impacts to worker safety beyond those presented in Section 5.17 of the Project AFC, as supplemented in June 2009.

2.17.3 Cumulative Impacts

No additional cumulative impacts to worker safety have been identified as part of this supplemental analysis. Cumulative impacts discussed in Section 5.17 of the Project AFC and Section 2.17 of the Supplement to the AFC are applicable to the proposed Project changes.

2.17.4 Mitigation Measures

The mitigation measures presented in Section 5.17 of the Project AFC and Section 2.17 of the June 2009 Supplement to the AFC are applicable to the proposed Project changes. No additional mitigation measures are recommended based on the Project modifications.

2.17.5 LORS Compliance

The LORS presented in Section 5.17 of the Project AFC and Section 2.17 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.17 of the Project AFC are unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.17 of the Project.

2.17.6 References

No additional references beyond those presented in Section 5.17 of the Project AFC and Section 2.17 of the Supplement to the AFC were used for this supplemental analysis.

2.18 CUMULATIVE IMPACTS

This section presents a discussion of the potential cumulative impacts from the modifications to the transmission line and waterline alignments, and the use of an alternative water supply.

2.18.1 Affected Environment

The affected environment for Cumulative Impacts was originally discussed in Section 5.18 of the AFC and section 2.18 of the Supplement to the AFC, submitted in June 2009.. The affected environment resulting from the transmission line alignment modifications, the waterline alignment modifications, and the use of an alternative water supply is unchanged from that presented in the AFC.

2.18.2 Environmental Consequences

The Cumulative Impacts during Project construction and operation remain unchanged from the AFC section 5.18.1, as supplemented in June 2009. The minor modifications to the transmission line and water line alignments, the use of the alternative water supply and the modifications to onsite hydrogen storage, are not significant changes with regard to cumulative impacts and do not create additional construction or operation related cumulative impacts beyond those presented in Section 5.18 of the Project AFC, as supplemented in June 2009.

2.18.3 Mitigation Measures

No additional mitigation measures beyond those presented in Section 5.18 of the Project AFC and Section 2.18 of the June 2009 Supplement to the AFC are recommended based on the Project modifications.

2.18.4 LORS Compliance

The LORS presented in Section 5.18 of the Project AFC and Section 2.18 of the June 2009 Supplement to the AFC are applicable to the revised Project and no additional LORS are recommended beyond those included in the preceding sections. The Project, including the changes discussed herein, will comply with all LORS.

2.18.5 References

No additional references beyond those presented in Section 5.18 of the Project AFC and Section 2.18 of the Supplement to the AFC were used for this supplemental analysis.

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March 26, 2010

Richard Knox
Project Manager
Tessera Solar
4800 N. Scottsdale Road, Suite 5500
Scottsdale, AZ 85251

Dear Mr. Knox:

It is my understanding that Tessera Solar is in the process of developing a solar facility known as Imperial Valley Solar (formerly known as SES Solar Two). The project is located approximately five miles east of Ocotillo, California.

This letter is to confirm that Dan Boyer Water Company will temporarily furnish well water to Imperial Valley Solar upon execution of an agreement. Well water will be used temporarily until the time that the project's permanent primary source of reclaimed water from the Seeley Wastewater Treatment Facility (SWWTF) is available. The project would be expected to require the alternate water source for approximately six to 11 months.

Dan Boyer Water Company is a private water purveyor located at 1108 Imperial Avenue, Ocotillo, California 92259. It operates state well #16S/9E-36G4 with a current permitted pumping rate of 40 acre-feet per year (afy). The well is permitted to extract water for construction and personal usage. Historically, the well has typically extracted between 120 and 132 afy for uses such as construction, dust control, and personal use.

This will serve letter is contingent upon the execution of a formal agreement between Dan Boyer Water Company and Imperial Valley Solar, LLC. We look forward to working with the Imperial Valley Solar project.

Sincerely,

Dan Boyer 3-26-10

Dan Boyer
Owner, Dan Boyer Water Company

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Appendix B-1
Construction Emissions
(March 31, 2010 rev.)

Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	16.81	15.48	246.02	48.11	277.35	0.26
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.34	1.20	18.96	5.30	22.12	0.03
Worker Vehicles	0.02	0.01	3.28	0.31	0.31	0.003
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Delivery Trucks from Westwind Well	0.146	0.131	1.061	0.497	2.366	0.003
SunCatcher Delivery Trucks	0.77	0.69	5.63	2.64	12.56	0.01
Subtotal of On-site Combustion Emissions	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**
On-Site Fugitive Emissions						
Construction Equipment	29.37	6.80				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	150.06	19.64				
Worker Vehicles	2.84	0.38				
Security Vehicles	3.90	0.54				
Water Delivery Trucks from Westwind Well	8.25	1.23				
SunCatcher Delivery Trucks	57.46	8.56				
Subtotal of On-Site Fugitive Emissions	**251.87**	**37.14**				
Subtotal of On-Site Emissions	**270.97**	**54.67**	**275.73**	**56.88**	**314.71**	**0.31**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.001
Worker Vehicles	1.22	0.63	225.86	9.04	26.65	0.13
Water Delivery Trucks from Westwind Well	0.18	0.15	0.96	0.21	4.67	0.01
SunCatcher Delivery Trucks	5.63	4.80	30.41	6.59	148.51	0.16
Subtotal of Off-Site Combustion Emissions	**7.04**	**5.59**	**258.76**	**15.90**	**180.40**	**0.29**
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	41.39	0.70				
Water Delivery Trucks from Westwind Well	10.58	1.55				
SunCatcher Delivery Trucks	130.86	18.32				
Subtotal of Off-Site Fugitive Emissions	**185.12**	**20.90**				
Subtotal of Off-Site Emissions	**192.15**	**26.48**	**258.76**	**15.90**	**180.40**	**0.29**
Total Maximum Daily Emissions	**463.12**	**81.16**	**534.49**	**72.78**	**495.12**	**0.60**

Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	2.24	2.07	32.25	6.56	34.58	0.03
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.223	0.199	3.278	0.891	3.679	0.005
Worker Vehicles	0.002	0.002	0.420	0.039	0.039	0.000
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Delivery Trucks from Westwind Well	0.026	0.024	0.191	0.089	0.426	0.000
SunCatcher Delivery Trucks	0.113	0.102	0.824	0.386	1.839	0.002
Subtotal of On-site Combustion Emissions	**2.61**	**2.39**	**37.10**	**7.97**	**40.56**	**0.04**
On-Site Fugitive Dust Emissions						
Construction Equipment	4.52	0.96				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	23.19	3.08				
Worker Vehicles	0.36	0.05				
Security Vehicles	0.70	0.10				
Water Delivery Trucks from Westwind Well	1.48	0.22				
SunCatcher Delivery Trucks	7.58	1.13				
Subtotal of On-Site Fugitive Emissions	**37.84**	**5.54**				
Subtotal of On-Site Emissions	**40.45**	**7.93**	**37.10**	**7.97**	**40.56**	**0.04**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.28	0.01	0.10	0.00
Worker Vehicles	0.16	0.08	28.86	1.15	3.40	0.02
Water Delivery Trucks from Westwind Well	0.03	0.03	0.17	0.04	0.84	0.00
SunCatcher Delivery Trucks	0.86	0.73	4.64	1.01	22.65	0.02
Subtotal of Off-Site Combustion Emissions	**1.05**	**0.84**	**33.94**	**2.21**	**27.00**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.41	0.06				
Worker Vehicles	5.29	0.09				
Water Delivery Trucks from Westwind Well	1.90	0.28				
SunCatcher Delivery Trucks	13.23	1.79				
Subtotal of Off-Site Fugitive Emissions	**20.83**	**2.21**				
Subtotal of Off-Site Emissions	**21.88**	**3.05**	**33.94**	**2.21**	**27.00**	**0.04**
Total Maximum Annual Emissions	**62.33**	**10.98**	**71.04**	**10.18**	**67.56**	**0.08**

Estimated Annual Maximum Construction Greenhouse Gases Emissions
(metric tonnes/year)

Activity	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	2,863.47	1.01	-	2,884.64
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	449.56	0.01	0.01	454.04
Worker Vehicles	31.46	0.00	0.00	32.18
Security Vehicles	19.36	0.00	0.00	20.53
Water Delivery Trucks from Westwind Well	44.40	0.00	0.00	44.64
SunCatcher Delivery Trucks	191.65	0.00	0.00	192.67
Subtotal of On-site Combustion Emissions	**3,599.92**	**1.03**	**0.02**	**3,628.70**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Water Delivery Trucks from Westwind Well				
SunCatcher Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**3,599.92**	**1.03**	**0.02**	**3,628.70**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	10.03	0.00	0.00	11.43
Worker Vehicles	1,730.96	0.24	0.29	1,827.15
Water Delivery Trucks from Westwind Well	85.93	0.00	0.00	86.79
SunCatcher Delivery Trucks	2,316.49	0.08	0.07	2,339.73
Subtotal of Off-Site Combustion Emissions	**4,143.41**	**0.33**	**0.37**	**4,265.09**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Water Delivery Trucks from Westwind Well				
SunCatcher Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**4,143.41**	**0.33**	**0.37**	**4,265.09**
Total Maximum Annual Emissions	**7,743.33**	**1.36**	**0.39**	**7,893.79**

CO_2	CH_4	N_2O	CO_2e
3156.44	1.11	0.00	3179.77
495.557	0.014	0.015	500.488
34.680	0.002	0.002	35.476
21.346	0.003	0.004	22.631
48.946	0.001	0.001	49.205
211.262	0.004	0.003	212.381
3968.23	**1.13**	**0.03**	**3999.96**
3968.23	**1.13**	**0.03**	**3999.96**
11.06	0.00	0.00	12.60
1908.06	0.27	0.32	2014.08
94.72	0.00	0.00	95.67
2553.49	0.09	0.08	2579.11
4567.33	**0.37**	**0.41**	**4701.46**
4567.33	**0.37**	**0.41**	**4701.46**
8535.56	**1.50**	**0.43**	**8701.41**

Estimated Entire Construction Period Emissions of GHG Pollutants (tons)

Activity	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	5446.19	2.26	0.00	5493.62
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1225.542	0.034	0.037	1237.716
Worker Vehicles	81.644	0.005	0.006	83.516
Security Vehicles	71.153	0.011	0.013	75.438
Water Well Trucks	163.153	0.003	0.003	164.017
Suncatcher Delivery Trucks	674.679	0.013	0.011	678.251
Subtotal of On-site Combustion Emissions	**7662.36**	**2.32**	**0.07**	**7732.56**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Water Well Trucks				
Suncatcher Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**7662.36**	**2.32**	**0.07**	**7732.56**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	49.38	0.01	0.01	52.83
Worker Vehicles	4491.92	0.64	0.76	4741.52
Water Well Trucks	315.74	0.01	0.01	318.90
Suncatcher Delivery Trucks	8241.16	0.30	0.25	8323.83
Subtotal of Off-Site Combustion Emissions	**13098.20**	**0.95**	**1.03**	**13437.08**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Water Well Trucks				
Suncatcher Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**13098.20**	**0.95**	**1.03**	**13437.08**
Total Entire Construction Period Emissions	**20760.55**	**3.27**	**1.10**	**21169.63**

Estimated Entire Construction Period Greenhouse Gases Emissions
(metric tonnes)

Activity	CO_2	CH_4	N_2O	CO_2e
On-Site Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment	4,940.70	2.05	-	4,983.73
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1,111.79	0.03	0.03	1,122.84
Worker Vehicles	74.07	0.00	0.01	75.76
Security Vehicles	64.55	0.01	0.01	68.44
Water Delivery Trucks from Westwind Well	148.01	0.00	0.00	148.79
SunCatcher Delivery Trucks	612.06	0.01	0.01	615.30
Subtotal of On-site Combustion Emissions	**6,951.17**	**2.11**	**0.06**	**7,014.86**
On-Site Fugitive Dust Emissions				
Construction Equipment				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Security Vehicles				
Water Well Trucks				
SunCatcher Delivery Trucks				
Subtotal of On-Site Fugitive Emissions				
Subtotal of On-Site Emissions	**6,951.17**	**2.11**	**0.06**	**7,014.86**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	44.80	0.01	0.01	47.92
Worker Vehicles	4,075.00	0.58	0.69	4,301.43
Water Delivery Trucks from Westwind Well	286.43	0.01	0.01	289.30
SunCatcher Delivery Trucks	7,476.25	0.27	0.22	7,551.25
Subtotal of Off-Site Combustion Emissions	**11,882.48**	**0.86**	**0.93**	**12,189.91**
Off-Site Paved Road Fugitive Emissions				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)				
Worker Vehicles				
Water Delivery Trucks from Westwind Well				
SunCatcher Delivery Trucks				
Subtotal of Off-Site Fugitive Emissions				
Subtotal of Off-Site Emissions	**11,882.48**	**0.86**	**0.93**	**12,189.91**
Total Entire Construction Period Emissions	**18,833.66**	**2.97**	**1.00**	**19,204.77**

Estimated Annual Maximum Construction Emissions of Greenhouse Gases by Fuel Type

Fuel Type	Annual Maximum CO_2 Emissions (tons/year)	Emission Factor (lb CO_2 /gallon fuel)	Annual Maximum Fuel Usage (gallons/year)
On-site			
Gasoline	103	19.42	10,613
Diesel (Distillate Fuel #1,2&4))	3,519	22.38	314,484
Propane	347	12.65	54,773
Off-site			
Gasoline	1,881	19.42	193,686
Diesel (Distillate Fuel #1,2&4))	2,686	22.38	240,102
Propane	-	12.65	-
Total			
Gasoline	1,984	19.42	204,300
Diesel (Distillate Fuel #1,2&4))	6,205	22.38	554,586
Propane	347	12.65	54,773

Notes:

1. Assumed 2% of worker passenger vehicles CO_2 emissions are from burning diesel; the rest of them from burning gasoline.
2. Greenhouse gas emission factor from CCAR General Reporting Protocol April 2008 Table C.4.

Entire Construction Period Emissions of Greenhouse Gases by Fuel

Fuel Type	Entire Construction Period CO_2 Emissions (tons)	Emission Factor (lb CO_2 /gallon fuel)	Entire Construction Period Fuel Usage (gallons)
On-site			
Gasoline	250	19.42	25,738
Diesel (Distillate Fuel #1,2&4))	6,510	22.38	581,851
Propane	902	12.65	142,619
Off-site			
Gasoline	4,425	19.42	455,649
Diesel (Distillate Fuel #1,2&4))	8,673	22.38	775,194
Propane	-	12.65	-
Total			
Gasoline	4,675	19.42	481,387
Diesel (Distillate Fuel #1,2&4))	15,183	22.38	1,357,045
Propane	902	12.65	142,619

Notes:

1. Assumed 2% of worker passenger vehicles CO_2 emissions are from burning diesel; the
2. Greenhouse gas emission factor from CCAR General Reporting Protocol April 2008

Construction Trade Projection (750 MW)

Discipline	Hours	Month After Construction Start																																														Highest Per Day Requirement by Solar Two During Project	El Centro Total Available for the Project
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
Carpenters	83,472	10	14	31	31	31	43	47	40	36	28	28	28	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	47	80
Concrete Crews	81,008	9	15	29	29	29	46	46	42	36	24	24	24	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	46	140
Electricians	212,010	17	28	57	57	57	84	84	60	54	54	54	54	69	69	113	105	105	88	48	48	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	0	0	0	0	0	113	210
Ironworkers	100,330	19	23	41	41	41	44	48	36	32	24	24	24	36	26	26	25	25	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	48	130
Laborers	153,557	17	43	65	62	62	142	142	68	30	30	30	30	56	41	51	46	46	32	22	17	17	17	17	17	17	17	17	10	10	10	10	10	10	10	10	0	0	0	0	0	142	540
Miscellaneous Crews	10,000	0	0	0	0	0	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	630
Operators	205,183	25	82	93	75	75	86	86	72	59	51	51	51	84	88	67	61	52	34	34	27	26	25	25	25	25	25	25	2	2	2	2	2	2	2	2	1	1	1	1	0	88	190
Plumbers	25,040	0	5	9	9	9	22	26	26	22	14	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	100
Solar Two Technicians	145,920	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Assemblers	371,200	0	0	0	0	0	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	N/A
SunCatcher Electricians	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Ironworkers	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Laborers	58,880	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Material Handlers	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Operators	29,440	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	N/A
SunCatcher Teamsters	44,160	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	N/A
SunCatcher Technicians	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
Teamsters	65,160	4	60	49	24	24	25	25	7	5	5	5	5	31	53	29	28	26	24	24	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	0	60	680
Technicians	3,504	0	0	0	0	0	5	5	5	5	5	5	5	5	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	60
Totals	**2,145,663**	**101**	**270**	**374**	**328**	**328**	**719**	**731**	**578**	**501**	**457**	**457**	**457**	**535**	**512**	**521**	**498**	**487**	**420**	**370**	**339**	**314**	**312**	**312**	**312**	**312**	**312**	**312**	**249**	**249**	**249**	**249**	**249**	**285**	**285**	**285**	**230**	**230**	**230**	**230**	**228**	**813**	**2,760**

Source: Bureau of Labor Statistics, 2008.

Note:

N/A = not applicable

14417 total personnel for 40 months
360 avg monthly personnel
731 max monthly personnel

Construction Equipment Projection (750 MW)
Revised Table 5.2-19

Month After Construction Start

Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	1-12	2-13	3-14	4-15	5-16	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26	16-27	17-28	18-29	19-30	20-31	21-32	22-33	23-34	24-35	25-36	26-37	27-38	28-39	29-40	1-40 (entire construction)
Air Compressor	50	X			1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	1	1																							24	25	26	27	28	26	24	21	18	16	14	12	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	34
Asphalt Paver	120	X				1																																							1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe	120	X			3	9	5	5	5	6	6	5	4	4	4	4	4	4	4	4	1	1	1																						60	61	56	55	54	50	45	40	35	31	27	23	19	15	11	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	79
Compactor	120	X			1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2																									34	36	35	34	33	30	27	24	21	18	15	12	9	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Crane small	175	X			1	3	4	5	5	8	8	8	7	6	6	6	8	8	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	67	74	79	81	81	81	77	73	69	66	64	62	60	56	52	50	49	48	48	48	48	48	48	48	48	48	48	48	48	48	191
Crane large	500	X						3	3	3	1													3	3	3	3	3																	10	10	10	10	7	4	1	0	3	6	9	12	15	15	15	15	15	15	15	12	9	6	3	0	0	0	0	0	0	25
Dozer	250	X			1	1	1	1	1	1	1	1	1				1	1	1	1																									9	9	9	9	9	8	7	6	5	4	4	4	4	3	2	1	0	0	0	0	0	0	6	0	0	0	0	0	0	13
Generator	50	X			1	1	1	2	2	4	4	4	6	6	6	6	3	3	3	3	3	2	2	2	2	2	1	1	1																43	45	47	49	50	51	49	47	45	41	37	32	27	25	22	19	16	13	11	9	7	5	3	2	1	0	0	0	0	71
Grader	175	X			1	3	3	3	3	3	2	2	1				2	2	1	1																									21	22	21	19	17	14	11	9	7	6	6	6	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Light Tower	50	X						1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1																			17	19	21	23	24	23	22	21	20	19	17	15	13	11	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	30
Loader	250	X			1	3	3	4	4	4	3	3	2	1	1	1	3	3	3	2	1																							30	32	32	32	30	27	23	20	17	15	14	13	12	9	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
Maxi Sneeker (Trencher)	50	X				2	2	2	2	5	5	4	4	4	4	4	5	5	5	5	5	2	2	1																				38	43	46	49	52	55	52	49	46	42	38	34	30	25	20	15	10	5	3	1	0	0	0	0	0	0	0	0	0	0	0	68
Skid Steer (Bobcat)	50	X				1	1	2	2	4	3	3	2	2	2	2	4	4	4	4	4																							24	28	31	34	36	38	34	31	28	26	24	22	20	16	12	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Welding Machine	50	X				1	2	3	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1																					37	40	42	43	42	39	36	33	29	25	21	17	14	11	8	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	51
Equipment fueled with Propane																		

CONSTRUCTION VEHICLES REQUIREMENTS

Description	Activity	Make / Model	Fuel	Quantity	Frequency	Horse-power	Vehicle Weight (tons)	Max Daily Onsite Distance per Vehicle (mile/day)	Assumed distance percentage to drive on onsite sealed roads	Assumed distance percentage to drive on onsite unpaved roads	Assumed distance percentage to drive on onsite paved roads	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Travel to and from
Busses	Shuttle between laydown area and main construction area	Bus	Gasoline	variable	Daily	175	12	12	0%	0%	100%	10	Laydown area
Concrete Pump Truck			Diesel	variable	Daily	250	20	6	0%	8%	82%	40	El Centro
Dump Truck			Diesel	variable	Daily	250	20	7	50%	50%	0%	0	on-site only
Flatbed Truck			Diesel	variable	Daily	250	10	28	100%	0%	0%	0	on-site only
Staff & Security Truck	Site Inspections & Security	Toyota Highlander or similar	Gasoline - Hybrid	5	Daily	187	2.25	33	100%	0%	0%	0	on-site only
Pickup Truck			Gasoline	variable	Daily	175	4	12	95%	5%	0%	0	on-site only
Water /Soiltac Truck			Diesel	variable	Daily	250	20	12	25%	75%	0%	0	on-site only
Worker Passenger Vehicles	Community to Work	Passenger vehicles	Gasoline & diesel	variable	Daily	100	2	0.3	100%	0%	0%	40	El Centro
General Construction Materials	Delivery trucks	transport truck	Diesel	variable	Daily	250	20	6	0%	0%	100%	100	Various locations
Suncatcher Delivery Trucks	Suncatcher Pedestals	transport truck	Diesel	variable	Daily	250	20	13	55%	0%	45%	240	Phoenix Area
	Stirling Engines	transport truck	Diesel	5	Daily	250	20	6	0%	0%	100%	50	Detroit
	Suncatcher Metal Supports	transport truck	Diesel	10	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Suncatcher Mirrors	transport truck	Diesel	6	Daily	250	20	6	0%	0%	100%	50	Detroit
	Electrical and Control Systems	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Azimuth and Elevation Drive	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	50	Midwest
Water Delivery Trucks from Westwind Well	All onsite water will be delivered by truck	7000 gal truck	Diesel	1	Daily	250	18.6	39	0%	0%	100%	143	Westwind Well, Ocotillo

Note:

Vehicles with variable quantities, the quantity per month can be found in Table 5.2-19 Construction Equipment Projection
Deliveries coming from Midwest (Detroit and elsewhere) will travel by rail to Los Angeles then by transport truck to the site
Average distance from main service complex to center of east or west portion of the site is 3.5 miles thus the average round trip distance each maintenance vehicle travels is 7 miles
Bus circuit is 11 miles (6 miles onsite, 5 miles offsite) - each bus does this loop twice a day
East access road will be heavily sealed and is 3.5 miles, the sealant will be applied in sufficient quantity that the road can be washed as needed. Thus this road will be considered the same as the paved northern access road for emissions estimates.
North access road and MSC parking area will be paved, route is 1.5 miles
All deliveries will travel an onsite loop starting near east laydown area traveling to the MSC then to the north exit, the loop will consist of 3.5 miles eastern access road + 1 (delivery area) miles + 1.5 miles
Construction laydown area is sealed
Each flatbed truck is assumed to make 4 trips per day to SunCatcher instalation locations delivering assembled dishes and misc parts
The Water Delivery Trucks from Westwind Well is assumed to make 13 round trips per day from Ocotillo Westwind well.
The fenceline perimeter is approximately 20.5 miles. Each security vehicle is assumed to travel from the MSC around the perimeter plus one trip to the center of the site and back (plus 10% for misc trips) = 33 m

Annual Onsite Combustion Emissions

Maximum annual construction equipment activity occurs in months 4-15.

Construction Assumptions - 30 days per month

			Emission rate per piece of equipment (lb/hr)										Annual Emissions (ton/year)										Number of Vehicles (entire construction period)	entire construction period emissions (ton)									
Equipment	Number of Vehicles per year	Hours/Day	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
Air Compressor	27	6	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.000	22.478	0.06	0.06	0.66	0.28	0.56	0.00	51.91	0.03	0.00	52.44	34	0.08	0.07	0.83	0.35	0.71	0.00	65.37	0.03	0.00	66.03
Asphalt Paver	0	7	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.000	54.706	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.01	0.01	0.05	0.02	0.09	0.00	6.08	0.00	0.00	6.11
Backhoe	55	7	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.000	51.869	0.30	0.28	1.99	0.54	3.30	0.00	281.41	0.05	0.00	282.43	79	0.43	0.40	2.86	0.78	4.74	0.00	404.20	0.07	0.00	405.67
Compactor	34	7	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.000	59.178	0.23	0.21	1.45	0.44	2.66	0.00	201.98	0.04	0.00	202.81	43	0.29	0.27	1.83	0.55	3.37	0.00	255.45	0.05	0.00	256.50
Crane small	81	5	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.000	80.514	0.35	0.32	3.07	0.80	6.17	0.01	503.26	0.07	0.00	504.77	191	0.83	0.77	7.24	1.88	14.54	0.01	1186.70	0.17	0.00	1190.27
Crane large	10	7	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.000	180.302	0.07	0.07	0.74	0.20	1.94	0.00	185.70	0.02	0.00	186.07	25	0.19	0.17	1.85	0.49	4.84	0.00	464.24	0.04	0.00	465.18
Dozer	9	8	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.000	166.390	0.09	0.08	0.63	0.22	2.13	0.00	172.09	0.02	0.00	172.51	13	0.12	0.11	0.90	0.32	3.07	0.00	248.58	0.03	0.00	249.19
Generator	49	9	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.000	30.815	0.19	0.18	1.92	0.76	2.02	0.00	199.69	0.07	0.00	201.12	71	0.28	0.25	2.78	1.10	2.93	0.00	289.35	0.10	0.00	291.43
Grader	19	7	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.000	124.159	0.17	0.16	1.55	0.38	3.00	0.00	258.29	0.03	0.00	259.02	27	0.24	0.22	2.20	0.55	4.26	0.00	367.05	0.05	0.00	368.08
Light Tower	23	9	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.000	28.179	0.09	0.08	0.98	0.37	0.91	0.00	90.30	0.03	0.00	91.00	30	0.12	0.11	1.28	0.48	1.19	0.00	117.79	0.04	0.00	118.69
Loader	32	7	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.000	149.142	0.19	0.17	1.40	0.50	5.17	0.01	471.53	0.05	0.00	472.48	42	0.25	0.23	1.84	0.66	6.78	0.01	618.89	0.06	0.00	620.13
Maxi Sneeker (Trencher)	49	9	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.000	33.253	0.28	0.26	2.95	1.27	2.42	0.00	217.56	0.12	0.00	219.97	68	0.39	0.36	4.09	1.77	3.36	0.00	301.91	0.16	0.00	305.27
Skid Steer (Bobcat)	34	7	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.000	25.665	0.08	0.07	0.88	0.30	0.84	0.00	85.82	0.03	0.00	86.39	44	0.10	0.10	1.14	0.39	1.09	0.00	111.06	0.04	0.00	111.80
Welding Machine	43	5	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.000	26.175	0.10	0.09	1.06	0.44	0.96	0.00	90.33	0.04	0.00	91.17	51	0.12	0.11	1.26	0.52	1.13	0.00	107.14	0.05	0.00	108.13
Equipment fueled with Propane	0																																
Aerial Lift	48	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	5.60	0.02	0.88	0.00	124.14	0.19	0.00	128.13	137	0.03	0.03	15.99	0.06	2.52	0.00	354.31	0.54	0.00	365.70
Fork Lift	93	4	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.859	0.01	0.01	1.47	0.02	0.69	0.00	91.88	0.13	0.00	94.71	186	0.02	0.02	2.95	0.03	1.38	0.00	183.75	0.27	0.00	189.42
Telehandler	43	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	5.89	0.02	0.93	0.00	130.55	0.20	0.00	134.74	120	0.03	0.03	16.45	0.07	2.59	0.00	364.32	0.56	0.00	376.03
Vehicles with Onroad Engines for Emissions Estimates																																	
Busses	72	12	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.826	0.00	0.00	1.20	0.10	0.09	0.00	47.74	0.00	0.01	49.58	149	0.00	0.00	2.48	0.21	0.19	0.00	98.79	0.01	0.01	102.60
Concrete Pump Truck	0	12	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.505	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.03	0.01	0.07	0.00	7.53	0.00	0.00	7.57
Dump Truck	28	12	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.089	0.01	0.01	0.08	0.04	0.18	0.00	20.50	0.00	0.00	20.61	46	0.02	0.02	0.13	0.06	0.29	0.00	33.68	0.00	0.00	33.85
Flatbed Truck	108	12	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.355	0.17	0.15	1.23	0.58	2.75	0.00	316.27	0.01	0.00	317.94	266	0.42	0.37	3.04	1.42	6.78	0.01	778.95	0.01	0.01	783.08
Staff & Security Truck	60	24	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.048	0.00	0.00	0.14	0.00	0.00	0.00	21.35	0.00	0.00	22.63	200	0.00	0.00	0.46	0.01	0.01	0.00	71.15	0.01	0.01	75.44
Pickup Truck	120	12	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.931	0.00	0.00	0.49	0.05	0.05	0.00	40.77	0.00	0.00	41.71	400	0.01	0.01	1.64	0.15	0.15	0.00	135.91	0.01	0.01	139.03
Water/Soiltac Truck	56	12	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.009	0.04	0.03	0.27	0.13	0.61	0.00	70.28	0.00	0.00	70.65	136	0.09	0.08	0.67	0.31	1.49	0.00	170.68	0.00	0.00	171.59
Well Water Truck	12	12	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.780	0.03	0.02	0.19	0.09	0.43	0.00	48.95	0.00	0.00	49.21	40	0.09	0.08	0.64	0.30	1.42	0.00	163.15	0.00	0.00	164.02
Worker Passenger Vehicles	4083	12	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.048	0.00	0.00	0.42	0.04	0.04	0.00	34.68	0.00	0.00	35.48	9611	0.01	0.00	0.99	0.09	0.09	0.00	81.64	0.00	0.01	83.52
Delivery Transport Trucks																																	
General Materials Delivery T	15	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.00	0.04	0.02	0.08	0.00	9.41	0.00	0.00	9.46	21	0.01	0.01	0.05	0.02	0.11	0.00	13.18	0.00	0.00	13.25
Suncatcher Pedestals Delive	10	24	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.797	0.01	0.01	0.05	0.02	0.12	0.00	13.60	0.00	0.00	13.67	25	0.02	0.02	0.13	0.06	0.30	0.00	33.99	0.00	0.00	34.17
Stirling Engines	60	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.15	0.07	0.33	0.00	37.65	0.00	0.00	37.85	200	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
Suncatcher Metal Supports	120	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.04	0.04	0.29	0.14	0.66	0.00	75.30	0.00	0.00	75.70	400	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Suncatcher Mirrors	72	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.18	0.08	0.39	0.00	45.18	0.00	0.00	45.42	240	0.08	0.07	0.59	0.27	1.31	0.00	150.60	0.00	0.00	151.40
Electrical and Control Syster	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14	80	0.03	0.02	0.20	0.09	0.44	0.00	50.20	0.00	0.00	50.47
Azimuth and Elevation Drive	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14	80	0.03	0.02	0.20	0.09	0.44	0.00	50.20	0.00	0.00	50.47
												Total	**2.61**	**2.39**	**37.10**	**7.97**	**40.56**	**0.04**	**3968.23**	**1.13**	**0.03**	**3999.96**		**4.54**	**4.15**	**78.24**	**13.83**	**74.95**	**0.07**	**7662.36**	**2.32**	**0.07**	**7732.56**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months

delivery trucks can arrive at the site anytime during the day or night

Short-term Onsite Combustion Emissions

Highest activity occurs in month 6.

construction schedule = 12 hours per day 7 am to 7 pm pedestal installation = 16 hours per day

delivery trucks can arrive at the site anytime during the day or nig

Equipment	Load Factor	Hours/Day	Horsepower	Emission factors (ton/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment													
Air Compressor	0.48	6	50	1.35E-05	1.25E-05	1.42E-04	5.99E-05	1.20E-04	1.44E-07	1.11E-02	5.40E-06	0.00E+00	1.12E-02
Asphalt Paver	0.62	7	120	3.47E-05	3.19E-05	2.07E-04	6.75E-05	3.98E-04	3.19E-07	2.72E-02	6.09E-06	0.00E+00	2.74E-02
Backhoe	0.55	7	120	2.77E-05	2.55E-05	1.83E-04	4.96E-05	3.03E-04	3.03E-07	2.58E-02	4.47E-06	0.00E+00	2.59E-02
Compactor	0.56	7	120	3.36E-05	3.09E-05	2.11E-04	6.39E-05	3.89E-04	3.46E-07	2.95E-02	5.77E-06	0.00E+00	2.96E-02
Crane small	0.43	5	175	2.81E-05	2.59E-05	2.45E-04	6.37E-05	4.92E-04	4.52E-07	4.01E-02	5.75E-06	0.00E+00	4.03E-02
Crane large	0.43	7	500	3.63E-05	3.34E-05	3.58E-04	9.56E-05	9.38E-04	8.83E-07	9.00E-02	8.62E-06	0.00E+00	9.02E-02
Dozer	0.64	8	250	4.15E-05	3.82E-05	3.02E-04	1.08E-04	1.02E-03	9.34E-07	8.30E-02	9.70E-06	0.00E+00	8.32E-02
Generator	0.74	9	50	1.46E-05	1.35E-05	1.47E-04	5.80E-05	1.55E-04	1.98E-07	1.53E-02	5.23E-06	0.00E+00	1.54E-02
Grader	0.61	7	175	4.11E-05	3.78E-05	3.72E-04	9.21E-05	7.19E-04	6.97E-07	6.19E-02	8.31E-06	0.00E+00	6.21E-02
Light Tower	0.78	9	50	1.41E-05	1.30E-05	1.52E-04	5.67E-05	1.42E-04	1.81E-07	1.40E-02	5.12E-06	0.00E+00	1.41E-02
Loader	0.55	7	250	3.00E-05	2.76E-05	2.22E-04	7.89E-05	8.16E-04	8.37E-07	7.44E-02	7.11E-06	0.00E+00	7.46E-02
Maxi Sneeker (Trencher)	0.75	9	50	2.10E-05	1.94E-05	2.23E-04	9.63E-05	1.83E-04	2.13E-07	1.64E-02	8.69E-06	0.00E+00	1.66E-02
Skid Steer (Bobcat)	0.55	7	50	1.19E-05	1.09E-05	1.30E-04	4.46E-05	1.25E-04	1.65E-07	1.27E-02	4.02E-06	0.00E+00	1.28E-02
Welding Machine	0.45	5	50	1.47E-05	1.35E-05	1.52E-04	6.34E-05	1.37E-04	1.68E-07	1.30E-02	5.72E-06	0.00E+00	1.31E-02
Equipment fueled with Propane								Emission factors (ton/hr)					
Aerial Lift	0.46	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Fork Lift	0.3	4	50	8.14E-07	8.14E-07	1.47E-04	1.60E-06	6.85E-05	0.00E+00	9.15E-03	1.34E-05	0.00E+00	9.43E-03
Telehandler	0.54	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Vehicles with Onroad Engines for Emissions Estimates	Onsite Miles per Day Travelled per Vehicle							Emission factors (g/mile)					
Busses	12	12	175	6.60E-02	4.63E-02	4.19E+01	3.57E+00	3.17E+00	1.70E-02	1.67E+03	1.20E-01	2.00E-01	1.74E+03
Concrete Pump Truck	6	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Dump Truck	7	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Flatbed Truck	28	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Staff & Security Truck	33	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	12	12	175	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Water/Soiltac Truck	12	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Well Water Truck	39	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Worker Passenger Vehicles	0.3	12	NA	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Delivery Transport Trucks													
General Materials Delivery Trucks	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Pedestals Delivery Truck	13	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Stirling Engines	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Metal Supports	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Mirrors	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Electrical and Control Systems	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Azimuth and Elevation Drive	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03

Equipment	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment										
Air Compressor	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.00	22.48
Asphalt Paver	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.00	54.71
Backhoe	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.00	51.87
Compactor	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.00	59.18
Crane small	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.00	80.51
Crane large	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.00	180.30
Dozer	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.00	166.39
Generator	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.00	30.82
Grader	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.00	124.16
Light Tower	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.00	28.18
Loader	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.00	149.14
Maxi Sneeker (Trencher)	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.00	33.25
Skid Steer (Bobcat)	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.00	25.67
Welding Machine	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.00	26.18
Equipment fueled with Propane										
Aerial Lift	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Fork Lift	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.86
Telehandler	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Busses	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.83
Concrete Pump Truck	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.50
Dump Truck	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.09
Flatbed Truck	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.35
Staff & Security Truck	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.05
Pickup Truck	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.93
Water/Soiltac Truck	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.01
Well Water Truck	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.78
Worker Passenger Vehicles	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.05
Delivery Transport Trucks										
General Materials Delivery Trucks	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Pedestals Delivery Truck	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.80
Stirling Engines	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Metal Supports	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Mirrors	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Electrical and Control Systems	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Azimuth and Elevation Drive	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
										Total

Month 1 Daily Emissions (lb/day)	Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	3	1.10	1.01	7.24	1.96	12.01	0.01	1023.30	0.18	0.00	1027.01
Compactor	1	0.45	0.42	2.83	0.86	5.22	0.00	396.05	0.08	0.00	397.68
Crane small	1	0.29	0.27	2.53	0.66	5.08	0.00	414.21	0.06	0.00	415.45
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	2	0.01	0.01	2.11	0.02	0.99	0.00	131.72	0.19	0.00	135.78
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
Concrete Pump Truck	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Dump Truck	3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
Flatbed Truck	2	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	67	0.00	0.00	0.46	0.04	0.04	0.00	38.13	0.00	0.00	39.01
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	**137**	**5.18**	**4.73**	**64.80**	**14.17**	**87.34**	**0.09**	**8706.39**	**1.64**	**0.10**	**8771.11**

Month 2 Daily Emissions (lb/day)	Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	1	0.52	0.48	3.07	1.00	5.92	0.00	405.11	0.09	0.00	407.01
Backhoe	9	3.29	3.02	21.72	5.89	36.02	0.04	3069.89	0.53	0.00	3081.04
Compactor	3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
Crane small	3	0.87	0.80	7.59	1.97	15.23	0.01	1242.62	0.18	0.00	1246.36
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
Maxi Sneeker (Trencher)	2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
Skid Steer (Bobcat)	1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
Welding Machine	1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
Equipment fueled with Propane											
Aerial Lift	5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
Concrete Pump Truck	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Dump Truck	8	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Flatbed Truck	9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	14	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	180	0.01	0.00	1.23	0.12	0.12	0.00	101.93	0.01	0.01	104.27
Delivery Transport Trucks											
General Materials Delivery Trucks	3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	252.33	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	**305**	**13.95**	**12.78**	**161.24**	**36.97**	**219.05**	**0.22**	**21021.55**	**4.36**	**0.16**	**21161.28**

Month 21 Daily Emissions (lb/day)	Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
Vehicles with Onroad Engines for Emissions Estimates											
Busses	2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	209	0.01	0.01	1.43	0.13	0.13	0.00	118.55	0.01	0.01	121.26
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
TOTALS	**285**	**5.25**	**4.80**	**100.44**	**16.18**	**103.92**	**0.10**	**11105.02**	**2.92**	**0.11**	**11199.00**

Month 22 Daily Emissions (lb/day)	Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
7	0.18	0.16	1.33	0.62	2.97	0.00	341.65	0.01	0.01	343.45
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
249	0.01	0.01	1.71	0.16	0.16	0.00	141.20	0.01	0.01	144.44
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
367	**12.16**	**11.14**	**162.26**	**33.79**	**201.35**	**0.20**	**19628.87**	**4.65**	**0.15**	**19772.83**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.16	0.14	1.14	0.53	2.55	0.00	292.84	0.01	0.00	294.39
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
343	**15.19**	**13.93**	**191.14**	**42.81**	**264.55**	**0.26**	**25577.73**	**5.47**	**0.15**	**25738.43**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
2	0.04	0.04	18.27	0.07	2.88	0.00	404.80	0.62	0.00	417.81
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
345	**15.82**	**14.51**	**214.78**	**45.52**	**271.81**	**0.27**	**26345.73**	**6.32**	**0.14**	**26523.00**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
479	0.02	0.01	3.28	0.31	0.31	0.00	271.45	0.02	0.02	277.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
620	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.04**	**8.35**	**0.15**	**30741.20**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
1	0.50	0.46	4.92	1.32	12.90	0.01	1237.98	0.12	0.00	1240.48
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
487	0.02	0.01	3.34	0.31	0.31	0.00	275.98	0.02	0.02	282.31
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
1	0.05	0.04	0.35	0.17	0.79	0.00	90.64	0.00	0.00	91.12
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
617	**16.72**	**15.35**	**237.56**	**50.57**	**260.27**	**0.26**	**25266.23**	**7.26**	**0.15**	**25464.98**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
385	0.01	0.01	2.64	0.25	0.25	0.00	218.22	0.01	0.02	223.22
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
507	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**	**22646.71**	**6.09**	**0.14**	**22818.80**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
7	2.03	1.87	17.70	4.60	35.53	0.03	2899.44	0.42	0.00	2908.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
334	0.01	0.01	2.29	0.21	0.21	0.00	189.15	0.01	0.01	193.48
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
446	**13.76**	**12.62**	**187.42**	**42.99**	**204.61**	**0.21**	**19948.69**	**5.82**	**0.14**	**20113.14**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
411	**11.66**	**10.69**	**162.25**	**37.56**	**159.77**	**0.17**	**16042.01**	**5.07**	**0.14**	**16190.34**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
4	0.06	0.06	31.13	0.13	4.90	0.00	689.66	1.06	0.00	711.83
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
357	0.01	0.01	2.44	0.23	0.23	0.00	201.98	0.01	0.01	206.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
476	**14.91**	**13.68**	**213.93**	**45.53**	**231.78**	**0.23**	**22463.06**	**6.59**	**0.14**	**22644.76**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
9	0.05	0.05	9.51	0.10	4.44	0.00	592.75	0.87	0.00	611.03
7	0.13	0.13	63.95	0.26	10.07	0.00	1416.81	2.17	0.00	1462.34
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	0.05	0.38	0.18	0.85	0.00	97.61	0.00	0.00	98.13
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
341	0.01	0.01	2.34	0.22	0.22	0.00	193.30	0.01	0.01	197.73
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
463	**14.51**	**13.32**	**247.05**	**44.73**	**232.16**	**0.23**	**22855.00**	**7.80**	**0.14**	**23061.70**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
347	0.01	0.01	2.38	0.22	0.22	0.00	196.70	0.01	0.01	201.21
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
461	**13.27**	**12.18**	**215.15**	**41.96**	**207.13**	**0.21**	**20521.31**	**6.65**	**0.14**	**20703.94**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
332	0.01	0.01	2.27	0.21	0.21	0.00	188.01	0.01	0.01	192.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
440	**12.36**	**11.33**	**198.43**	**39.35**	**187.51**	**0.19**	**18676.00**	**6.12**	**0.14**	**18846.89**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
5	0.01	0.01	5.54	0.47	0.42	0.00	221.00	0.02	0.03	229.53
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
325	0.01	0.01	2.22	0.21	0.20	0.00	183.86	0.01	0.01	188.08
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
420	**8.13**	**7.44**	**156.10**	**29.05**	**120.98**	**0.13**	**12916.49**	**4.89**	**0.13**	**13059.83**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
280	0.01	0.01	1.92	0.18	0.18	0.00	158.57	0.01	0.01	162.20
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
359	**5.16**	**4.71**	**102.84**	**17.84**	**78.70**	**0.08**	**8709.95**	**3.16**	**0.12**	**8812.83**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
247	0.01	0.01	1.69	0.16	0.16	0.00	139.69	0.01	0.01	142.89
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
325	**5.00**	**4.57**	**100.98**	**17.13**	**77.30**	**0.08**	**8562.91**	**3.10**	**0.12**	**8664.05**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.38	0.35	4.01	1.73	3.30	0.00	295.99	0.16	0.00	299.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
226	0.01	0.01	1.55	0.15	0.15	0.00	127.98	0.01	0.01	130.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
303	**5.63**	**5.14**	**104.56**	**17.93**	**107.22**	**0.11**	**11410.45**	**3.08**	**0.11**	**11507.94**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monthly Comparison of Construction Equipment Emissions:

Month of Contruction	Total Equipment Quantity	Daily Emissions (lb/day)									
		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	137	5.18	4.73	64.80	14.17	87.34	0.09	8706.39	1.64	0.097	8771.11
2	305	13.95	12.78	161.24	36.97	219.05	0.22	21021.55	4.36	0.155	21161.28
3	367	12.16	11.14	162.26	33.79	201.35	0.20	19628.87	4.65	0.149	19772.83
4	343	15.19	13.93	191.14	42.81	264.55	0.26	25577.73	5.47	0.148	25738.43
5	345	15.82	14.51	214.78	45.52	271.81	0.27	26345.73	6.32	0.144	26523.00
6	620	19.09	17.53	275.73	56.88	314.71	0.31	30518.04	8.35	0.154	30741.20
7	617	16.72	15.35	237.56	50.57	260.27	0.26	25266.23	7.26	0.149	25464.98
8	507	15.35	14.08	200.27	46.44	234.90	0.24	22646.71	6.09	0.143	22818.80
9	446	13.76	12.62	187.42	42.99	204.61	0.21	19948.69	5.82	0.136	20113.14
10	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
11	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
12	411	11.66	10.69	162.25	37.56	159.77	0.17	16042.01	5.07	0.135	16190.34
13	476	14.91	13.68	213.93	45.53	231.78	0.23	22463.06	6.59	0.140	22644.76
14	463	14.51	13.32	247.05	44.73	232.16	0.23	22855.00	7.80	0.138	23061.70
15	461	13.27	12.18	215.15	41.96	207.13	0.21	20521.31	6.65	0.139	20703.94
16	440	12.36	11.33	198.43	39.35	187.51	0.19	18676.00	6.12	0.136	18846.89
17	420	8.13	7.44	156.10	29.05	120.98	0.13	12916.49	4.89	0.131	13059.83
18	359	5.16	4.71	102.84	17.84	78.70	0.08	8709.95	3.16	0.118	8812.83
19	325	5.00	4.57	100.98	17.13	77.30	0.08	8562.91	3.10	0.116	8664.05
20	303	5.63	5.14	104.56	17.93	107.22	0.11	11410.45	3.08	0.106	11507.94
21	285	5.25	4.80	100.44	16.18	103.92	0.10	11105.02	2.92	0.105	11199.00
22	282	4.94	4.51	97.26	14.97	100.54	0.10	10758.85	2.82	0.104	10850.36
23	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
24	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
25	275	3.03	2.76	78.82	9.49	56.71	0.06	6501.29	2.37	0.100	6581.93
26	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
27	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
28	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
29	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
30	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
31	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
32	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
33	249	2.66	2.41	70.15	8.09	50.02	0.05	5722.76	1.79	0.096	5790.18
34	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
35	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
36	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
37	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
38	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
39	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
40	209	2.24	2.04	89.86	6.58	46.15	0.04	5353.92	2.56	0.081	5432.89
MAX VALUE (lb/day)	**620**	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.0**	**8.35**	**0.155**	**30741.2**

Months for Annual Contruction		Annual Emissions (ton/year)									
		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	**12**	2.44	2.24	32.78	7.26	38.11	0.039	3720.99	0.98	0.0252	3749.38
2	**13**	2.58	2.37	35.02	7.73	40.28	0.041	3927.34	1.05	0.0259	3957.48
3	**14**	2.59	2.38	36.30	7.85	40.48	0.041	3954.84	1.10	0.0256	3985.99
4	**15**	2.61	2.39	37.10	7.97	40.56	0.041	3968.23	1.13	0.0255	3999.96
5	**16**	2.57	2.35	37.21	7.92	39.41	0.040	3864.70	1.14	0.0253	3896.58
6	**17**	2.45	2.25	36.33	7.67	37.15	0.038	3663.27	1.12	0.0251	3694.63
7	**18**	2.24	2.06	33.73	7.09	33.60	0.034	3336.14	1.05	0.0245	3365.71
8	**19**	2.07	1.89	31.68	6.59	30.86	0.032	3085.59	0.98	0.0240	3113.69
9	**20**	1.92	1.76	30.25	6.16	28.95	0.030	2917.05	0.94	0.0235	2944.03
10	**21**	1.79	1.64	28.94	5.76	27.43	0.028	2784.40	0.89	0.0230	2810.32
11	**22**	1.69	1.55	27.94	5.41	26.52	0.027	2703.05	0.86	0.0226	2728.10
12	**23**	1.58	1.45	26.90	5.04	25.57	0.026	2617.62	0.82	0.0221	2641.78
13	**24**	1.48	1.35	25.89	4.69	24.64	0.025	2534.30	0.79	0.0216	2557.57
14	**25**	1.30	1.19	23.86	4.15	22.02	0.022	2294.87	0.73	0.0210	2316.63
15	**26**	1.12	1.03	21.30	3.60	19.34	0.019	2045.49	0.64	0.0204	2065.33
16	**27**	0.97	0.88	19.22	3.10	17.05	0.017	1831.12	0.58	0.0199	1849.39
17	**28**	0.82	0.75	17.37	2.63	15.02	0.015	1641.55	0.52	0.0192	1658.43
18	**29**	0.74	0.67	16.16	2.32	13.99	0.014	1538.38	0.48	0.0187	1554.26
19	**30**	0.70	0.64	15.74	2.17	13.60	0.013	1498.31	0.47	0.0184	1513.81
20	**31**	0.67	0.61	15.28	2.04	13.19	0.013	1455.51	0.45	0.0181	1470.49
21	**32**	0.62	0.57	14.76	1.89	12.33	0.012	1369.99	0.43	0.0179	1384.52
22	**33**	0.58	0.53	14.31	1.77	11.52	0.011	1289.25	0.41	0.0178	1303.38
23	**34**	0.55	0.50	14.25	1.67	10.82	0.011	1221.47	0.41	0.0177	1235.49
24	**35**	0.52	0.47	14.23	1.58	10.16	0.010	1157.76	0.40	0.0175	1171.70
25	**36**	0.48	0.44	14.17	1.47	9.40	0.009	1082.03	0.40	0.0172	1095.81
26	**37**	0.47	0.43	14.34	1.43	9.25	0.009	1066.09	0.41	0.0170	1079.85
27	**38**	0.47	0.42	14.55	1.41	9.14	0.009	1054.22	0.41	0.0167	1067.99
28	**39**	0.46	0.42	14.76	1.38	9.04	0.009	1042.35	0.41	0.0165	1056.14
29	**40**	0.45	0.41	14.97	1.36	8.94	0.009	1032.08	0.42	0.0162	1045.89
MAX VALUE (ton/year)		**2.61**	**2.39**	**37.21**	**7.97**	**40.56**	**0.041**	**3968.23**	**1.14**	**0.0259**	**3999.96**

Annual Offsite Combustion Emissions

Maximum annual construction activity occurs in months 4-15.

Construction Assumptions - 30 days per month

Equipment	Number of Vehicles per year	Offsite Miles per Day Travelled per Vehicle	Offsite Miles per Year Travelled all Vehicle	Emission factors (g/mile)										Annual Emissions (ton/year)										Number of Vehicles (entire construction period)	Offsite Miles Travelled all Vehicle (entire construction period)	entire construction period emissions (ton)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e			PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Vehicles with Onroad Engines for Emissions Estimates																																			
Busses	72	10	21600	0.031	0.014	11.649	0.493	4.394	0.005	464.95	0.120	0.200	529.47	0.00	0.00	0.28	0.01	0.10	0.00	11.06	0.00	0.00	12.60	149	44700	0.00	0.00	0.57	0.02	0.22	0.00	22.89	0.01	0.01	26.07
Concrete Pump Truck	0	40	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	14400	0.01	0.01	0.05	0.01	0.23	0.00	26.50	0.00	0.00	26.76
Dump Truck	28	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	108	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	266	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	60	0	0	0.010	0.010	2.100	0.055	0.030	0.010	326.30	0.050	0.060	345.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	120	0	0	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	400	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	56	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	136	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	12	143	51480	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.03	0.03	0.17	0.04	0.84	0.00	94.72	0.00	0.00	95.67	40	171600	0.11	0.09	0.57	0.12	2.80	0.00	315.74	0.01	0.01	318.90
Worker Passenger Vehicles	4083	40	4899200	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.16	0.08	28.86	1.15	3.40	0.02	1908.06	0.27	0.32	2014.08	9611	11533600	0.37	0.19	67.93	2.72	8.02	0.04	4491.92	0.64	0.76	4741.52
Delivery Transport Trucks																																			
General Materials Delivery T	15	100	45000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.03	0.02	0.15	0.03	0.73	0.00	82.80	0.00	0.00	83.63	21	63000	0.04	0.03	0.21	0.05	1.03	0.00	115.92	0.00	0.00	117.08
Suncatcher Pedestals Delive	10	240	72000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.04	0.04	0.24	0.05	1.17	0.00	132.48	0.00	0.00	133.81	25	180000	0.11	0.09	0.60	0.13	2.94	0.00	331.19	0.01	0.01	334.51
Stirling Engines	60	50	90000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.06	0.05	0.30	0.07	1.47	0.00	165.60	0.01	0.00	167.26	200	300000	0.19	0.16	1.00	0.22	4.90	0.01	551.99	0.02	0.02	557.52
Suncatcher Metal Supports	120	240	864000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.53	0.46	2.89	0.63	14.10	0.02	1589.72	0.06	0.05	1605.67	400	2880000	1.78	1.52	9.62	2.09	47.00	0.05	5299.07	0.19	0.16	5352.23
Suncatcher Mirrors	72	50	108000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.07	0.06	0.36	0.08	1.76	0.00	198.72	0.01	0.01	200.71	240	360000	0.22	0.19	1.20	0.26	5.87	0.01	662.38	0.02	0.02	669.03
Electrical and Control Systen	24	240	172800	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.11	0.09	0.58	0.13	2.82	0.00	317.94	0.01	0.01	321.13	80	576000	0.36	0.30	1.92	0.42	9.40	0.01	1059.81	0.04	0.03	1070.45
Azimuth and Elevation Drive	24	50	36000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.02	0.02	0.12	0.03	0.59	0.00	66.24	0.00	0.00	66.90	80	120000	0.07	0.06	0.40	0.09	1.96	0.00	220.79	0.01	0.01	223.01
													Total	**1.05**	**0.84**	**33.94**	**2.21**	**27.00**	**0.04**	**4567.33**	**0.37**	**0.41**	**4701.46**			**3.26**	**2.65**	**84.09**	**6.12**	**84.36**	**0.12**	**13098.20**	**0.95**	**1.03**	**13437.08**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months

Short-term Offsite Combustion Emissions

construction schedule = 12 hours per day 7 am to 7 pm
delivery trucks can arrive at the site anytime during the day or night

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission factors (g/mile) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	10	12	175	3.10E-02	1.41E-02	1.16E+01	4.93E-01	4.39E+00	5.00E-03	4.65E+02	1.20E-01	2.00E-01	5.29E+02
Concrete Pump Truck	40	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Dump Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Flatbed Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Staff & Security Truck	0	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	0	12	175	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Water/Soiltac Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Well Water Truck	143	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Worker Passenger Vehicles	40	12	NA	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Delivery Transport Trucks													
General Construction Materials	100	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Pedestals	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Stirling Engines	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Metal Supports	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Mirrors	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Electrical and Control Syste	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Azimuth and Elevation Drive	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03

Vehicles with Onroad Engines for Emissions Estimates	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	0.000	0.000	0.021	0.001	0.008	0.000	0.853	0.000	0.000	0.97
Concrete Pump Truck	0.004	0.004	0.022	0.005	0.109	0.000	12.266	0.000	0.000	12.39
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Water/Soiltac Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Well Water Truck	0.015	0.013	0.080	0.017	0.389	0.000	43.852	0.002	0.001	44.29
Worker Passenger Vehicles	0.000	0.000	0.039	0.002	0.005	0.000	2.596	0.000	0.000	2.74
Delivery Transport Trucks										
General Construction Materials	0.005	0.004	0.028	0.006	0.136	0.000	15.333	0.001	0.000	15.49
Suncatcher Pedestals	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Stirling Engines	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Suncatcher Metal Supports	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Suncatcher Mirrors	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Electrical and Control Syste	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Azimuth and Elevation Drive	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Total										

Vehicles with Onroad Engines for Emissions Estimates	Month 1 Daily Emissions (lb/day) Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
Concrete Pump Truck	2	0.10	0.08	0.53	0.12	2.61	0.00	294.39	0.01	0.01	297.35
Dump Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	67	0.17	0.09	31.73	1.27	3.74	0.02	2097.91	0.30	0.36	2214.48
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
Total	**123**	**4.82**	**4.05**	**57.83**	**6.75**	**126.62**	**0.15**	**15949.58**	**0.80**	**0.79**	**16210.38**

Vehicles with Onroad Engines for Emissions Estimates	Month 2 Daily Emissions (lb/day) Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O
Busses	6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03
Concrete Pump Truck	5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02
Dump Truck	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02
Worker Passenger Vehicles	180	0.46	0.24	84.81	3.39	10.01	0.05	5608.28	0.79	0.95
Delivery Transport Trucks										
General Construction Materials	3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01
Total	**266**	**5.63**	**4.64**	**114.24**	**9.51**	**146.79**	**0.20**	**21025.99**	**1.36**	**1.44**

Vehicles with Onroad Engines for Emissions Estimates	Month 21 Daily Emissions (lb/day) Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	209	0.53	0.28	98.64	3.95	11.64	0.06	6522.22	0.92	1.11	6884.63
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**265**	**5.97**	**4.91**	**128.51**	**10.34**	**155.21**	**0.21**	**22708.54**	**1.51**	**1.60**	**23235.97**

Vehicles with Onroad Engines for Emissions Estimates	Month 22 Daily Emissions (lb/day) Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 23 Daily Emissions (lb/day) Quantity Mo 23	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 24 Daily Emissions (lb/day) Quantity Mo 24	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10
Delivery Transport Trucks										
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**

Notes:
Emission factors from CARB Off-road Mobile Source Emission Factors (2006-2020) for diesel and propane equipment. (2009 data used).
Dozer = Crawler Tractor
Loaders = Rubber tired loaders
Backhoe = Tractors/Loaders/Backhoes
Light Tower = Other Construction Equipment
Utilization Load Factors from SCAQMD
PM2.5 emission factors obtained by multiplying the PM10 emissions by PM2.5 fraction in CEIDARS list for onroad or offroad diesel vehicles.
For propane equipment assumed PM2.5 and PM10 Fraction of total PM is 1.000
Onroad vehicle emissions from EMFAC2007 model
CH_4 and N_2O emission factors for the onroad vehicles are from reference source 2: Table C.5, California Climate Action Registry General Reporting Protocol Version 3.0, April 2007

CO_2 GWP (SAR, 1996) =	1
CH_4 GWP (SAR, 1996) =	21
N_2O GWP (SAR, 1996) =	310

CO_2e
69.97
743.37
0.00
0.00
0.00
0.00
0.00
531.51
5919.91

1115.05
0.00
929.21
8920.38
1115.05
1784.08
371.68
21500.20

CO_2e
23.32
0.00
0.00
0.00
0.00
0.00
0.00
531.51
6840.78

0.00
2676.11
929.21
8920.38
1115.05
1784.08
371.68
23192.12

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02	743.37
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
249	0.64	0.33	117.48	4.70	13.86	0.07	7768.50	1.10	1.32	8200.17
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
328	**5.81**	**4.74**	**146.91**	**10.81**	**150.64**	**0.21**	**23186.21**	**1.67**	**1.80**	**23780.46**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
295	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
291	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 26 Daily Emissions (lb/day)

Quantity Mo 26	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 27 Daily Emissions (lb/day)

Quantity Mo 27	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
479	1.22	0.63	225.86	9.04	26.65	0.13	14934.63	2.11	2.53	15764.49
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
551	**7.04**	**5.59**	**258.76**	**15.90**	**180.40**	**0.29**	**32265.90**	**2.75**	**3.08**	**33277.53**

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
487	1.25	0.64	229.63	9.19	27.09	0.13	15183.89	2.15	2.58	16027.60
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
1	0.30	0.25	1.60	0.35	7.83	0.01	883.18	0.03	0.03	892.04
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
555	**6.46**	**5.09**	**259.32**	**15.36**	**165.18**	**0.28**	**30748.80**	**2.72**	**3.07**	**31756.56**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
385	0.98	0.51	181.56	7.27	21.42	0.10	12005.87	1.70	2.04	12672.99
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
451	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**	**26687.60**	**2.24**	**2.50**	**27509.91**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
334	0.85	0.44	157.38	6.30	18.57	0.09	10406.47	1.47	1.77	10984.72
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
394	**5.40**	**4.32**	**183.46**	**11.69**	**139.03**	**0.22**	**23984.22**	**1.97**	**2.20**	**24706.59**

Month 28 Daily Emissions (lb/day)

Quantity Mo 28	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 30 Daily Emissions (lb/day)

Quantity Mo 30	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 31 Daily Emissions (lb/day)

Quantity Mo 31	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
357	0.91	0.47	168.06	6.72	19.83	0.09	11112.70	1.57	1.89	11730.19
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
420	**5.46**	**4.35**	**194.14**	**12.11**	**140.29**	**0.22**	**24690.45**	**2.07**	**2.32**	**25452.06**

Month 32 Daily Emissions (lb/day)

Quantity Mo 32	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 34 Daily Emissions (lb/day)

Quantity Mo 34	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 35 Daily Emissions (lb/day)

Quantity Mo 35	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
341	0.87	0.45	160.83	6.44	18.98	0.09	10634.95	1.50	1.80	11225.90
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
403	**5.42**	**4.33**	**186.92**	**11.82**	**139.44**	**0.22**	**24212.71**	**2.00**	**2.24**	**24947.77**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
347	0.89	0.46	163.66	6.55	19.31	0.09	10821.90	1.53	1.84	11423.23
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
409	**5.44**	**4.34**	**189.75**	**11.94**	**139.77**	**0.22**	**24399.65**	**2.03**	**2.27**	**25145.10**

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
332	0.85	0.44	156.43	6.26	18.46	0.09	10344.15	1.46	1.76	10918.94
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
392	**5.40**	**4.32**	**182.52**	**11.65**	**138.92**	**0.22**	**23921.91**	**1.96**	**2.19**	**24640.82**

Month 36 Daily Emissions (lb/day)

Quantity Mo 36	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 37 Daily Emissions (lb/day)

Quantity Mo 37	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
5	0.00	0.00	1.28	0.05	0.48	0.00	51.21	0.01	0.02	58.31
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
325	0.83	0.43	152.98	6.12	18.05	0.09	10115.67	1.43	1.72	10677.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
384	**5.38**	**4.31**	**178.81**	**11.50**	**138.42**	**0.22**	**23683.18**	**1.93**	**2.14**	**24387.97**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
280	0.72	0.37	131.93	5.28	15.57	0.07	8723.99	1.23	1.48	9208.74
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
336	**5.26**	**4.25**	**157.51**	**10.65**	**135.84**	**0.20**	**22281.26**	**1.73**	**1.90**	**22907.30**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
247	0.63	0.33	116.23	4.65	13.71	0.07	7685.42	1.09	1.30	8112.46
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
303	**5.18**	**4.20**	**141.80**	**10.02**	**133.98**	**0.20**	**21242.69**	**1.58**	**1.73**	**21811.02**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
226	0.58	0.30	106.49	4.26	12.56	0.06	7041.50	1.00	1.19	7432.77
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
282	**6.02**	**4.94**	**136.36**	**10.65**	**156.14**	**0.21**	**23227.83**	**1.58**	**1.69**	**23784.11**

Month 39 Daily Emissions (lb/day)

Quantity Mo 39	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 40 Daily Emissions (lb/day)

Quantity Mo 40	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
152	0.39	0.20	71.62	2.87	8.45	0.04	4735.88	0.67	0.80	4999.03
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
197	**4.94**	**4.08**	**96.68**	**8.21**	**128.53**	**0.17**	**18272.67**	**1.16**	**1.22**	**18674.26**

Monthly Comparison of Construction Equipment Emissions:

		Daily Emissions (lb/day)									
Month of Contruction	**Offroad Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	123	4.82	4.05	57.83	6.75	126.62	0.15	15949.58	0.80	0.79	16210.38
2	266	5.63	4.64	114.24	9.51	146.79	0.20	21025.99	1.36	1.44	21500.20
3	328	5.81	4.74	146.91	10.81	150.64	0.21	23186.21	1.67	1.80	23780.46
4	295	6.37	5.24	135.94	10.99	165.91	0.22	24144.28	1.60	1.70	24704.63
5	291	6.37	5.24	135.94	10.99	165.91	0.22	24144.28	1.60	1.70	24704.63
6	551	7.04	5.59	258.76	15.90	180.40	0.29	32265.90	2.75	3.08	33277.53
7	555	6.46	5.09	259.32	15.36	165.18	0.28	30748.80	2.72	3.07	31756.56
8	451	5.91	4.70	209.66	13.09	151.68	0.24	26687.60	2.24	2.50	27509.91
9	394	5.40	4.32	183.46	11.69	139.03	0.22	23984.22	1.97	2.20	24706.59
10	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
11	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
12	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
13	420	5.46	4.35	194.14	12.11	140.29	0.22	24690.45	2.07	2.32	25452.06
14	403	5.42	4.33	186.92	11.82	139.44	0.22	24212.71	2.00	2.24	24947.77
15	409	5.44	4.34	189.75	11.94	139.77	0.22	24399.65	2.03	2.27	25145.10
16	392	5.40	4.32	182.52	11.65	138.92	0.22	23921.91	1.96	2.19	24640.82
17	384	5.38	4.31	178.81	11.50	138.42	0.22	23683.18	1.93	2.14	24387.97
18	336	5.26	4.25	157.51	10.65	135.84	0.20	22281.26	1.73	1.90	22907.30
19	303	5.18	4.20	141.80	10.02	133.98	0.20	21242.69	1.58	1.73	21811.02
20	282	6.02	4.94	136.36	10.65	156.14	0.21	23227.83	1.58	1.69	23784.11
21	265	5.97	4.91	128.51	10.34	155.21	0.21	22708.54	1.51	1.60	23235.97
22	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
23	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
24	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
25	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
26	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
27	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
28	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
29	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
30	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
31	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
32	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
33	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
34	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
35	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
36	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
37	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
38	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
39	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
40	197	4.94	4.08	96.68	8.21	128.53	0.17	18272.67	1.16	1.22	18674.26
MAX VALUE (lb/day)	**555**	**7.04**	**5.59**	**259.32**	**15.90**	**180.40**	**0.29**	**32265.90**	**2.75**	**3.08**	**33277.53**

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	1.05	0.85	30.16	2.08	27.07	0.040	4370.22	0.33	0.3659	4490.65
2	**13**	1.06	0.85	32.21	2.16	27.27	0.041	4501.33	0.35	0.3888	4629.27
3	**14**	1.05	0.85	33.30	2.19	27.16	0.042	4549.13	0.36	0.4008	4680.99
4	**15**	1.05	0.84	33.94	2.21	27.00	0.042	4567.33	0.37	0.4077	4701.46
5	**16**	1.03	0.83	34.64	2.22	26.59	0.042	4564.00	0.37	0.4151	4700.50
6	**17**	1.02	0.81	35.28	2.23	26.18	0.041	4557.08	0.38	0.4217	4695.75
7	**18**	0.99	0.79	33.77	2.15	25.51	0.040	4407.31	0.36	0.4041	4540.20
8	**19**	0.97	0.78	32.00	2.07	25.04	0.039	4264.72	0.35	0.3840	4391.01
9	**20**	0.97	0.78	30.90	2.03	25.11	0.038	4212.82	0.34	0.3718	4335.13
10	**21**	0.98	0.79	30.08	2.01	25.35	0.038	4193.69	0.33	0.3628	4313.07
11	**22**	0.99	0.80	29.45	2.00	25.62	0.038	4187.64	0.32	0.3561	4304.82
12	**23**	1.00	0.81	28.83	1.99	25.89	0.038	4181.59	0.32	0.3493	4296.57
13	**24**	1.01	0.82	28.20	1.97	26.15	0.038	4175.54	0.31	0.3426	4288.33
14	**25**	1.01	0.82	27.13	1.93	26.02	0.038	4105.44	0.30	0.3305	4214.29
15	**26**	1.00	0.81	26.18	1.89	25.90	0.037	4042.52	0.29	0.3197	4147.81
16	**27**	1.00	0.81	25.18	1.85	25.78	0.037	3976.78	0.29	0.3084	4078.37
17	**28**	0.99	0.81	23.99	1.81	25.64	0.036	3898.59	0.27	0.2950	3995.78
18	**29**	0.98	0.81	22.85	1.76	25.50	0.035	3823.97	0.26	0.2822	3916.98
19	**30**	0.98	0.80	22.04	1.73	25.40	0.035	3770.39	0.26	0.2730	3860.39
20	**31**	0.98	0.80	21.46	1.70	25.33	0.035	3732.38	0.25	0.2665	3820.25
21	**32**	0.96	0.79	20.97	1.67	24.93	0.034	3664.59	0.25	0.2605	3750.51
22	**33**	0.95	0.78	20.76	1.65	24.56	0.033	3615.82	0.24	0.2578	3700.83
23	**34**	0.93	0.77	20.56	1.63	24.19	0.033	3567.66	0.24	0.2552	3651.81
24	**35**	0.92	0.75	20.36	1.61	23.83	0.033	3519.50	0.24	0.2526	3602.79
25	**36**	0.90	0.74	19.90	1.58	23.43	0.032	3454.21	0.23	0.2471	3535.67
26	**37**	0.90	0.74	19.51	1.56	23.38	0.032	3428.66	0.23	0.2427	3508.71
27	**38**	0.90	0.74	19.13	1.55	23.34	0.032	3403.12	0.22	0.2384	3481.74
28	**39**	0.90	0.74	18.74	1.53	23.29	0.031	3377.57	0.22	0.2340	3454.77
29	**40**	0.90	0.74	18.64	1.53	23.28	0.031	3371.02	0.22	0.2329	3447.86
MAX VALUE (ton/year)		**1.06**	**0.85**	**35.28**	**2.23**	**27.27**	**0.042**	**4567.33**	**0.38**	**0.4217**	**4701.46**

Imperial Valley Solar
Fugitive Dust Emissions (on-site)
Peak month = 6 Maximum annual construction equipment activity occurs in months 4-15.

Travel on sealed roads (paved)

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
7.4 sL = road surface silt loading (grams per square meter) (g/m^2), from Table 13.2.1-4 for Municipal solid waste landfi
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on sealed roads	Max Daily Distance per Vehicle to drive on sealed roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per year (months 4-15)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	0%	0	0	0.5	6	27	0	0.000	0.002
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.134	0.893
Backhoe	6	0	0%	0	0	11	7	55	0	0.039	0.260
Compactor	3	0	0%	0	0	10	7	34	0	0.034	0.226
Crane small	8	0.5	50%	0	2	10	5	81	607.5	0.034	0.226
Crane large	3	0.5	0%	0	0	35	7	10	0	0.222	1.480
Dozer	1	0	0%	0	0	20	8	9	0	0.096	0.639
Generator	4	0	0%	0	0	0.5	9	49	0	0.000	0.002
Grader	3	0	0%	0	0	20	7	19	0	0.096	0.639
Light Tower	2	0	0%	0	0	0.25	9	23	0	0.000	0.000
Loader	4	0	0%	0	0	25	7	32	0	0.134	0.893
Maxi Sneeker (Trencher)	5	0	0%	0	0	5	9	49	0	0.012	0.079
Skid Steer (Bobcat)	4	0	0%	0	0	2	7	34	0	0.003	0.020
Welding Machine	4	0	0%	0	0	0.5	5	43	0	0.000	0.002
Equipment fueled with Propane											
Aerial Lift	6	1	50%	1	3	4	6	48	720	0.008	0.057
Fork Lift	8	1	50%	1	4	3	4	93	1395	0.005	0.037
Telehandler	5	1	50%	1	3	3	6	43	645	0.005	0.037
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	72	0	0.044	0.297
Concrete Pump	0	6	0%	0	0	20	12	0	0	0.096	0.639
Dump Truck	4	7	50%	4	14	20	12	28	2940	0.096	0.639
Flatbed Truck	9	28	100%	28	252	10	12	108	90720	0.034	0.226
Staff & Security Truck	5	33	100%	33	165	2.25	24	60	59400	0.003	0.024
Pickup Truck	10	12	95%	11	114	4	12	120	41040	0.008	0.057
Water/Soiltac Truck	6	12	25%	3	18	20	12	56	5040	0.096	0.639
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.086	0.573
Worker Passenger Vehicles	479	0.3	100%	0	144	2	12	4083	36744	0.003	0.020
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	0%	0	0	20	24	15	0	0.096	0.639
Suncatcher Pedestals Delivery Trucks	3	13	55%	7	21	20	24	10	2145	0.096	0.639
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.096	0.639
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.096	0.639
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.096	0.639
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.096	0.639
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.096	0.639

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.09	0.09	0.45	0.45	0.43%	0.07	0.07	0.01	0.01	0.07	0.07	0.01	0.01
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.03	0.03	0.17	0.17	0.16%	0.02	0.02	0.00	0.00	0.02	0.02	0.00	0.00
Fork Lift	0%	0%	0.04	0.04	0.15	0.15	0.14%	0.03	0.03	0.01	0.01	0.02	0.02	0.00	0.00
Telehandler	0%	0%	0.01	0.01	0.09	0.09	0.09%	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.75	0.75	8.94	8.94	8.51%	0.94	0.94	0.11	0.11	1.34	1.34	0.14	0.14
Flatbed Truck	0%	0%	4.74	4.74	56.84	56.84	54.11%	10.23	10.23	0.70	0.70	8.45	8.45	1.52	1.52
Staff & Security Truck	0%	0%	0.16	0.16	3.90	3.90	3.72%	0.70	0.70	0.02	0.02	0.54	0.54	0.10	0.10
Pickup Truck	0%	0%	0.54	0.54	6.47	6.47	6.15%	1.16	1.16	0.08	0.08	0.94	0.94	0.17	0.17
Water/Soiltac Truck	0%	0%	0.96	0.96	11.50	11.50	10.95%	1.61	1.61	0.14	0.14	1.72	1.72	0.24	0.24
Well Water Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	0%	0.24	0.24	2.84	2.84	2.70%	0.36	0.36	0.03	0.03	0.38	0.38	0.05	0.05
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	0%	0.57	0.57	13.70	13.70	13.04%	0.69	0.69	0.09	0.09	2.05	2.05	0.10	0.10
Stirling Engines	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Metal Supports	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on sealed road (paved)			**8.12**	**8.12**	**105.06**	**105.06**		**15.82**	**15.82**	**1.20**	**1.20**	**15.55**	**15.55**	**2.34**	**2.34**

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
1.6 sL = road surface silt loading (grams per square meter) (g/r^2),
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

Rural roads CARB - Emission Inventory Database - Section 7.8 SJV - Entrained Paved Road Dust - Rural Roads (emission inventory code: 640-643-5400-0000), June 2006.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on paved road	Max Daily Distance per Vehicle to drive on paved road (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per year (months 4-15)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	0%	0	0	0.5	6	27	0	0.000	0.000
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.049	0.330
Backhoe	6	0	0%	0	0	11	7	55	0	0.014	0.096
Compactor	3	0	0%	0	0	10	7	34	0	0.012	0.083
Crane small	8	0.5	0%	0	0	10	5	81	0	0.012	0.083
Crane large	3	0.5	0%	0	0	35	7	10	0	0.082	0.547
Dozer	1	0	0%	0	0	20	8	9	0	0.035	0.236
Generator	4	0	0%	0	0	0.5	9	49	0	0.000	0.000
Grader	3	0	0%	0	0	20	7	19	0	0.035	0.236
Light Tower	2	0	0%	0	0	0.25	9	23	0	0.000	0.000
Loader	4	0	0%	0	0	25	7	32	0	0.049	0.330
Maxi Sneeker (Trencher)	5	0	0%	0	0	5	9	49	0	0.004	0.029
Skid Steer (Bobcat)	4	0	0%	0	0	2	7	34	0	0.001	0.007
Welding Machine	4	0	0%	0	0	0.5	5	43	0	0.000	0.000
Equipment fueled with Propane											
Aerial Lift	6	1	0%	0	0	4	6	48	0	0.003	0.021
Fork Lift	8	1	0%	0	0	3	4	93	0	0.002	0.013
Telehandler	5	1	0%	0	0	3	6	43	0	0.002	0.013
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	100%	12	72	12	12	72	25920	0.016	0.109
Concrete Pump	0	6	82%	4.92	0	20	12	0	0	0.035	0.236
Dump Truck	4	7	0%	0	0	20	12	28	0	0.035	0.236
Flatbed Truck	9	28	0%	0	0	10	12	108	0	0.012	0.083
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.001	0.008
Pickup Truck	10	12	0%	0	0	4	12	120	0	0.003	0.021
Water/Soiltac Truck	6	12	0%	0	0	20	12	56	0	0.035	0.236
Well Water Truck	1	39	100%	39	39	18.6	12	12	14040	0.031	0.211
Worker Passenger Vehicles	479	0.3	0%	0	0	2	12	4083	0	0.001	0.007
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	100%	6	18	20	24	15	2700	0.035	0.236
Suncatcher Pedestals Delivery Trucks	3	13	45%	5.85	18	20	24	10	1755	0.035	0.236
Stirling Engines	5	6	100%	6	30	20	24	60	10800	0.035	0.236
Suncatcher Metal Supports	10	6	100%	6	60	20	24	120	21600	0.035	0.236
Suncatcher Mirrors	6	6	100%	6	36	20	24	72	12960	0.035	0.236
Electrical and Control Systems	2	6	100%	6	12	20	24	24	4320	0.035	0.236
Azimuth and Elevation Drive	2	6	100%	6	12	20	24	24	4320	0.035	0.236

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Telehandler	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.66	0.66	7.87	7.87	13.15%	1.42	1.42	0.10	0.10	1.16	1.16	0.21	0.21
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.69	0.69	8.25	8.25	13.77%	1.48	1.48	0.10	0.10	1.23	1.23	0.22	0.22
Worker Passenger Vehicles	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.18	0.18	4.24	4.24	7.09%	0.32	0.32	0.03	0.03	0.63	0.63	0.05	0.05
Suncatcher Pedestals Delivery Trucks	0%	0%	0.17	0.17	4.14	4.14	6.91%	0.21	0.21	0.03	0.03	0.62	0.62	0.03	0.03
Stirling Engines	0%	0%	0.29	0.29	7.07	7.07	11.82%	1.27	1.27	0.04	0.04	1.05	1.05	0.19	0.19
Suncatcher Metal Supports	0%	0%	0.59	0.59	14.15	14.15	23.63%	2.55	2.55	0.09	0.09	2.11	2.11	0.38	0.38
Suncatcher Mirrors	0%	0%	0.35	0.35	8.49	8.49	14.18%	1.53	1.53	0.05	0.05	1.26	1.26	0.23	0.23
Electrical and Control Systems	0%	0%	0.12	0.12	2.83	2.83	4.73%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
Azimuth and Elevation Drive	0%	0%	0.12	0.12	2.83	2.83	4.73%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
TOTAL Fugitive emissions for vehicles traveled on paved road			**3.17**	**3.17**	**59.87**	**59.87**		**9.79**	**9.79**	**0.47**	**0.47**	**8.90**	**8.90**	**1.45**	**1.45**

Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$

EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 1
E = size-specific emission factor (lb/VMT)
k, a, b = empirical constants
8.5 s = surface material silt content (%)
W = mean vehicle weight (tons)

Construction sites - Scraper routes

constants

	$PM_{2.5}$	PM_{10}
k	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on unpaved roads	Max Daily Distance per Vehicle to drive on unpaved roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per year (months 4-15)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	100%	0	0	0.5	6	27	0	0.047	0.475
Asphalt Paver	0	0.2	100%	0.2	0	25	7	0	0	0.276	2.762
Backhoe	6	0	100%	0	0	11	7	55	0	0.191	1.909
Compactor	3	0	100%	0	0	10	7	34	0	0.183	1.828
Crane small	8	0.5	50%	0.25	2	10	5	81	607.5	0.183	1.828
Crane large	3	0.5	100%	0.5	2	35	7	10	150	0.321	3.213
Dozer	1	0	100%	0	0	20	8	9	0	0.250	2.498
Generator	4	0	100%	0	0	0.5	9	49	0	0.047	0.475
Grader	3	0	100%	0	0	20	7	19	0	0.250	2.498
Light Tower	2	0	100%	0	0	0.25	9	23	0	0.035	0.348
Loader	4	0	100%	0	0	25	7	32	0	0.276	2.762
Maxi Sneeker (Trencher)	5	0	100%	0	0	5	9	49	0	0.134	1.339
Skid Steer (Bobcat)	4	0	100%	0	0	2	7	34	0	0.089	0.886
Welding Machine	4	0	100%	0	0	0.5	5	43	0	0.047	0.475
Equipment fueled with Propane											
Aerial Lift	6	1	50%	0.5	3	4	6	48	720	0.121	1.211
Fork Lift	8	1	50%	0.5	4	3	4	93	1395	0.106	1.064
Telehandler	5	1	50%	0.5	3	3	6	43	645	0.106	1.064
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	72	0	0.198	1.985
Concrete Pump	0	6	8%	0.48	0	20	12	0	0	0.250	2.498
Dump Truck	4	7	50%	3.5	14	20	12	28	2940	0.250	2.498
Flatbed Truck	9	28	0%	0	0	10	12	108	0	0.183	1.828
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.093	0.934
Pickup Truck	10	12	5%	0.6	6	4	12	120	2160	0.121	1.211
Water/Soiltac Truck	6	12	75%	9	54	20	12	56	15120	0.250	2.498
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.242	2.417
Worker Passenger Vehicles	479	0.3	0%	0	0	2	12	4083	0	0.089	0.886
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	0%	0	0	20	24	15	0	0.250	2.498
Suncatcher Pedestals Delivery Trucks	3	13	0%	0	0	20	24	10	0	0.250	2.498
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.250	2.498
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.250	2.498
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.250	2.498
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.250	2.498
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.250	2.498

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	68%	0.71	0.23	3.66	1.17	1.86%	0.56	0.18	0.07	0.02	0.37	0.12	0.06	0.02
Crane large	0%	68%	0.70	0.22	4.82	1.54	2.46%	0.24	0.08	0.07	0.02	0.48	0.15	0.02	0.01
Dozer	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	68%	0.66	0.21	3.63	1.16	1.85%	0.44	0.14	0.07	0.02	0.36	0.12	0.04	0.01
Fork Lift	0%	68%	1.18	0.38	4.25	1.36	2.17%	0.74	0.24	0.12	0.04	0.43	0.14	0.07	0.02
Telehandler	0%	68%	0.41	0.13	2.66	0.85	1.36%	0.34	0.11	0.04	0.01	0.27	0.09	0.03	0.01
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	68%	2.91	0.93	34.97	11.19	17.83%	3.67	1.17	0.29	0.09	3.50	1.12	0.37	0.12
Flatbed Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	68%	0.61	0.19	7.26	2.32	3.70%	1.31	0.42	0.06	0.02	0.73	0.23	0.13	0.04
Water/Soiltac Truck	0%	68%	11.24	3.60	134.88	43.16	68.77%	18.88	6.04	1.12	0.36	13.49	4.32	1.89	0.60
Well Water Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Metal Supports	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on unpaved surfaces			**18.42**	**5.89**	**196.13**	**62.76**		**26.18**	**8.38**	**1.84**	**0.59**	**19.61**	**6.28**	**2.62**	**0.84**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Bulldozing & grading EPA AP-42 Section 11.9

$E = \rho * 1 * s^{1.5} / M^{1.4}$ PM10 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.75 ρ = particle size multiplier for PM10
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.75 lb/hr of PM10

$E = \rho * 5.7 * s^{1.2} / M^{1.3}$ PM2.5 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.105 ρ = particle size multiplier for PM2.5
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.41 lb/hr of PM2.5

$E = \rho * 0.051 * S^{2.0}$ PM10 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.6 ρ = particle size multiplier for PM10
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
1.54 lb/VMT of PM10

$E = \rho * 0.040 * S^{2.5}$ PM2.5 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.031 ρ = particle size multiplier for PM2.5
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
0.17 lb/VMT of PM2.5

Equipment	Quantity/ month	Hours/ Day	VMT/day/ vehicle	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	VMT/year/ vehicle	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Compactor	3	7	2	68%	2.96	0.32	34	730	0.541	0.058
Dozer	1	8		68%	1.85	1.02	9		0.250	0.137
Maxi Sneeker (Trencher)	5	9	2	68%	4.94	0.53	49	730	0.901	0.097
Skid Steer (Bobcat)	4	7		68%	6.36	3.50	34		0.811	0.446
Grader	3	7	4	68%	5.92	0.64	19	1460	1.081	0.117
				Grading Total	**13.82**	**1.49**			**2.52**	**0.27**
				Bulldozing Total	**8.21**	**4.51**			**1.06**	**0.58**
				Total	**22.03**	**6.00**			**3.58**	**0.86**

12 months of earth work
12 total construction hours per work day
30 construction days per month

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Dirt Piling or Material Handling PM10 Emissions from Material Handling (lb/ton) from EPA AP-42 Chapter 13.2.4 Eq. 1

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ E = Emission factor (lb/ton material handled)

7.45 U = Mean Wind speed (mph) (from 1991-1995 Imperial Co. airport data)
12 M = Moisture content of surface material (%) (from Table 13.2.4-1 for cover at municipal landfill)

	$PM_{2.5}$	PM_{10}
k	0.053	0.35

0.00003 lb/ton of PM2.5
0.00022 lb/ton of PM10

Equipment	Quantity/ month	Hours/ Day	Material Handled per Day (ton)	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	Material Handled per year (ton)	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Backhoe	6	7	2,804	68%	0.1966	0.0298	55	1009503	0.035	0.005
Wheeled Loader	4	7	2,804	68%	0.1966	0.0298	32	1009503	0.035	0.005
Dump Trucks	4	12	5,608	68%	0.3932	0.0595	28	2,019,006	0.071	0.011
				Total	**0.79**	**0.12**			**0.14**	**0.02**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
Assume 50% soil movement from loaders and 50% from backhoes

4,033 yd3/day 5,608 ton/day
1,452,000 yd3/project 2,019,006 tons/project 2781 density of soil (lb/yd3)
(USDA NRCS Physical Soil Propert 0.5 depth of disturbance (yards)
total project for Niland Fine Sand and Rositas Fine Sand soil)
600 acres = 1,452,000 cubic yds, assume depth of soils moved is
3000 total acres disturbed as described in Table 3-17 of Project Description
only a small portion of this soil is picked up and moved via dump druck

Cover Storage Pile

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J SCAQMD Table A9-9-E

PM10 Emission factor from wind erosion of storage piles per day per acre

15 G = Silt content (%) (from CEQA Handbook Table A9-9-E-1 for blended ore and dirt)
12 H = Number of days with >= 0.01 inches of precipitation per year (from El Centro 2 SSW weather station WRCC)
2.5 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height
0.5 J = Fraction of TSP that is PM10 = 0.5
2.128 lb/acre/day

wind speed percentage based on 2005 wind speed data as recorded at El Centro 2 SSW station

Source	Quantity	Size of Pile (acre)	Hours/Day	Days/Year per Pile	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	2	1	24	182.5	68%	1.36	0.30	0.12	0.03

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
pile size assumed
piles present only for 6 months

Construction on-site fugitive dust PM10

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Month 6 construction on-site fugitive dust: Sealed Road - PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions	Months 4-15 construction on-site fugitive dust: Sealed Road - PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions
					lb/day					ton/year		
Diesel Construction Equipment												
Air Compressor	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	6	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Compactor	3	0	0.00	0.00	0.00	2.96	2.96	0.00	0.00	0.00	0.54	0.54
Crane small	8	0.5	0.45	0.00	1.17		1.62	0.07	0.00	0.18		0.25
Crane large	3	0.5	0.00	0.00	1.54		1.54	0.00	0.00	0.08		0.08
Dozer	1	0	0.00	0.00	0.00	1.85	1.85	0.00	0.00	0.00	0.25	0.25
Generator	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	3	0	0.00	0.00	0.00	5.92	5.92	0.00	0.00	0.00	1.08	1.08
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	4	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Maxi Sneeker (Trencher)	5	0	0.00	0.00	0.00	4.94	4.94	0.00	0.00	0.00	0.90	0.90
Skid Steer (Bobcat)	4	0	0.00	0.00	0.00	6.36	6.36	0.00	0.00	0.00	0.81	0.81
Welding Machine	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	6	1	0.17	0.00	1.16		1.33	0.02	0.00	0.14		0.16
Fork Lift	8	1	0.15	0.00	1.36		1.51	0.03	0.00	0.24		0.26
Telehandler	5	1	0.09	0.00	0.85		0.94	0.01	0.00	0.11		0.12
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	7.87	0.00		7.87	0.00	1.42	0.00		1.42
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	4	7	8.94	0.00	11.19	0.39	20.53	0.94	0.00	1.17	0.07	2.18
Flatbed Truck	9	28	56.84	0.00	0.00		56.84	10.23	0.00	0.00		10.23
Staff & Security Truck	5	33	3.90	0.00	0.00		3.90	0.70	0.00	0.00		0.70
Pickup Truck	10	12	6.47	0.00	2.32		8.79	1.16	0.00	0.42		1.58
Water/Soiltac Truck	6	12	11.50	0.00	43.16		54.66	1.61	0.00	6.04		7.65
Well Water Truck	1	39	0.00	8.25	0.00		8.25	0.00	1.48	0.00		1.48
Worker Passenger Vehicles	479	0.3	2.84	0.00	0.00		2.84	0.36	0.00	0.00		0.36
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	3	6	0.00	4.24	0.00		4.24	0.00	0.32	0.00		0.32
Suncatcher Pedestals Delivery Trucks	3	13	13.70	4.14	0.00		17.84	0.69	0.21	0.00		0.89
Stirling Engines	5	6	0.00	7.07	0.00		7.07	0.00	1.27	0.00		1.27
Suncatcher Metal Supports	10	6	0.00	14.15	0.00		14.15	0.00	2.55	0.00		2.55
Suncatcher Mirrors	6	6	0.00	8.49	0.00		8.49	0.00	1.53	0.00		1.53
Electrical and Control Systems	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Azimuth and Elevation Drive	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Storage piles						1.36	1.36				0.12	0.12
			105.06	**59.87**	**62.76**	**24.18**	**251.87**	**15.82**	**9.79**	**8.38**	**3.85**	**37.84**

Construction on-site fugitive dust PM2.5

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Month 6 construction on-site fugitive dust: Sealed Road - PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions	Months 4-15 construction on-site fugitive dust: Sealed Road - PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions
					lb/day					ton/year		
Diesel Construction Equipment												
Air Compressor	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	6	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Compactor	3	0	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.06	0.06
Crane small	8	0.5	0.07	0.00	0.12		0.18	0.01	0.00	0.02		0.03
Crane large	3	0.5	0.00	0.00	0.15		0.15	0.00	0.00	0.01		0.01
Dozer	1	0	0.00	0.00	0.00	1.02	1.02	0.00	0.00	0.00	0.14	0.14
Generator	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	3	0	0.00	0.00	0.00	0.64	0.64	0.00	0.00	0.00	0.12	0.12
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	4	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Maxi Sneeker (Trencher)	5	0	0.00	0.00	0.00	0.53	0.53	0.00	0.00	0.00	0.10	0.10
Skid Steer (Bobcat)	4	0	0.00	0.00	0.00	3.50	3.50	0.00	0.00	0.00	0.45	0.45
Welding Machine	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	6	1	0.02	0.00	0.12		0.14	0.00	0.00	0.01		0.02
Fork Lift	8	1	0.02	0.00	0.14		0.16	0.00	0.00	0.02		0.03
Telehandler	5	1	0.01	0.00	0.09		0.10	0.00	0.00	0.01		0.01
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	1.16	0.00		1.16	0.00	0.21	0.00		0.21
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	4	7	1.34	0.00	1.12	0.06	2.52	0.14	0.00	0.12	0.01	0.27
Flatbed Truck	9	28	8.45	0.00	0.00		8.45	1.52	0.00	0.00		1.52
Staff & Security Truck	5	33	0.54	0.00	0.00		0.54	0.10	0.00	0.00		0.10
Pickup Truck	10	12	0.94	0.00	0.23		1.17	0.17	0.00	0.04		0.21
Water/Soiltac Truck	6	12	1.72	0.00	4.32		6.04	0.24	0.00	0.60		0.85
Well Water Truck	1	39	0.00	1.23	0.00		1.23	0.00	0.22	0.00		0.22
Worker Passenger Vehicles	479	0.3	0.38	0.00	0.00		0.38	0.05	0.00	0.00		0.05
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	3	6	0.00	0.63	0.00		0.63	0.00	0.05	0.00		0.05
Suncatcher Pedestals Delivery Trucks	3	13	2.05	0.62	0.00		2.67	0.10	0.03	0.00		0.13
Stirling Engines	5	6	0.00	1.05	0.00		1.05	0.00	0.19	0.00		0.19
Suncatcher Metal Supports	10	6	0.00	2.11	0.00		2.11	0.00	0.38	0.00		0.38
Suncatcher Mirrors	6	6	0.00	1.26	0.00		1.26	0.00	0.23	0.00		0.23
Electrical and Control Systems	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Azimuth and Elevation Drive	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Storage piles						0.30	0.30				0.03	0.03
			15.55	**8.90**	**6.28**	**6.43**	**37.14**	**2.34**	**1.45**	**0.84**	**0.90**	**5.54**

Imperial Valley Solar
Fugitive Dust Emissions (offsite)
Peak month = 6
Maximum annual construction equipment activity occurs in months 4-15.

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
0.32 sL = road surface silt loading (grams per square meter) (g/m^2), Local CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust -
0.02 sL = road surface silt loading (grams per square meter) (g/m^2), Freeway Local Streets & Freeways (emission inventory code: 640-641-5400-0000), July 1997
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (month 6)	Number of Vehicles per year (months 4-15)	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Max Daily VMT (all vehicles)	Max Annual VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Vehicles with Onroad Engines for Emissions Estimates										
Busses	6	72	10	60	21600	12	12	30	0.005	0.038
Concrete Pump	0	0	40	0	0	20	12	30	0.012	0.083
Dump Truck	4	28	0	0	0	20	12	30	0.012	0.083
Flatbed Truck	9	108	0	0	0	10	12	30	0.004	0.029
Staff & Security Truck	5	60	0	0	0	2.25	24	30	0.000	0.003
Pickup Truck	10	120	0	0	0	4	12	30	0.001	0.007
Water/Soiltac Truck	6	56	0	0	0	20	12	30	0.012	0.083
Well Water Truck	1	12	143	143	51480	18.6	12	30	0.011	0.074
Worker Passenger Vehicles	479	4083	40	19173	4899200	2	12	30	0.000	0.002
Suncatcher Delivery Trucks										
General Materials Delivery Trucks	3	15	100	300	45000	20	24	30	0.012	0.083
Suncatcher Pedestals Delivery Trucks	3	10	240	720	72000	20	24	30	0.012	0.083
Stirling Engines	5	60	50	250	90000	20	24	30	0.002	0.013
Suncatcher Metal Supports	10	120	240	2400	864000	20	24	30	0.002	0.013
Suncatcher Mirrors	6	72	50	300	108000	20	24	30	0.002	0.013
Electrical and Control Systems	2	24	240	480	172800	20	24	30	0.002	0.013
Azimuth and Elevation Drive	2	24	50	100	36000	20	24	30	0.002	0.013

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.19	0.19	2.29	2.29	1.24%	0.41	0.41	0.03	0.03	0.33	0.33	0.06	0.06
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.88	0.88	10.58	10.58	5.71%	1.90	1.90	0.13	0.13	1.55	1.55	0.28	0.28
Worker Passenger Vehicles	0%	0%	3.45	3.45	41.39	41.39	22.36%	5.29	5.29	0.06	0.06	0.70	0.70	0.09	0.09
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	1.03	1.03	24.76	24.76	13.38%	1.86	1.86	0.15	0.15	3.63	3.63	0.27	0.27
Suncatcher Pedestals Delivery Trucks	0%	0%	2.48	2.48	59.42	59.42	32.10%	2.97	2.97	0.36	0.36	8.71	8.71	0.44	0.44
Stirling Engines	0%	0%	0.14	0.14	3.31	3.31	1.79%	0.60	0.60	0.02	0.02	0.42	0.42	0.08	0.08
Suncatcher Metal Supports	0%	0%	1.32	1.32	31.74	31.74	17.14%	5.71	5.71	0.17	0.17	4.07	4.07	0.73	0.73
Suncatcher Mirrors	0%	0%	0.17	0.17	3.97	3.97	2.14%	0.71	0.71	0.02	0.02	0.51	0.51	0.09	0.09
Electrical and Control Systems	0%	0%	0.26	0.26	6.35	6.35	3.43%	1.14	1.14	0.03	0.03	0.81	0.81	0.15	0.15
Azimuth and Elevation Drive	0%	0%	0.06	0.06	1.32	1.32	0.71%	0.24	0.24	0.01	0.01	0.17	0.17	0.03	0.03
TOTAL Fugitive emissions for vehicle travel offsite paved roads			**9.97**	**9.97**	**185.12**	**185.12**		**20.83**	**20.83**	**0.98**	**0.98**	**20.90**	**20.90**	**2.21**	**2.21**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months
delivery trucks can arrive at the site anytime during the day or night

Appendix B-2
Operational Emissions
(March 31, 2010 rev)

Estimated Daily Maximum Operational Emissions of Criteria Pollutants(lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.17	0.16	102.24	13.49	13.02	0.04
Worker Vehicles	0.04	0.03	6.88	0.64	0.64	0.01
Water Delivery Trucks from Westwind Well	0.08	0.07	0.57	0.27	1.27	0.00
Visitor Cars and Delivery Trucks	0.06	0.06	1.00	0.26	1.06	0.00
Subtotal of On-site Combustion Emissions	**0.36**	**0.32**	**110.76**	**14.68**	**16.85**	**0.07**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	112.60	16.70				
Worker Vehicles	2.35	0.26				
Water Delivery Trucks from Westwind Well	4.44	0.66				
Visitor Cars and Delivery Trucks	6.85	1.02				
Subtotal of On-Site Fugitive Emissions	**126.24**	**18.64**	**0.00**	**5.05**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**126.61**	**18.96**	**110.76**	**19.74**	**16.85**	**0.07**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.27	0.14	47.55	1.90	5.58	0.03
Water Delivery Trucks from Westwind Well	0.10	0.08	0.51	0.11	2.51	0.00
Visitor Cars and Delivery Trucks	0.20	0.16	5.71	0.40	5.62	0.01
Subtotal of Off-Site Combustion Emissions	**0.57**	**0.38**	**53.78**	**2.41**	**13.72**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	9.75	0.27				
Water Delivery Trucks from Westwind Well	5.70	0.83				
Visitor Cars and Delivery Trucks	12.91	1.77				
Subtotal of Off-Site Fugitive Emissions	**28.36**	**2.87**				
Subtotal of Off-Site Emissions	**28.92**	**3.25**	**53.78**	**2.41**	**13.72**	**0.04**
Total Maximum Emissions	**155.53**	**22.22**	**164.54**	**22.15**	**30.57**	**0.11**

Estimated Annual Maximum Operational Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.0003	0.0003	0.0019	0.0007	0.0221	0.0006
Maintenance & Security Vehicles and Equipment	0.03	0.03	18.40	2.43	2.34	0.01
Worker Vehicles	0.01	0.01	1.24	0.12	0.12	0.00
Water Delivery Trucks from Westwind Well	0.01	0.01	0.10	0.05	0.23	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.09	0.01	0.04	0.00
Subtotal of On-site Combustion Emissions	**0.05**	**0.05**	**19.83**	**2.61**	**2.75**	**0.01**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	20.27	3.01				
Worker Vehicles	0.42	0.05				
Water Delivery Trucks from Westwind Well	0.80	0.12				
Visitor Cars and Delivery Trucks	0.22	0.03				
Subtotal of On-Site Fugitive Emissions	**21.71**	**3.20**	**0.00**	**0.92**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**21.77**	**3.25**	**19.83**	**3.53**	**2.75**	**0.01**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.05	0.02	8.56	0.34	1.01	0.01
Water Delivery Trucks from Westwind Well	0.02	0.01	0.09	0.02	0.45	0.00
Visitor Cars and Delivery Trucks	0.01	0.01	0.65	0.03	0.23	0.00
Subtotal of Off-Site Combustion Emissions	**0.07**	**0.05**	**9.30**	**0.39**	**1.68**	**0.01**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	1.75	0.05				
Water Delivery Trucks from Westwind Well	1.03	0.07				
Visitor Cars and Delivery Trucks	0.48	0.88				
Subtotal of Off-Site FugitiveEmissions	**3.26**	**1.00**				
Subtotal of Off-Site Emissions	**3.33**	**1.04**	**9.30**	**0.39**	**1.68**	**0.01**
Total Maximum Emissions	**25.10**	**4.29**	**29.14**	**3.92**	**4.43**	**0.02**

Estimated Annual Maximum Operational Greenhouse Gases Emissions (metric tonnes/year)

Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
On-Site Operational Emissions					
On-Site Combustion Emissions					
Diesel Generator	2.64	0.00	0.00		2.65
Maintenance & Security Vehicles and Equipment	891.81	0.43	0.10		930.65
Worker Vehicles	98.79	0.01	0.01		100.69
Water Delivery Trucks from Westwind Well	23.91	0.00	0.00		24.04
Visitor Cars and Delivery Trucks	8.55	0.00	0.00		8.68
Subtotal of On-site Combustion Emissions	**1,025.71**	**0.44**	**0.10**		**1,066.71**
On-Site Fugitive Emissions					
Potential sulfur hexafluoride (SF_6) emissions leakage emissions from proposed circuit breakers and other transmissions system equipment				0.01	271.83
Subtotal of On-Site Fugitive Emissions				0.01	271.83
Subtotal of On-Site Emissions	**1,025.71**	**0.44**	**0.10**	**0.01**	**1,338.55**
Off-Site On-Road Emissions					
Off-Site Combustion Emissions					
Worker Vehicles	593.01	0.08	0.08		618.33
Water Delivery Trucks from Westwind Well	46.27	0.00	0.00		46.75
Visitor Cars and Delivery Trucks	52.89	0.01	0.01		54.84
Subtotal of Off-Site Combustion Emissions	**692.17**	**0.08**	**0.08**		**719.92**
Subtotal of Off-Site Emissions	**692.17**	**0.08**	**0.08**		**719.92**
Total Maximum Emissions	**1,717.88**	**0.52**	**0.19**	**0.01**	**2,058.47**

Imperial Valley Solar

Emissions from Emergency Diesel Generator

Rated Horsepower	**335**	**BHP**
Testing duration	**15**	**min/week**
Yearly testing	**52**	**week/year**
Expected non-emergency usage	**13**	**hr/yr**

Pollutant	Emision Factor	Emission Rate	Emission Rate per Testing	Yearly Emissions	Hourly Emission Rate	Annual Emission Rate
	g/HP/Hr	lb/hr	lb	lb/yr	g/s	g/s
NO_X	4.61	3.41	0.85	44.30	0.107	6.37E-04
CO	0.39	0.29	0.07	3.75	0.009	5.39E-05
VOC (Total Hydrocarbons)	0.15	0.11	0.03	1.44	0.003	2.07E-05
SO_X	0.12	0.09	0.02	1.15	0.003	1.66E-05
PM_{10}	0.06	0.04	0.01	0.58	0.001	8.29E-06
CO_2		447.54	111.88	5818.00	14.097	8.37E-02
CH_4		0.06	0.02	0.80	0.002	1.15E-05
N_2O		0.004	0.0011	0.06	0.0001	8.24E-07
CO_2e		450.20	112.55	5852.62	14.181	8.42E-02

Engine parameters

Flow Rate (acfm)	1218	17.726	m/s
Exhaust Temp (degrees C)	465	738.15	K
Stack Diameter (feet)	0.6667	0.2032	m
Stack height (feet) above ground	6.5	1.981	m
Fuel Use (gal/hr)[2]	20	20.000	gal/hr

Note:

1. The stack will be in outdoor enclosures, not in buildings.
2. Fuel use value is based on the engine parameter data in CARB Table 1 of "Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines", Oct 2000.
3. Emission rates for the criteria pollutant are based on vendor data (to meet Tier 3 requirements).
4. The stack will be in outdoor enclosures, not in buildings.
5. Greenhouse gas emission factors from CCAR General Reporting Protocol April 2008 Tables C.6 and C.7
6. Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

- CO_2 GWP (SAR, 1996) = 1
- CH_4 GWP (SAR, 1996) = 21
- N_2O GWP (SAR, 1996) = 310

Imperial Valley Solar

Equipment =	5000-gal above ground storage tank
Fuel =	Gasoline
Dimension=	88" W x 299" L x 67" H
Throughput (gal/year) =	85,000
Days of Operations (days/year) =	365

	TOG Emission Factor*	TOG Emissions	
Description	**(lbs/1000 gal)**	**(tons/Year)**	**(lbs/day)**
Working Loss		0.298	1.631
Breathing Loss		0.575	3.152
Vehicle Refueling - Vapor Displacement	0.74	0.031	0.172
Vehicle Refueling - Spillage	0.42	0.018	0.098
Total Vehicle Refueling		0.049	0.270
Total TOG Emissions		**0.922**	**5.053**

Note:

1. Emission estimate based on 85,000 gallon per year tank throughput.
2. Emission factors from CARB Emission Inventory Estimation Guidelines Section 4.10 GASOLINE DISPENSING FACILITIES (Revised May 1999)
3. Emission estimates from EPA Tank4.0.9d model results

Imperial Valley Solar

Table 5.2-27

Estimated maximum potential sulfur hexafluoride (SF_6) emissions leakage emissions from proposed circuit breakers and other transmissions system equipment

Breaker	Qty	Typical Make	Typical Model	SF6 Lbs/Bkr	Leakage Rate	Leakage Lbs/Yr (per Bkr)	Leakage Lbs/Yr (All Bkrs)	CO_2e emissions (metric tons/Yr)
230kV Main Breaker (2000A)	2	GE-Hitachi HVB	HP Series	240	1%	2.4	4.8	52.04
230kV Transformer Breaker (2000A)	5	GE-Hitachi HVB	HP Series	240	1%	2.4	12	130.09
34.5kV Capacitor Breaker (1200A)	10	GE-Hitachi HVB	HS Series	31	1%	0.31	3.1	33.61
34.5kV Solar Group Breaker (1200A)	15	GE-Hitachi HVB	HS Series	31	1%	0.31	4.65	50.41
48.3kV Capacitor Switcher	15	Southern States	CapSwitcher	7	0.50%	0.035	0.525	5.69
							CO_2e emissions (metric tons/Yr)	271.83

Note:

Greenhouse Gas Global Warming Potentials (GWPs) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

Greenhouse Gas	GWP (SAR, 1996)
SF_6	23,900

OPERATIONS AND MAINTENANCE VEHICLES REQUIREMENTS

Description	Activity	Make / Model	Fuel	Quantity	Frequency	Horse-power	Vehicle Weight (tons)	Assumed idle time on site during washing & maintaining the Suncatchers per vehicle (idle hr/day)	Max Daily Onsite Distance per Vehicle (mile/day)	Assumed distance percentage to drive on onsite sealed roads	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Travel to and from	Max Daily Total Distance per Vehicle (mile/day)	Max. Operating Hours / Day	Max. Operating Days / Month
Washing Vehicle	Mirror Washing	12 ton Truck	Gasoline	35	Daily	225	12	4.0	7	100%	0	on-site only	7	8	30
LRU Maintenance Truck with Boom	Field Servicing & Maintenance	10 ton Truck	Gasoline	20	Daily	200	10	4.0	7	100%	0	on-site only	7	8	30
Staff & Security Truck	Site Inspections & Security	Toyota Highlander or similar	Gasoline - Hybrid	5	Daily	187	2.25		33	100%	0	on-site only	33	24	30
Rubber-wheeled forklift with telescoping boom	SunCatcher PCU & Mirror Maintenance	Telehandler	Propane	2	Daily	50	4		10	100%	0	on-site only	10	8	30
Forklift	Warehousing of supplies		Propane	2	Daily	50	3		10	100%	0	on-site only	10	8	30
Telescoping Man Lift	Facility Maintenance and SunCatcher PCU & Mirror Maintenance		Propane	7	Daily	50	3		10	100%	0	on-site only	10	8	30
Staff Cars	Community to Work	Passenger vehicles	Gasoline & diesel	100	Daily	100	2		3	0%	40	El Centro	43	2	30
Van Pooling	To be Defined	Passenger Truck/Van	Gasoline	4	Daily	150	4		3	0%	40	El Centro	43	2	30
Visitor Cars	Sales, Deliveries, Services	Passenger vehicles	Gasoline & diesel	8	Daily	100	2		3	0%	50	San Diego	53	8	22
Delivery Trucks	Operations and Maintenance Supplies	5 ton Cargo	Diesel	1	Weekly	200	5		3	0%	50	El Centro / Detroit	53	2	5
	Waste Management	20 ton	Diesel	1	Weekly	250	20		3	0%	50	Class III sites	53	2	5
	Hazardous Waste	20 ton	Diesel	1	Weekly	250	20		3	0%	50	Class I sites	53	2	5
Water Delivery Trucks from Westwind Well	All onsite water will be delivered by truck	7000 gal truck	Diesel	1	Daily	250	18.6		21	0%	77	Westwind Well, Ocotillo	98	12	30
Transport Tractor Trailers	Spare Parts, Building Supplies, Temporary Rental Equipment	40-foot	Diesel	1	Weekly	250	20		10	70%	40	El Centro	50	2	5

Note:

1. **Bold** are offroad equipment
2. All other vehicles and equipment will use on-road engines
3. 70% of the time the Project will get the supplies from the El Centro, CA area and 30% of the time the Project will get the supplies from Detroit, MI.
4. Two CLASS I sites are: (1) Clean Harbors Buttonwillow Landfill (Solid Waste Facility) Lokern Road Kern County, CA - 340 miles to Solar Two site; (2) Chemical Waste Management Kettleman Hills Landfill (Solids Waste Facility) 36251 Old Skyline Road Kettleman City, CA 93239 - 400 miles to Solar Two site
5. The fenceline perimeter is approximately 20.5 miles. Each security vehicle is assumed to travel from the MSC around the perimeter plus one trip to the center of the site and back (plus 10% for misc trips) = 33 miles
6. Average distance from main service complex to center of east or west portion of the site is 3.5 miles thus the average round trip distance each maintenance vehicle travels is 7 miles
7. The Water Delivery Trucks from Westwind Well is assumed to make 7 round trips per day from Ocotillo Westwind well.

Imperial Valley Solar - Operation and Maintenance Equipment Emissions (on-site)

Emission Factors For Combustion Exhaust Emissions

Equipment Description	Horse-power	Vehicle Weight (lbs)	Fuel	Emission Factors (unit: g/mile or g/idle-hr for on-road vehicle and lb/hr for off-road equipment)									
				PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle													
Washing Vehicle (running)	225	24,000	Gasoline	0.030	0.013	0.499	0.041	0.114	0.016	1672.267	0.120	0.200	1736.79
Washing Vehicle (idling)	225	24,000	Gasoline	0.000	0.000	155.230	27.137	1.790	0.049	4776.900	0.343	0.571	4961.20
LRU Maintenance Truck with Boom (running)	200	20,000	Gasoline	0.030	0.013	0.499	0.041	0.114	0.016	1672.267	0.120	0.200	1736.79
LRU Maintenance Truck with Boom (idling)	200	20,000	Gasoline	0.000	0.000	155.230	27.137	1.790	0.049	4776.900	0.343	0.571	4961.20
Staff & Security Truck	187	4,500	Gasoline - Hybrid	0.010	0.010	2.100	0.055	0.030	0.010	326.296	0.050	0.060	345.95
Staff Cars	100	4,000	Gasoline & diesel	0.058	0.042	10.368	0.973	0.971	0.008	857.007	0.050	0.050	873.56
Van Pooling	150	8,000	Gasoline	0.034	0.020	1.236	0.035	0.068	0.014	1463.779	0.070	0.080	1490.05
Visitor Cars	100	4,000	Gasoline & diesel	0.058	0.042	10.368	0.973	0.971	0.008	857.007	0.050	0.050	873.56
Operations and Maintenance Supplies truck	200	10,000	Diesel	0.109	0.086	2.022	0.317	5.612	0.005	520.781	0.050	0.060	540.43
Waste Management truck	250	40,000	Diesel	1.697	1.523	12.353	5.780	27.548	0.030	3165.446	0.080	0.050	3182.63
Hazardous Waste truck	250	40,000	Diesel	1.697	1.523	12.353	5.780	27.548	0.030	3165.446	0.080	0.050	3182.63
Water Delivery Trucks from Westwind Well	250	37,200	Diesel	1.697	1.523	12.353	5.780	27.548	0.030	3165.446	0.080	0.050	3182.63
Transport Tractor Trailers truck	250	40,000	Diesel	1.697	1.523	12.353	5.780	27.548	0.030	3165.446	0.080	0.050	3182.63
Off-road Equipment													
Rubber-wheeled forklift with telescoping boom	50	8,000	Propane	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.001	19.28
Forklift	50	6,000	Propane	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.001	19.28
Telescoping Man Lift	50	6,000	Propane	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.001	19.28

Note:

1. Vehicle description in EMFAC2007 model
   - Washing vehicle is Medium-Heavy-Duty (MHD-CAT)
   - LRU Maintenance Truck with Boom is Light-Heavy-Duty (MHD-CAT)
   - Staff & Security Truck (gasoline) is Light-Heavy-Duty (LDT2-CAT)
   - Staff Car is Passenger Cars (LDA-ALL)
   - Van Pooling is Medium-Duty Trucks (MDV-CAT)
   - Visitor Cars is Passenger Cars (LDA-ALL)
   - Hydrogen Delivery Trucks is Heavy-Heavy-Duty (HHD-DSL)
   - Operations and Maintenance Supplies Delivery Truck is Light-Heavy-Duty (LHD1-DSL)
   - Waste Management Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Hazardous Waste Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Water Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Transport Tractor Trailer is Heavy-Heavy-Duty (HHD-DSL)
2. Criteria pollutant emission factors for propane fuel off-road equipment obtained from CARB OFFROAD2007.
3. Rubber-wheeled forklift with telescoping boom and telescoping man lift are all forklifts
4. PM emission factors determined using guidance from SCAQMD Final - Methodology to Calculate PM_{10} and $PM_{2.5}$ Significance Thresholds 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions

   On-road vehicles
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
   - $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250
   - Assume $PM_{2.5}$ and PM_{10} Fraction of total PM for gasoline hybrid car is: 1.000

   Off-road equipment
   - Assume $PM_{2.5}$ and PM_{10} Fraction of total PM for propane fuel equipment is: 1.000
5. The emissions of "Toyota Highlander Hybrid" meet the Tier 2/Bin 3 Federal emissions standard (reference source 3) and its performance is 27 mile/gallon in city (from Toyota website)
6. SO_2 emission factors for the Toyota Highlander Hybrid are from EMFAC2007- Light-Duty Trucks (LDT2-CAT).
7. N_2O emission factors for propane fuel off-road equipment are from reference source 1: Table C.4, California Climate Action Registry General Reporting Protocol Version 3.0, April 2008
8. CO_2 emission factors for gasoline and diesel fuel on-road vehicles are from EMFAC2007 model.
9. CH_4 and N_2O emission factors for the running vehicles (non-hybrid) are from reference source 2: Table C.5 (highest EF from model year 1993 to present), California Climate Action Registry General Reporting Protocol Version 3.0, April 2007
10. CH_4 and N_2O emission factors for the idling vehicles are scaled from the same type of running vehicle emission factor.
11. Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)
    - CO_2 GWP (SAR, 1996) = 1
    - CH_4 GWP (SAR, 1996) = 21
    - N_2O GWP (SAR, 1996) = 310

Daily Emissions For Combustion Exhaust Emissions

Equipment Description	No. Of Units	Max Daily Distance per Vehicle (mile/day)	Max Daily VMT (all units)	Max. Daily Emissions (lb/day) PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle													
Washing Vehicle (running)	35	7.0	245	0.016	0.007	0.269	0.022	0.062	0.009	902.435	0.065	0.108	937.253
Washing Vehicle (idling)	35	-	-	-	-	47.868	8.368	0.552	0.015	1,473.053	0.106	0.176	1,529.887
LRU Maintenance Truck with Boom (running)	20	7.0	140	0.009	0.004	0.154	0.013	0.035	0.005	515.677	0.037	0.062	535.573
LRU Maintenance Truck with Boom (idling)	20	-	-	-	-	27.353	4.782	0.315	0.009	841.744	0.060	0.101	874.221
Staff & Security Truck	5	33.0	165	0.004	0.004	0.763	0.020	0.011	0.004	118.588	0.018	0.022	125.729
Staff Cars	100	3.0	300	0.038	0.028	6.851	0.643	0.642	0.005	566.304	0.033	0.033	577.240
Van Pooling	4	3.0	12	0.001	0.001	0.033	0.001	0.002	0.000	38.690	0.002	0.002	39.385
Visitor Cars	8	3.0	24	0.003	0.002	0.548	0.051	0.051	0.000	45.304	0.003	0.003	46.179
Operations and Maintenance Supplies truck	1	3.0	3	0.001	0.001	0.013	0.002	0.037	0.000	3.441	0.000	0.000	3.571
Waste Management truck	1	3.0	3	0.011	0.010	0.082	0.038	0.182	0.000	20.917	0.001	0.000	21.031
Hazardous Waste truck	1	3.0	3	0.011	0.010	0.082	0.038	0.182	0.000	20.917	0.001	0.000	21.031
Water Delivery Trucks from Westwind Well	1	21.0	21	0.078	0.070	0.571	0.267	1.274	0.001	146.419	0.004	0.002	147.214
Transport Tractor Trailers truck	1	10.0	10	0.037	0.034	0.272	0.127	0.607	0.001	69.723	0.002	0.001	70.102
Off-road Equipment													
Rubber-wheeled forklift with telescoping boom	2			0.026	0.026	4.697	0.051	2.191	-	292.714	0.430	0.022	308.469
Forklift	2			0.026	0.026	4.697	0.051	2.191	-	292.714	0.430	0.022	308.469
Telescoping Man Lift	7			0.091	0.091	16.438	0.180	7.668	-	1,024.500	1.505	0.076	1,079.640
Max. Daily Emissions Total (lb/day)				**0.35**	**0.31**	**110.69**	**14.66**	**16.00**	**0.05**	**6,373.14**	**2.70**	**0.63**	**6,624.99**

Hourly Emissions For Combustion Exhaust Emissions

Equipment Description	Max. Operating Hours / Day	Max. Hourly Emissions (lb/hr) PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle											
Washing Vehicle (running)	8	0.002	0.001	0.034	0.003	0.008	0.001	112.804	0.008	0.013	117.157
Washing Vehicle (idling)	8	-	-	5.984	1.046	0.069	0.002	184.132	0.013	0.022	191.236
LRU Maintenance Truck with Boom (running)	8	0.001	0.001	0.019	0.002	0.004	0.001	64.460	0.005	0.008	66.947
LRU Maintenance Truck with Boom (idling)	8	-	-	3.419	0.598	0.039	0.001	105.218	0.008	0.013	109.278
Staff & Security Truck	24	0.000	0.000	0.032	0.001	0.000	0.000	4.941	0.001	0.001	5.239
Staff Cars	2	0.019	0.014	3.426	0.321	0.321	0.003	283.152	0.017	0.017	288.620
Van Pooling	2	0.000	0.000	0.016	0.000	0.001	0.000	19.345	0.001	0.001	19.692
Visitor Cars	8	0.000	0.000	0.069	0.006	0.006	0.000	5.663	0.000	0.000	5.772
Operations and Maintenance Supplies truck	2	0.000	0.000	0.007	0.001	0.019	0.000	1.721	0.000	0.000	1.786
Waste Management truck	2	0.006	0.005	0.041	0.019	0.091	0.000	10.459	0.000	0.000	10.515
Hazardous Waste truck	2	0.006	0.005	0.041	0.019	0.091	0.000	10.459	0.000	0.000	10.515
Water Delivery Trucks from Westwind Well	12	0.007	0.006	0.048	0.022	0.106	0.000	12.202	0.000	0.000	12.268
Transport Tractor Trailers truck	2	0.019	0.017	0.136	0.064	0.303	0.000	34.862	0.001	0.001	35.051
Off-road Equipment											
Rubber-wheeled forklift with telescoping boom	8	0.003	0.003	0.587	0.006	0.274	-	36.589	0.054	0.003	38.559
Forklift	8	0.003	0.003	0.587	0.006	0.274	-	36.589	0.054	0.003	38.559
Telescoping Man Lift	8	0.011	0.011	2.055	0.022	0.958	-	128.063	0.188	0.009	134.955
Max. Hourly Emissions Total (lb/hr)		**0.08**	**0.07**	**16.50**	**2.14**	**2.57**	**0.01**	**1,050.66**	**0.35**	**0.09**	**1,086.15**

Yearly Emissions For Combustion Exhaust Emissions

Equipment Description	Max. Operating Days / Month	Max. Annual Emissions (ton/year) PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle											
Washing Vehicle (running)	30	0.003	0.001	0.048	0.004	0.011	0.002	162.438	0.012	0.019	168.706
Washing Vehicle (idling)	30	-	-	8.616	1.506	0.099	0.003	265.150	0.019	0.032	275.380
LRU Maintenance Truck with Boom (running)	30	0.002	0.001	0.028	0.002	0.006	0.001	92.822	0.007	0.011	96.403
LRU Maintenance Truck with Boom (idling)	30	-	-	4.924	0.861	0.057	0.002	151.514	0.011	0.018	157.360
Staff & Security Truck	30	0.001	0.001	0.137	0.004	0.002	0.001	21.346	0.003	0.004	22.631
Staff Cars	30	0.007	0.005	1.233	0.116	0.115	0.001	101.935	0.006	0.006	103.903
Van Pooling	30	0.000	0.000	0.006	0.000	0.000	0.000	6.964	0.000	0.000	7.089
Visitor Cars	22	0.000	0.000	0.072	0.007	0.007	0.000	5.980	0.000	0.000	6.096
Operations and Maintenance Supplies truck	5	0.000	0.000	0.000	0.000	0.001	0.000	0.103	0.000	0.000	0.107
Waste Management truck	5	0.000	0.000	0.002	0.001	0.005	0.000	0.628	0.000	0.000	0.631
Hazardous Waste truck	5	0.000	0.000	0.002	0.001	0.005	0.000	0.628	0.000	0.000	0.631
Water Delivery Trucks from Westwind Well	30	0.014	0.013	0.103	0.048	0.229	0.000	26.355	0.001	0.000	26.499
Transport Tractor Trailers truck	5	0.001	0.001	0.008	0.004	0.018	0.000	2.092	0.000	0.000	2.103
Off-road Equipment											
Rubber-wheeled forklift with telescoping boom	30	0.005	0.005	0.845	0.009	0.394	-	52.689	0.077	0.004	55.524
Forklift	30	0.005	0.005	0.845	0.009	0.394	-	52.689	0.077	0.004	55.524
Telescoping Man Lift	30	0.016	0.016	2.959	0.032	1.380	-	184.410	0.271	0.014	194.335
Max. Annual Emissions Total (ton/year)		**0.05**	**0.05**	**19.83**	**2.60**	**2.73**	**0.01**	**1,127.74**	**0.48**	**0.11**	**1,172.92**

Imperial Valley Solar
Fugitive Dust Emissions (on-site)

Travel on sealed roads (paved)

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
7.4 sL = road surface silt loading (grams per square meter) (g/m^2), from AP-42 Table 13.2.1-4 for Municipal solid waste landfill
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	No. Of Unit	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on sealed roads	Max Daily Distance per Vehicle to drive on sealed roads (mile/day)	Max Daily VMT (all units)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Washing Vehicle	35	7	100%	7	245	12	8	30	0.044	0.297
LRU Maintenance Truck with Boom	20	7	100%	7	140	10	8	30	0.034	0.226
Staff & Security Truck	5	33	100%	33	165	2.25	24	30	0.003	0.024
Rubber-wheeled forklift with telescoping boom	2	10	100%	10	20	4	8	30	0.008	0.057
Forklift	2	10	100%	10	20	3	8	30	0.005	0.037
Telescoping Man Lift	7	10	100%	10	70	3	8	30	0.005	0.037
Staff Cars	100	3	0%	0	0	2.0	2	30	0.003	0.020
Van Pooling	4	3	0%	0	0	4	2	30	0.008	0.057
Visitor Cars	8	3	0%	0	0	2	8	22	0.003	0.020
Operations and Maintenance Supplies truck	1	3	0%	0	0	5	2	5	0.012	0.079
Waste Management truck	1	3	0%	0	0	20	2	5	0.096	0.639
Hazardous Waste truck	1	3	0%	0	0	20	2	5	0.096	0.639
Water Delivery Trucks from Westwind Well	1	21	0%	0	0	18.6	12	30	0.086	0.573
Transport Tractor Trailers truck	1	10	70%	7	7	20	2	5	0.096	0.639
	76									

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Washing Vehicle	0%	0%	9.09	9.09	72.68	72.68	62.08%	13.08	13.08	1.35	1.35	10.83	10.83	1.95	1.95
LRU Maintenance Truck with Boom	0%	0%	3.95	3.95	31.58	31.58	26.97%	5.68	5.68	0.59	0.59	4.70	4.70	0.85	0.85
Staff & Security Truck	0%	0%	0.16	0.16	3.90	3.90	3.33%	0.70	0.70	0.02	0.02	0.54	0.54	0.10	0.10
Rubber-wheeled forklift with telescoping boom	0%	0%	0.14	0.14	1.13	1.13	0.97%	0.20	0.20	0.02	0.02	0.16	0.16	0.03	0.03
Forklift	0%	0%	0.09	0.09	0.73	0.73	0.63%	0.13	0.13	0.01	0.01	0.10	0.10	0.02	0.02
Telescoping Man Lift	0%	0%	0.32	0.32	2.57	2.57	2.19%	0.46	0.46	0.05	0.05	0.36	0.36	0.07	0.07
Staff Cars	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Van Pooling	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Visitor Cars	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operations and Maintenance Supplies truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste Management truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hazardous Waste truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Delivery Trucks from Westwind Well	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Transport Tractor Trailers truck	0%	0%	2.24	2.24	4.47	4.47	3.82%	0.13	0.13	0.33	0.33	0.67	0.67	0.02	0.02
TOTAL Fugitive emissions for vehicles traveled on sealed road (paved)			**15.99**	**15.99**	**117.08**	**117.08**		**20.40**	**20.40**	**2.38**	**2.38**	**17.37**	**17.37**	**3.03**	**3.03**

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 1
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest

1.6 sL = road surface silt loading (grams per square meter) (g/m^2), From CARB - Emission Inventory Database - Section 7.8 SJV - Entrained Paved Road Dust - Rural Roads (emission inventory code: 640-643-5400-(
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	No. Of Unit	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on paved road	Max Daily Distance per Vehicle to drive on paved road (mile/day)	Max Daily VMT (all units)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Washing Vehicle	35	7	0%	0	0	12	8	30	0.016	0.109
LRU Maintenance Truck with Boom	20	7	0%	0	0	10	8	30	0.012	0.083
Staff & Security Truck	5	33	0%	0	0	2.25	24	30	0.001	0.008
Rubber-wheeled forklift with telescoping boom	2	10	0%	0	0	4	8	30	0.003	0.021
Forklift	2	10	0%	0	0	3	8	30	0.002	0.013
Telescoping Man Lift	7	10	0%	0	0	3	8	30	0.002	0.013
Staff Cars	100	3	100%	3	300	2	2	30	0.001	0.007
Van Pooling	4	3	100%	3	12	4	2	30	0.003	0.021
Visitor Cars	8	3	100%	3	24	2	8	22	0.001	0.007
Operations and Maintenance Supplies truck	1	3	100%	3	3	5	2	5	0.004	0.029
Waste Management truck	1	3	100%	3	3	20	2	5	0.035	0.236
Hazardous Waste truck	1	3	100%	3	3	20	2	5	0.035	0.236
Water Delivery Trucks from Westwind Well	1	21	100%	21	21	18.6	12	30	0.031	0.211
Transport Tractor Trailers truck	1	10	30%	3	3	20	2	5	0.035	0.236
	117									

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]		Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]
Washing Vehicle	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LRU Maintenance Truck with Boom	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber-wheeled forklift with telescoping boom	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Telescoping Man Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff Cars	0%	0%	1.05	1.05	2.10	2.10	22.93%	0.38	0.38	0.11	0.11	0.23	0.23	0.04	0.04
Van Pooling	0%	0%	0.12	0.12	0.25	0.25	2.71%	0.04	0.04	0.02	0.02	0.03	0.03	0.01	0.01
Visitor Cars	0%	0%	0.02	0.02	0.17	0.17	1.83%	0.02	0.02	0.00	0.00	0.02	0.02	0.00	0.00
Operations and Maintenance Supplies truck	0%	0%	0.04	0.04	0.09	0.09	0.95%	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00
Waste Management truck	0%	0%	0.35	0.35	0.71	0.71	7.72%	0.02	0.02	0.05	0.05	0.11	0.11	0.00	0.00
Hazardous Waste truck	0%	0%	0.35	0.35	0.71	0.71	7.72%	0.02	0.02	0.05	0.05	0.11	0.11	0.00	0.00
Water Delivery Trucks from Westwind Well	0%	0%	0.37	0.37	4.44	4.44	48.43%	0.80	0.80	0.05	0.05	0.66	0.66	0.12	0.12
Transport Tractor Trailers truck	0%	0%	0.35	0.35	0.71	0.71	7.72%	0.02	0.02	0.05	0.05	0.11	0.11	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on paved road			**2.67**	**2.67**	**9.17**	**9.17**		**1.31**	**1.31**	**0.35**	**0.35**	**1.27**	**1.27**	**0.18**	**0.18**

on-site fugitive

Vehicle Type	No. Of Unit	Max Daily Distance per Vehicle (mile/day)	Max. Operating Hours / Day	Assumed distance percentage to drive on sealed road (paved)	Assumed distance percentage to drive on paved road	Sealed Road - PM_{10} Fugitive Emissions (lb/day)	Paved Road - PM_{10} Fugitive Emissions (lb/day)	Total PM_{10} Fugitive Emissions (lb/day)
Washing Vehicle	35	7	8	100%	0%	72.68	0.00	72.68
LRU Maintenance Truck with Boom	20	7	8	100%	0%	31.58	0.00	31.58
Staff & Security Truck	5	33	24	100%	0%	3.90	0.00	3.90
Rubber-wheeled forklift with telescoping boom	2	10	8	100%	0%	1.13	0.00	1.13
Forklift	2	10	8	100%	0%	0.73	0.00	0.73
Telescoping Man Lift	7	10	8	100%	0%	2.57	0.00	2.57
Staff Cars	100	3	2	0%	100%	0.00	2.10	2.10
Van Pooling	4	3	2	0%	100%	0.00	0.25	0.25
Visitor Cars	8	3	8	0%	100%	0.00	0.17	0.17
Operations and Maintenance Supplies truck	1	3	2	0%	100%	0.00	0.09	0.09
Waste Management truck	1	3	2	0%	100%	0.00	0.71	0.71
Hazardous Waste truck	1	3	2	0%	100%	0.00	0.71	0.71
Water Delivery Trucks from Westwind Well	1	21	12	0%	100%	0.00	4.44	4.44
Transport Tractor Trailers truck	1	10	2	70%	30%	4.47	0.71	5.18
						117.08	**9.17**	**126.24**

Imperial Valley Solar - Operation and Maintenance Equipment Emissions (off-site)

Emission Factors For Combustion Exhaust Emissions

				Emission Factors (unit: g/mile or g/idle-hr for on-road vehicle and lb/hr for off-road equipment)									
Equipment Description	**Horse-power**	**Vehicle Weight (lbs)**	**Fuel**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROG**	**NO_x**	**SO_x**	**CO_2**	**CH_4**	**N_2O**	**Total GHG - CO_2e**
On-road Vehicle													
Washing Vehicle (running)	driving on-site only												
Washing Vehicle (idling)													
LRU Maintenance Truck with Boom (running)													
LRU Maintenance Truck with Boom (idling)													
Staff & Security Truck													
Staff Cars	100	4,000	Gasoline & diesel	0.029	0.015	5.348	0.214	0.631	0.003	353.633	0.050	0.050	370.18
Van Pooling	150	8,000	Gasoline	0.034	0.020	1.236	0.035	0.068	0.014	1463.779	0.070	0.080	1490.05
Visitor Cars	100	4,000	Gasoline & diesel	0.029	0.015	5.348	0.214	0.631	0.003	353.633	0.050	0.050	370.18
Operations and Maintenance Supplies truck	200	10,000	Diesel	0.052	0.033	0.532	0.101	4.522	0.005	520.781	0.050	0.060	540.43
Waste Management truck	250	40,000	Diesel	0.562	0.479	3.034	0.658	14.818	0.016	1670.679	0.080	0.050	1687.86
Hazardous Waste truck	250	40,000	Diesel	0.562	0.479	3.034	0.658	14.818	0.016	1670.679	0.080	0.050	1687.86
Water Delivery Trucks from Westwind Well	250	37,200	Diesel	0.562	0.479	3.034	0.658	14.818	0.016	1670.679	0.080	0.050	1687.86
Transport Tractor Trailers truck	250	40,000	Diesel	0.562	0.479	3.034	0.658	14.818	0.016	1670.679	0.080	0.050	1687.86
Off-road Equipment													
Rubber-wheeled forklift with telescoping boom	driving on-site only												
Forklift													
Telescoping Man Lift													

Note:

1. Vehicle description in EMFAC2007 model
   - Staff Car is Passenger Cars (LDA-ALL)
   - Van Pooling is Medium-Duty Trucks (MDV-CAT)
   - Visitor Cars is Passenger Cars (LDA-ALL)
   - Hydrogen Delivery Trucks is Heavy-Heavy-Duty (HHD-DSL)
   - Operations and Maintenance Supplies Delivery Truck is Light-Heavy-Duty (LHD1-DSL)
   - Waste Management Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Hazardous Waste Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Water Delivery Truck is Heavy-Heavy-Duty (HHD-DSL)
   - Transport Tractor Trailer is Heavy-Heavy-Duty (HHD-DSL)
2. PM emission factors determined using guidance from SCAQMD Final - Methodology to Calculate PM_{10} and $PM_{2.5}$ Significance Thresholds 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions

   On-road vehicles
   - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
   - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
   - $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
   - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250
   - Assume $PM_{2.5}$ and PM_{10} Fraction of total PM for gasoline hybrid car is: 1.000
3. CO_2 emission factors for gasoline and diesel fuel on-road vehicles are from EMFAC2007 model.
4. CH_4 and N_2O emission factors for the running vehicles (non-hybrid) are from reference source 2: Table C.5 (highest EF from model year 1993 to present), California Climate Action Registry General Reporting Protocol Version 3.0, April 2007
5. Greenhouse Gas Global Warming Potential (GWP) - Intergovernmental Panel on Climate Change, Second Assessment Report (1996)
   - CO_2 GWP (SAR, 1996) = 1
   - CH_4 GWP (SAR, 1996) = 21
   - N_2O GWP (SAR, 1996) = 310

Daily Emissions For Combustion Exhaust Emissions

Equipment Description	No. Of Units	Max Daily Distance per Vehicle within Imperial County (mile/day)	Max Daily VMT (all units)	Max. Daily Emissions (lb/day)									
				PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle													
Washing Vehicle (running)	driving on-site only												
Washing Vehicle (idling)													
LRU Maintenance Truck with Boom (running)													
LRU Maintenance Truck with Boom (idling)													
Staff & Security Truck													
Staff Cars	100	40.0	4,000	0.26	0.13	47.12	1.89	5.56	0.03	3,115.71	0.44	0.44	3,261.52
Van Pooling	4	40.0	160	0.01	0.01	0.44	0.01	0.02	0.00	515.87	0.02	0.03	525.13
Visitor Cars	8	50.0	400	0.03	0.01	4.71	0.19	0.56	0.00	311.57	0.04	0.04	326.15
Operations and Maintenance Supplies truck	1	50.0	50	0.01	0.00	0.06	0.01	0.50	0.00	57.35	0.01	0.01	59.52
Waste Management truck	1	50.0	50	0.06	0.05	0.33	0.07	1.63	0.00	184.00	0.01	0.01	185.89
Hazardous Waste truck	1	50.0	50	0.06	0.05	0.33	0.07	1.63	0.00	184.00	0.01	0.01	185.89
Water Delivery Trucks from Westwind Well	1	77.0	77	0.10	0.08	0.51	0.11	2.51	0.00	283.35	0.01	0.01	286.27
Transport Tractor Trailers truck	1	40.0	40	0.05	0.04	0.27	0.06	1.31	0.00	147.20	0.01	0.00	148.71
Off-road Equipment													
Rubber-wheeled forklift with telescoping boom	driving on-site only												
Forklift													
Telescoping Man Lift													
	Max. Daily Emissions Total (lb/day)			**0.57**	**0.38**	**53.78**	**2.41**	**13.72**	**0.04**	**4,799.04**	**0.55**	**0.54**	**4,979.07**

Hourly Emissions For Combustion Exhaust Emissions

Equipment Description	Max. Operating Hours / Day	Max. Hourly Emissions (lb/hr)									
		PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle											
Washing Vehicle (running)	driving on-site only										
Washing Vehicle (idling)											
LRU Maintenance Truck with Boom (running)											
LRU Maintenance Truck with Boom (idling)											
Staff & Security Truck											
Staff Cars	2	0.128	0.066	23.559	0.943	2.780	0.013	1,557.855	0.220	0.220	1,630.762
Van Pooling	2	0.006	0.003	0.218	0.006	0.012	0.002	257.935	0.012	0.014	262.564
Visitor Cars	8	0.003	0.002	0.589	0.024	0.069	0.000	38.946	0.006	0.006	40.769
Operations and Maintenance Supplies truck	2	0.003	0.002	0.029	0.006	0.249	0.000	28.677	0.003	0.003	29.759
Waste Management truck	2	0.031	0.026	0.167	0.036	0.816	0.001	91.998	0.004	0.003	92.944
Hazardous Waste truck	2	0.031	0.026	0.167	0.036	0.816	0.001	91.998	0.004	0.003	92.944
Water Delivery Trucks from Westwind Well	12	0.008	0.007	0.043	0.009	0.209	0.000	23.613	0.001	0.001	23.856
Transport Tractor Trailers truck	2	0.025	0.021	0.134	0.029	0.653	0.001	73.598	0.004	0.002	74.355
Off-road Equipment											
Rubber-wheeled forklift with telescoping boom	driving on-site only										
Forklift											
Telescoping Man Lift											
	Max. Hourly Emissions Total (lb/hour)	**0.23**	**0.15**	**24.91**	**1.09**	**5.60**	**0.02**	**2,164.62**	**0.25**	**0.25**	**2,247.95**

Yearly Emissions For Combustion Exhaust Emissions

Equipment Description	Max. Operating Days / Month	Max. Annual Emissions (ton/year)									
		PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-road Vehicle											
Washing Vehicle (running)	driving on-site only										
Washing Vehicle (idling)											
LRU Maintenance Truck with Boom (running)											
LRU Maintenance Truck with Boom (idling)											
Staff & Security Truck											
Staff Cars	30	0.05	0.02	8.48	0.34	1.00	0.00	560.83	0.08	0.08	587.07
Van Pooling	30	0.00	0.00	0.08	0.00	0.00	0.00	92.86	0.00	0.01	94.52
Visitor Cars	22	0.00	0.00	0.62	0.02	0.07	0.00	41.13	0.01	0.01	43.05
Operations and Maintenance Supplies truck	5	0.00	0.00	0.00	0.00	0.01	0.00	1.72	0.00	0.00	1.79
Waste Management truck	5	0.00	0.00	0.01	0.00	0.05	0.00	5.52	0.00	0.00	5.58
Hazardous Waste truck	5	0.00	0.00	0.01	0.00	0.05	0.00	5.52	0.00	0.00	5.58
Water Delivery Trucks from Westwind Well	30	0.02	0.01	0.09	0.02	0.45	0.00	51.00	0.00	0.00	51.53
Transport Tractor Trailers truck	5	0.00	0.00	0.01	0.00	0.04	0.00	4.42	0.00	0.00	4.46
Off-road Equipment											
Rubber-wheeled forklift with telescoping boom	driving on-site only										
Forklift											
Telescoping Man Lift											
	Max. Annual Emissions Total (ton/year)	**0.07**	**0.05**	**9.30**	**0.39**	**1.68**	**0.01**	**762.99**	**0.09**	**0.09**	**793.58**

Imperial Valley Solar
Fugitive Dust Emissions (off-site)

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
0.32 sL = road surface silt loading (grams per square meter) (g/m^2), From CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust - Local Streets (emission inventory code: 640-641-5400-0000)
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	No. Of Unit	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on paved road	Max Daily Distance per Vehicle to drive on paved road (mile/day)	Max Daily VMT (all units)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Washing Vehicle	driving on-site only									
LRU Maintenance Truck with Boom										
Staff & Security Truck										
Rubber-wheeled forklift with telescoping boom										
Forklift										
Telescoping Man Lift										
Staff Cars	100	40.0	100%	40	4000	2	2	30	0.000	0.002
Van Pooling	4	40.0	100%	40	160	4	2	30	0.001	0.007
Visitor Cars	8	50.0	100%	50	400	2	8	22	0.000	0.002
Operations and Maintenance Supplies truck	1	50.0	100%	50	50	5	2	5	0.001	0.010
Waste Management truck	1	50.0	100%	50	50	20	2	5	0.012	0.083
Hazardous Waste truck	1	50.0	100%	50	50	20	2	5	0.012	0.083
Water Delivery Trucks from Westwind Well	1	77.0	100%	77	77	18.6	12	30	0.011	0.074
Transport Tractor Trailers truck	1	40.0	100%	40	40	20	2	5	0.012	0.083

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]		Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]	Unmitigated	Mitigated[7]
Washing Vehicle	driving on-site only														
LRU Maintenance Truck with Boom															
Staff & Security Truck															
Rubber-wheeled forklift with telescoping boom															
Forklift															
Telescoping Man Lift															
Staff Cars	0%	0%	4.32	4.32	8.63	8.63	30.45%	1.55	1.55	0.07	0.07	0.15	0.15	0.03	0.03
Van Pooling	0%	0%	0.56	0.56	1.11	1.11	3.93%	0.20	0.20	0.06	0.06	0.12	0.12	0.02	0.02
Visitor Cars	0%	0%	0.11	0.11	0.86	0.86	3.04%	0.11	0.11	0.00	0.00	0.01	0.01	0.00	0.00
Operations and Maintenance Supplies truck	0%	0%	0.25	0.25	0.50	0.50	1.75%	0.01	0.01	0.03	0.03	0.06	0.06	0.00	0.00
Waste Management truck	0%	0%	2.06	2.06	4.13	4.13	14.55%	0.12	0.12	0.30	0.30	0.60	0.60	0.02	0.02
Hazardous Waste truck	0%	0%	2.06	2.06	4.13	4.13	14.55%	0.12	0.12	0.30	0.30	0.60	0.60	0.02	0.02
Water Delivery Trucks from Westwind Well	0%	0%	0.47	0.47	5.70	5.70	20.09%	1.03	1.03	0.07	0.07	0.83	0.83	0.15	0.15
Transport Tractor Trailers truck	0%	0%	1.65	1.65	3.30	3.30	11.64%	0.10	0.10	0.24	0.24	0.48	0.48	0.01	0.01
TOTAL Fugitive emissions for vehicles traveled on paved road			**11.48**	**11.48**	**28.36**	**28.36**		**3.26**	**3.26**	**1.08**	**1.08**	**2.87**	**2.87**	**0.25**	**0.25**

off-site fugitive

Vehicle Type	No. Of Unit	Max Daily Distance per Vehicle (mile/day)	Max. Operating Hours / Day	Assumed distance percentage to drive on unpaved road	Assumed distance percentage to drive on paved road	Unpaved Road - PM_{10} Fugitive Emissions (lb/day)	Paved Road - PM_{10} Fugitive Emissions (lb/day)	Total PM_{10} Fugitive Emissions (lb/day)
Washing Vehicle	driving on-site only							
LRU Maintenance Truck with Boom								
Staff & Security Truck								
Rubber-wheeled forklift with telescoping boom								
Forklift								
Telescoping Man Lift								
Staff Cars	100	40	2	0%	100%	0.00	8.63	8.63
Van Pooling	4	40	2	0%	100%	0.00	1.11	1.11
Visitor Cars	8	50	8	0%	100%	0.00	0.86	0.86
Operations and Maintenance Supplies truck	1	50	2	0%	100%	0.00	0.50	0.50
Waste Management truck	1	50	2	0%	100%	0.00	4.13	4.13
Hazardous Waste truck	1	50	2	0%	100%	0.00	4.13	4.13
Water Delivery Trucks from Westwind Well	1	77	12	0%	100%	0.00	5.70	5.70
Transport Tractor Trailers truck	1	40	2	0%	100%	0.00	3.30	3.30
						0.00	**28.36**	**28.36**

Appendix B-3a
Construction and Operation Overlap Emissions
(March 31, 2010 rev.)

Estimated Maximum Daily Construction and Operations Overlapping Emissions for Month 8 (lbs/day)

CONSTRUCTION						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_x**	**SO_x**
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	13.33	12.28	173.12	38.63	201.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.64	0.25	0.25	0.00
Security Vehicles	0.00	0.00	0.76	0.02	0.01	0.00
Water Well Trucks	0.15	0.13	1.06	0.50	2.37	0.00
Suncatcher Delivery Trucks	0.63	0.56	4.57	2.14	10.19	0.01
Subtotal of On-site Combustion Emissions	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**
On-Site Fugitive Dust Emissions						
Construction Equipment	22.23	5.34				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.28	0.31				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	39.61	5.89				
Subtotal of On-Site Fugitive Dust Emissions	**203.08**	**30.32**				
Subtotal of On-Site Emissions	**218.44**	**44.40**	**200.27**	**46.44**	**234.90**	**0.24**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.00
Worker Vehicles	0.98	0.51	181.56	7.27	21.42	0.10
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.74	4.04	25.60	5.55	125.01	0.13
Subtotal of Off-Site Combustion Emissions	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	33.27	0.57				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	71.44	9.62				
Subtotal of Off-Site Fugitive Emissions	**117.57**	**12.05**				
Subtotal of Off-Site Emissions	**123.48**	**16.76**	**209.66**	**13.09**	**151.68**	**0.24**
Total Maximum Annual Emissions	**341.92**	**61.16**	**409.93**	**59.53**	**386.58**	**0.48**
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.00	0.00	2.45	0.32	0.31	0.00
Worker Vehicles	0.00	0.00	0.17	0.02	0.02	0.00
Water Delivery Trucks from Westwind Well	0.00	0.00	0.01	0.01	0.03	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.02	0.01	0.03	0.00
Subtotal of On-site Combustion Emissions	**0.02**	**0.02**	**2.73**	**0.38**	**1.24**	**0.02**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	2.70	0.40				
Worker Vehicles	0.06	0.01				
Water Delivery Trucks from Westwind Well	0.11	0.02				
Visitor Cars and Delivery Trucks	0.16	0.02				
Subtotal of On-Site Fugitive Dust Emissions	**3.03**	**0.45**		**5.05**		
Subtotal of On-Site Emissions	**3.05**	**0.47**	**2.73**	**5.43**	**1.24**	**0.02**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.00	1.14	0.05	0.13	0.00
Water Delivery Trucks from Westwind Well	0.00	0.00	0.01	0.00	0.06	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.14	0.01	0.13	0.00
Subtotal of Off-Site Combustion Emissions	**0.01**	**0.01**	**1.29**	**0.06**	**0.33**	**0.00**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.23	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Westwind Well	0.14	0.02	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.31	0.04	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	**0.68**	**0.07**	**0.00**	**0.00**	**0.00**	**0.00**
Subtotal of Off-Site Emissions	**0.69**	**0.08**	**1.29**	**0.06**	**0.33**	**0.00**
Total Maximum Emissions	**3.74**	**0.54**	**4.02**	**5.49**	**1.57**	**0.02**
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	**221.48**	**44.87**	**203.00**	**51.88**	**236.14**	**0.26**
Total of Off-Site Emissions Construction & Operations	**124.18**	**16.83**	**210.95**	**13.15**	**152.01**	**0.24**
Construction & Operations Overlap Total	**345.66**	**61.70**	**413.95**	**65.02**	**388.14**	**0.51**

Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 8-19 (tons/year)

CONSTRUCTION						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_x**	**SO_x**
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.73	1.59	27.16	5.29	25.37	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.20	0.18	3.06	0.82	3.37	0.004
Worker Vehicles	0.002	0.002	0.397	0.037	0.037	0.0003
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.102	0.092	0.742	0.347	1.655	0.002
Subtotal of On-site Combustion Emissions	**2.07**	**1.89**	**31.68**	**6.59**	**30.86**	**0.03**
On-Site Fugitive Dust Emissions						
Construction Equipment	3.68	0.80				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	20.26	2.73				
Worker Vehicles	0.34	0.05				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	6.43	0.96				
Subtotal of On-Site Fugitive Dust Emissions	**32.91**	**4.85**				
Subtotal of On-Site Emissions	**34.97**	**6.74**	**31.68**	**6.59**	**30.86**	**0.03**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.26	0.01	0.10	0.00
Worker Vehicles	0.15	0.08	27.30	1.09	3.22	0.02
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.79	0.68	4.28	0.93	20.89	0.02
Subtotal of Off-Site Combustion Emissions	**0.97**	**0.78**	**32.00**	**2.07**	**25.04**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.38	0.05				
Worker Vehicles	5.00	0.08				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	8.77	1.13				
Subtotal of Off-Site Fugitive Emissions	**16.06**	**1.55**				
Subtotal of Off-Site Emissions	**17.04**	**2.33**	**32.00**	**2.07**	**25.04**	**0.04**
Total Maximum Annual Emissions	**52.01**	**9.07**	**63.69**	**8.65**	**55.90**	**0.07**
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.00	0.00	0.00	0.00	0.02	0.00
Maintenance & Security Vehicles and Equipment	0.00	0.00	2.89	0.38	0.37	0.00
Worker Vehicles	0.00	0.00	0.19	0.02	0.02	0.00
Water Delivery Trucks from Westwind Well	0.00	0.00	0.02	0.01	0.04	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.01	0.00	0.01	0.00
Subtotal of On-site Combustion Emissions	**0.01**	**0.01**	**3.12**	**0.41**	**0.45**	**0.00**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	3.18	0.47				
Worker Vehicles	0.07	0.01				
Water Delivery Trucks from Westwind Well	0.13	0.02				
Visitor Cars and Delivery Trucks	0.03	0.01				
Subtotal of On-Site Fugitive Dust Emissions	**3.41**	**0.50**		**0.92**		
Subtotal of On-Site Emissions	**3.42**	**0.51**	**3.12**	**1.33**	**0.45**	**0.00**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.00	1.34	0.05	0.16	0.00
Water Delivery Trucks from Westwind Well	0.00	0.00	0.01	0.00	0.07	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.10	0.00	0.04	0.00
Subtotal of Off-Site Combustion Emissions	**0.01**	**0.01**	**1.46**	**0.06**	**0.26**	**0.00**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.28	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Westwind Well	0.16	0.01	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.07	0.14	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	**0.51**	**0.16**	**0.00**	**0.00**	**0.00**	**0.00**
Subtotal of Off-Site Emissions	**0.52**	**0.16**	**1.46**	**0.06**	**0.26**	**0.00**
Total Maximum Emissions	**3.94**	**0.67**	**4.58**	**1.39**	**0.71**	**0.00**
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	**38.39**	**7.25**	**34.80**	**7.92**	**31.31**	**0.03**
Total of Off-Site Emissions Construction & Operations	**17.56**	**2.49**	**33.46**	**2.13**	**25.31**	**0.04**
Construction & Operations Overlap Total	**55.95**	**9.74**	**68.26**	**10.05**	**56.62**	**0.07**

Anticipated Operational Capacity by Month of Construction Schedule

Month in Construction Schedule	MW Online	Fraction of peak MW
8	18	0.024
9	36	0.048
10	54	0.072
11	72	0.096
12	90	0.120
13	108	0.144
14	126	0.168
15	144	0.192
16	162	0.216
17	180	0.240
18	198	0.264
19	225	0.300
20	252	0.336
21	279	0.372
22	306	0.408
23	333	0.444
24	360	0.480
25	387	0.516
26	414	0.552
27	441	0.588
28	468	0.624
29	495	0.660
30	522	0.696
31	549	0.732
32	576	0.768
33	603	0.804
34	630	0.840
35	657	0.876
36	684	0.912
37	711	0.948
38	738	0.984
39	750	1.000
40	750	1.000

Year in Construction Schedule	Average Annual MW Online	Fraction of peak MW
8-19	118	0.16
9-20	137	0.18
10-21	158	0.21
11-22	179	0.24
12-23	200	0.27
13-24	223	0.30
14-25	246	0.33
15-26	270	0.36
16-27	295	0.39
17-28	320	0.43
18-29	347	0.46
19-30	374	0.50
20-31	401	0.53
21-32	428	0.57
22-33	455	0.61
23-34	482	0.64
24-35	509	0.68
25-36	536	0.71
26-37	563	0.75
27-38	590	0.79
28-39	615	0.82
29-40	639	0.85

Note: from month 8 - 18 18 MW will come online per month
after that 27 MW will come online per month until full 750MW buildout

Activity	PM10	PM2.5	CO	ROC	NOx	SOx
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.0003	0.0003	0.0019	0.0007	0.0221	0.0006
Maintenance & Security Vehicles and Equipment	0.03	0.03	18.40	2.43	2.34	0.01
Worker Vehicles	0.01	0.01	1.24	0.12	0.12	0.00
Water Delivery Trucks from Westwind Well	0.01	0.01	0.10	0.05	0.23	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.09	0.01	0.04	0.00
Subtotal of On-site Combustion Emissions	**0.05**	**0.05**	**19.83**	**2.61**	**2.75**	**0.01**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	20.27	3.01				
Worker Vehicles	0.42	0.05				
Water Delivery Trucks from Westwind Well	0.80	0.12				
Visitor Cars and Delivery Trucks	0.22	0.03				
Subtotal of On-Site Fugitive Emissions	**21.71**	**3.20**	**0.00**	**0.92**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**21.77**	**3.25**	**19.83**	**3.53**	**2.75**	**0.01**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.05	0.02	8.56	0.34	1.01	0.01
Water Delivery Trucks from Westwind Well	0.02	0.01	0.09	0.02	0.45	0.00
Visitor Cars and Delivery Trucks	0.01	0.01	0.65	0.03	0.23	0.00
Subtotal of Off-Site Combustion Emissions	**0.07**	**0.05**	**9.30**	**0.39**	**1.68**	**0.01**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	1.75	0.05				
Water Delivery Trucks from Westwind Well	1.03	0.07				
Visitor Cars and Delivery Trucks	0.48	0.88				
Subtotal of Off-Site FugitiveEmissions	**3.26**	**1.00**				
Subtotal of Off-Site Emissions	**3.33**	**1.04**	**9.30**	**0.39**	**1.68**	**0.01**
Total Maximum Emissions	**25.10**	**4.29**	**29.14**	**3.92**	**4.43**	**0.02**

Estimated Daily Maximum Operational Emissions of Criteria Pollutants(lbs/day)

Activity	PM10	PM2.5	CO	ROC	NOx	SOx
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.17	0.16	102.24	13.49	13.02	0.04
Worker Vehicles	0.04	0.03	6.88	0.64	0.64	0.01
Water Delivery Trucks from Westwind Well	0.08	0.07	0.57	0.27	1.27	0.00
Visitor Cars and Delivery Trucks	0.06	0.06	1.00	0.26	1.06	0.00
Subtotal of On-site Combustion Emissions	**0.36**	**0.32**	**110.76**	**14.68**	**16.85**	**0.07**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	112.60	16.70				
Worker Vehicles	2.35	0.26				
Water Delivery Trucks from Westwind Well	4.44	0.66				
Visitor Cars and Delivery Trucks	6.85	1.02				
Subtotal of On-Site Fugitive Emissions	**126.24**	**18.64**	**0.00**	**5.05**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**126.61**	**18.96**	**110.76**	**19.74**	**16.85**	**0.07**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.27	0.14	47.55	1.90	5.58	0.03
Water Delivery Trucks from Westwind Well	0.10	0.08	0.51	0.11	2.51	0.00
Visitor Cars and Delivery Trucks	0.20	0.16	5.71	0.40	5.62	0.01
Subtotal of Off-Site Combustion Emissions	**0.57**	**0.38**	**53.78**	**2.41**	**13.72**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	9.75	0.27				
Water Delivery Trucks from Westwind Well	5.70	0.83				
Visitor Cars and Delivery Trucks	12.91	1.77				
Subtotal of Off-Site Fugitive Emissions	**28.36**	**2.87**				
Subtotal of Off-Site Emissions	**28.92**	**3.25**	**53.78**	**2.41**	**13.72**	**0.04**
Total Maximum Emissions	**155.53**	**22.22**	**164.54**	**22.15**	**30.57**	**0.11**

Estimated Annual Construction Emissions of Criteria Pollutants (tons/year) during Month 8-19

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.73	1.59	27.16	5.29	25.37	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.204	0.182	3.058	0.820	3.369	0.004
Worker Vehicles	0.002	0.002	0.397	0.037	0.037	0.000
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.102	0.092	0.742	0.347	1.655	0.002
Subtotal of On-site Combustion Emissions	**2.07**	**1.89**	**31.68**	**6.59**	**30.86**	**0.03**
On-Site Fugitive Dust Emissions						
Construction Equipment	3.68	0.80				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	20.26	2.73				
Worker Vehicles	0.34	0.05				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	6.43	0.96				
Subtotal of On-Site Fugitive Emissions	**32.91**	**4.85**				
Subtotal of On-Site Emissions	**34.97**	**6.74**	**31.68**	**6.59**	**30.86**	**0.03**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.26	0.01	0.10	0.00
Worker Vehicles	0.15	0.08	27.30	1.09	3.22	0.02
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.79	0.68	4.28	0.93	20.89	0.02
Subtotal of Off-Site Combustion Emissions	**0.97**	**0.78**	**32.00**	**2.07**	**25.04**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.38	0.05				
Worker Vehicles	5.00	0.08				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	8.77	1.13				
Subtotal of Off-Site Fugitive Emissions	**16.06**	**1.55**				
Subtotal of Off-Site Emissions	**17.04**	**2.33**	**32.00**	**2.07**	**25.04**	**0.04**
Total Maximum Annual Emissions	**52.01**	**9.07**	**63.69**	**8.65**	**55.90**	**0.07**

Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day) in Month 8

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	13.33	12.28	173.12	38.63	201.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.64	0.25	0.25	0.002
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Well Trucks	0.146	0.131	1.061	0.497	2.366	0.003
Suncatcher Delivery Trucks	0.63	0.56	4.57	2.14	10.19	0.01
Subtotal of On-site Combustion Emissions	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**
On-Site Fugitive Emissions						
Construction Equipment	22.23	5.34				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.28	0.31				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	39.61	5.89				
Subtotal of On-Site Fugitive Emissions	**203.08**	**30.32**				
Subtotal of On-Site Emissions	**218.44**	**44.40**	**200.27**	**46.44**	**234.90**	**0.24**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.001
Worker Vehicles	0.98	0.51	181.56	7.27	21.42	0.10
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.74	4.04	25.60	5.55	125.01	0.13
Subtotal of Off-Site Combustion Emissions	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	33.27	0.57				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	71.44	9.62				
Subtotal of Off-Site Fugitive Emissions	**117.57**	**12.05**				
Subtotal of Off-Site Emissions	**123.48**	**16.76**	**209.66**	**13.09**	**151.68**	**0.24**
Total Maximum Daily Emissions	**341.92**	**61.16**	**409.93**	**59.53**	**386.58**	**0.48**

Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day) in Month 8

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	13.33	12.28	173.12	38.63	201.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.64	0.25	0.25	0.002
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Well Trucks	0.146	0.131	1.061	0.497	2.366	0.003
Suncatcher Delivery Trucks	0.63	0.56	4.57	2.14	10.19	0.01
Subtotal of On-site Combustion Emissions	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**
On-Site Fugitive Emissions						
Construction Equipment	22.23	5.34				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.28	0.31				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	39.61	5.89				
Subtotal of On-Site Fugitive Emissions	**203.08**	**30.32**				
Subtotal of On-Site Emissions	**218.44**	**44.40**	**200.27**	**46.44**	**234.90**	**0.24**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.001
Worker Vehicles	0.98	0.51	181.56	7.27	21.42	0.10
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.74	4.04	25.60	5.55	125.01	0.13
Subtotal of Off-Site Combustion Emissions	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	33.27	0.57				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	71.44	9.62				
Subtotal of Off-Site Fugitive Emissions	**117.57**	**12.05**				
Subtotal of Off-Site Emissions	**123.48**	**16.76**	**209.66**	**13.09**	**151.68**	**0.24**
Total Maximum Daily Emissions	**341.92**	**61.16**	**409.93**	**59.53**	**386.58**	**0.48**

Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day) in Month 8

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	13.33	12.28	173.12	38.63	201.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.64	0.25	0.25	0.002
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Well Trucks	0.146	0.131	1.061	0.497	2.366	0.003
Suncatcher Delivery Trucks	0.63	0.56	4.57	2.14	10.19	0.01
Subtotal of On-site Combustion Emissions	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**
On-Site Fugitive Emissions						
Construction Equipment	22.23	5.34				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.28	0.31				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	39.61	5.89				
Subtotal of On-Site Fugitive Emissions	**203.08**	**30.32**				
Subtotal of On-Site Emissions	**218.44**	**44.40**	**200.27**	**46.44**	**234.90**	**0.24**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.001
Worker Vehicles	0.98	0.51	181.56	7.27	21.42	0.10
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.74	4.04	25.60	5.55	125.01	0.13
Subtotal of Off-Site Combustion Emissions	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	33.27	0.57				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	71.44	9.62				
Subtotal of Off-Site Fugitive Emissions	**117.57**	**12.05**				
Subtotal of Off-Site Emissions	**123.48**	**16.76**	**209.66**	**13.09**	**151.68**	**0.24**
Total Maximum Daily Emissions	**341.92**	**61.16**	**409.93**	**59.53**	**386.58**	**0.48**

Construction Equipment Projection (750 MW)

Month After Construction Start

Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	1-12	2-13	3-14	4-15	5-16	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26	16-27	17-28	18-29	19-30	20-31	21-32	22-33	23-34	24-35	25-36	26-37	27-38	28-39	29-40	1-40 (entire construction)
Air Compressor	50	X			1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	1	1																							24	25	26	27	28	26	24	21	18	16	14	12	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	34
Asphalt Paver	120	X				1																																							1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe	120	X			3	9	5	5	5	6	6	5	4	4	4	4	4	4	4	4	1	1	1																						60	61	56	55	54	50	45	40	35	31	27	23	19	15	11	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	79
Compactor	120	X			1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2																									34	36	35	34	33	30	27	24	21	18	15	12	9	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Crane small	175	X			1	3	4	5	5	8	8	8	7	6	6	6	8	8	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	67	74	79	81	81	81	77	73	69	66	64	62	60	56	52	50	49	48	48	48	48	48	48	48	48	48	48	48	48	48	191
Crane large	500	X						3	3	3	1													3	3	3	3	3																	10	10	10	10	7	4	1	0	3	6	9	12	15	15	15	15	15	15	15	12	9	6	3	0	0	0	0	0	0	25
Dozer	250	X			1	1	1	1	1	1	1	1	1				1	1	1	1																									9	9	9	9	9	8	7	6	5	4	4	4	4	3	2	1	0	0	0	0	0	0	6	0	0	0	0	0	0	13
Generator	50	X			1	1	1	2	2	4	4	4	6	6	6	6	3	3	3	3	3	2	2	2	2	2	1	1	1																43	45	47	49	50	51	49	47	45	41	37	32	27	25	22	19	16	13	11	9	7	5	3	2	1	0	0	0	0	71
Grader	175	X			1	3	3	3	3	3	2	2	1				2	2	1	1																									21	22	21	19	17	14	11	9	7	6	6	6	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Light Tower	50	X						1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1																			17	19	21	23	24	23	22	21	20	19	17	15	13	11	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	30
Loader	250	X			1	3	3	4	4	4	3	3	2	1	1	1	3	3	3	2	1																							30	32	32	32	30	27	23	20	17	15	14	13	12	9	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
Maxi Sneeker (Trencher)	50	X				2	2	2	2	5	5	4	4	4	4	4	5	5	5	5	5	2	2	1																				38	43	46	49	52	55	52	49	46	42	38	34	30	25	20	15	10	5	3	1	0	0	0	0	0	0	0	0	0	0	0	68
Skid Steer (Bobcat)	50	X				1	1	2	2	4	3	3	2	2	2	2	4	4	4	4	4																							24	28	31	34	36	38	34	31	28	26	24	22	20	16	12	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Welding Machine	50	X				1	2	3	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1																					37	40	42	43	42	39	36	33	29	25	21	17	14	11	8	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	51
Equipment fueled with Propane																		

Construction Equipment Projection (750 MW)

Month After Construction Start

Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	1-12	2-13	3-14	4-15	5-16	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26	16-27	17-28	18-29	19-30	20-31	21-32	22-33	23-34	24-35	25-36	26-37	27-38	28-39	29-40	1-40 (entire construction)
Air Compressor	50	X			1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	1	1																							24	25	26	27	28	26	24	21	18	16	14	12	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	34
Asphalt Paver	120	X				1																																							1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe	120	X			3	9	5	5	5	6	6	5	4	4	4	4	4	4	4	4	1	1	1																						60	61	56	55	54	50	45	40	35	31	27	23	19	15	11	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	79
Compactor	120	X			1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2																									34	36	35	34	33	30	27	24	21	18	15	12	9	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Crane small	175	X			1	3	4	5	5	8	8	8	7	6	6	6	8	8	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	67	74	79	81	81	81	77	73	69	66	64	62	60	56	52	50	49	48	48	48	48	48	48	48	48	48	48	48	48	48	191
Crane large	500	X						3	3	3	1													3	3	3	3	3																	10	10	10	10	7	4	1	0	3	6	9	12	15	15	15	15	15	15	15	12	9	6	3	0	0	0	0	0	0	25
Dozer	250	X			1	1	1	1	1	1	1	1	1				1	1	1	1																									9	9	9	9	9	8	7	6	5	4	4	4	4	3	2	1	0	0	0	0	0	0	6	0	0	0	0	0	0	13
Generator	50	X			1	1	1	2	2	4	4	4	6	6	6	6	3	3	3	3	3	2	2	2	2	2	1	1	1																43	45	47	49	50	51	49	47	45	41	37	32	27	25	22	19	16	13	11	9	7	5	3	2	1	0	0	0	0	71
Grader	175	X			1	3	3	3	3	3	2	2	1				2	2	1	1																									21	22	21	19	17	14	11	9	7	6	6	6	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Light Tower	50	X						1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1																			17	19	21	23	24	23	22	21	20	19	17	15	13	11	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	30
Loader	250	X			1	3	3	4	4	4	3	3	2	1	1	1	3	3	3	2	1																							30	32	32	32	30	27	23	20	17	15	14	13	12	9	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
Maxi Sneeker (Trencher)	50	X				2	2	2	2	5	5	4	4	4	4	4	5	5	5	5	5	2	2	1																				38	43	46	49	52	55	52	49	46	42	38	34	30	25	20	15	10	5	3	1	0	0	0	0	0	0	0	0	0	0	0	68
Skid Steer (Bobcat)	50	X				1	1	2	2	4	3	3	2	2	2	2	4	4	4	4	4																							24	28	31	34	36	38	34	31	28	26	24	22	20	16	12	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Welding Machine	50	X				1	2	3	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1																					37	40	42	43	42	39	36	33	29	25	21	17	14	11	8	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	51
Equipment fueled with Propane																		

Construction Trade Projection (750 MW)

Discipline	Hours	Month After Construction Start																																														Highest Per Day Requirement by Solar Two During Project	El Centro Total Available for the Project
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
Carpenters	83,472	10	14	31	31	31	43	47	40	36	28	28	28	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	47	80
Concrete Crews	81,008	9	15	29	29	29	46	46	42	36	24	24	24	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	46	140
Electricians	212,010	17	28	57	57	57	84	84	60	54	54	54	54	69	69	113	105	105	88	48	48	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	0	0	0	0	0	113	210
Ironworkers	100,330	19	23	41	41	41	44	48	36	32	24	24	24	36	26	26	25	25	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	48	130
Laborers	153,557	17	43	65	62	62	142	142	68	30	30	30	30	56	41	51	46	46	32	22	17	17	17	17	17	17	17	17	10	10	10	10	10	10	10	10	0	0	0	0	0	142	540
Miscellaneous Crews	10,000	0	0	0	0	0	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	630
Operators	205,183	25	82	93	75	75	86	86	72	59	51	51	51	84	88	67	61	52	34	34	27	26	25	25	25	25	25	25	2	2	2	2	2	2	2	2	1	1	1	1	0	88	190
Plumbers	25,040	0	5	9	9	9	22	26	26	22	14	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	100
Solar Two Technicians	145,920	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Assemblers	371,200	0	0	0	0	0	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	N/A
SunCatcher Electricians	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Ironworkers	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Laborers	58,880	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Material Handlers	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Operators	29,440	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	N/A
SunCatcher Teamsters	44,160	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	N/A
SunCatcher Technicians	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
Teamsters	65,160	4	60	49	24	24	25	25	7	5	5	5	5	31	53	29	28	26	24	24	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	0	60	680
Technicians	3,504	0	0	0	0	0	5	5	5	5	5	5	5	5	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	60
Totals	**2,145,663**	**101**	**270**	**374**	**328**	**328**	**719**	**731**	**578**	**501**	**457**	**457**	**457**	**535**	**512**	**521**	**498**	**487**	**420**	**370**	**339**	**314**	**312**	**312**	**312**	**312**	**312**	**312**	**249**	**249**	**249**	**249**	**249**	**285**	**285**	**285**	**230**	**230**	**230**	**230**	**228**	**813**	**2,760**

Source: Bureau of Labor Statistics, 2008.

Note:

N/A = not applicable

14417 total personnel for 40 months
360 avg monthly personnel
731 max monthly personnel

Annual Onsite Combustion Emissions

Month 8-19

Construction Assumptions - 30 days per month

Equipment	Number of Vehicles per year	Hours/Day	Emission rate per piece of equipment (lb/hr)										Annual Emissions (ton/year)										Number of Vehicles (entire construction period)	entire construction period emissions (ton)									
			PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e		PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																																	
Air Compressor	21	6	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.000	22.478	0.05	0.05	0.51	0.22	0.44	0.00	40.37	0.02	0.00	40.78	34	0.08	0.07	0.83	0.35	0.71	0.00	65.37	0.03	0.00	66.03
Asphalt Paver	0	7	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.000	54.706	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1	0.01	0.01	0.05	0.02	0.09	0.00	6.08	0.00	0.00	6.11
Backhoe	40	7	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.000	51.869	0.22	0.20	1.45	0.39	2.40	0.00	204.66	0.04	0.00	205.40	79	0.43	0.40	2.86	0.78	4.74	0.00	404.20	0.07	0.00	405.67
Compactor	24	7	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.000	59.178	0.16	0.15	1.02	0.31	1.88	0.00	142.58	0.03	0.00	143.16	43	0.29	0.27	1.83	0.55	3.37	0.00	255.45	0.05	0.00	256.50
Crane small	73	5	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.000	80.514	0.32	0.29	2.77	0.72	5.56	0.01	453.56	0.06	0.00	454.92	191	0.83	0.77	7.24	1.88	14.54	0.01	1186.70	0.17	0.00	1190.27
Crane large	0	7	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.000	180.302	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25	0.19	0.17	1.85	0.49	4.84	0.00	464.24	0.04	0.00	465.18
Dozer	6	8	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.000	166.390	0.06	0.05	0.42	0.15	1.42	0.00	114.73	0.01	0.00	115.01	13	0.12	0.11	0.90	0.32	3.07	0.00	248.58	0.03	0.00	249.19
Generator	47	9	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.000	30.815	0.18	0.17	1.84	0.73	1.94	0.00	191.54	0.07	0.00	192.92	71	0.28	0.25	2.78	1.10	2.93	0.00	289.35	0.10	0.00	291.43
Grader	9	7	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.000	124.159	0.08	0.07	0.73	0.18	1.42	0.00	122.35	0.02	0.00	122.69	27	0.24	0.22	2.20	0.55	4.26	0.00	367.05	0.05	0.00	368.08
Light Tower	21	9	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.000	28.179	0.08	0.08	0.89	0.33	0.83	0.00	82.45	0.03	0.00	83.08	30	0.12	0.11	1.28	0.48	1.19	0.00	117.79	0.04	0.00	118.69
Loader	20	7	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.000	149.142	0.12	0.11	0.88	0.31	3.23	0.00	294.71	0.03	0.00	295.30	42	0.25	0.23	1.84	0.66	6.78	0.01	618.89	0.06	0.00	620.13
Maxi Sneeker (Trencher)	49	9	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.000	33.253	0.28	0.26	2.95	1.27	2.42	0.00	217.56	0.12	0.00	219.97	68	0.39	0.36	4.09	1.77	3.36	0.00	301.91	0.16	0.00	305.27
Skid Steer (Bobcat)	31	7	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.000	25.665	0.07	0.07	0.80	0.27	0.77	0.00	78.25	0.02	0.00	78.77	44	0.10	0.10	1.14	0.39	1.09	0.00	111.06	0.04	0.00	111.80
Welding Machine	33	5	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.000	26.175	0.08	0.07	0.82	0.34	0.73	0.00	69.32	0.03	0.00	69.97	51	0.12	0.11	1.26	0.52	1.13	0.00	107.14	0.05	0.00	108.13
Equipment fueled with Propane	0																																
Aerial Lift	40	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	4.67	0.02	0.74	0.00	103.45	0.16	0.00	106.77	137	0.03	0.03	15.99	0.06	2.52	0.00	354.31	0.54	0.00	365.70
Fork Lift	87	4	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.859	0.01	0.01	1.38	0.02	0.64	0.00	85.95	0.13	0.00	88.60	186	0.02	0.02	2.95	0.03	1.38	0.00	183.75	0.27	0.00	189.42
Telehandler	44	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	6.03	0.02	0.95	0.00	133.58	0.20	0.00	137.88	120	0.03	0.03	16.45	0.07	2.59	0.00	364.32	0.56	0.00	376.03
Vehicles with Onroad Engines for Emissions Estimates																																	
Busses	67	12	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.826	0.00	0.00	1.11	0.09	0.08	0.00	44.42	0.00	0.01	46.14	149	0.00	0.00	2.48	0.21	0.19	0.00	98.79	0.01	0.01	102.60
Concrete Pump Truck	0	12	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.505	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12	0.00	0.00	0.03	0.01	0.07	0.00	7.53	0.00	0.00	7.57
Dump Truck	10	12	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.089	0.00	0.00	0.03	0.01	0.06	0.00	7.32	0.00	0.00	7.36	46	0.02	0.02	0.13	0.06	0.29	0.00	33.68	0.00	0.00	33.85
Flatbed Truck	104	12	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.355	0.16	0.15	1.19	0.56	2.65	0.00	304.55	0.01	0.00	306.16	266	0.42	0.37	3.04	1.42	6.78	0.01	778.95	0.01	0.01	783.08
Staff & Security Truck	60	24	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.048	0.00	0.00	0.14	0.00	0.00	0.00	21.35	0.00	0.00	22.63	200	0.00	0.00	0.46	0.01	0.01	0.00	71.15	0.01	0.01	75.44
Pickup Truck	120	12	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.931	0.00	0.00	0.49	0.05	0.05	0.00	40.77	0.00	0.00	41.71	400	0.01	0.01	1.64	0.15	0.15	0.00	135.91	0.01	0.01	139.03
Water/Soiltac Truck	48	12	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.009	0.03	0.03	0.24	0.11	0.52	0.00	60.24	0.00	0.00	60.56	136	0.09	0.08	0.67	0.31	1.49	0.00	170.68	0.00	0.00	171.59
Well Water Truck	12	12	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.780	0.03	0.02	0.19	0.09	0.43	0.00	48.95	0.00	0.00	49.21	40	0.09	0.08	0.64	0.30	1.42	0.00	163.15	0.00	0.00	164.02
Worker Passenger Vehicles	3862	12	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.048	0.00	0.00	0.40	0.04	0.04	0.00	32.81	0.00	0.00	33.56	9611	0.01	0.00	0.99	0.09	0.09	0.00	81.64	0.00	0.01	83.52
Delivery Transport Trucks																																	
General Materials Delivery T	3	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.00	0.00	0.01	0.00	0.02	0.00	1.88	0.00	0.00	1.89	21	0.01	0.01	0.05	0.02	0.11	0.00	13.18	0.00	0.00	13.25
Suncatcher Pedestals Delive	0	24	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.797	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25	0.02	0.02	0.13	0.06	0.30	0.00	33.99	0.00	0.00	34.17
Stirling Engines	60	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.15	0.07	0.33	0.00	37.65	0.00	0.00	37.85	200	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
Suncatcher Metal Supports	120	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.04	0.04	0.29	0.14	0.66	0.00	75.30	0.00	0.00	75.70	400	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Suncatcher Mirrors	72	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.18	0.08	0.39	0.00	45.18	0.00	0.00	45.42	240	0.08	0.07	0.59	0.27	1.31	0.00	150.60	0.00	0.00	151.40
Electrical and Control Syster	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14	80	0.03	0.02	0.20	0.09	0.44	0.00	50.20	0.00	0.00	50.47
Azimuth and Elevation Drive	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14	80	0.03	0.02	0.20	0.09	0.44	0.00	50.20	0.00	0.00	50.47
												Total	**2.07**	**1.89**	**31.68**	**6.59**	**30.86**	**0.03**	**3085.59**	**0.98**	**0.02**	**3113.69**		**4.54**	**4.15**	**78.24**	**13.83**	**74.95**	**0.07**	**7662.36**	**2.32**	**0.07**	**7732.56**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months

delivery trucks can arrive at the site anytime during the day or night

Imperial Valley Solar
Fugitive Dust Emissions (on-site)

Annual : Month 8-19
Month: Month 8

Travel on sealed roads (paved)

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
7.4 sL = road surface silt loading (grams per square meter) (g/m^2), from Table 13.2.1-4 for Municipal solid waste landfill
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 8)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on sealed roads	Max Daily Distance per Vehicle to drive on sealed roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 8-19)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	0%	0	0	0.5	6	21	0	0.000	0.002
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.134	0.893
Backhoe	5	0	0%	0	0	11	7	40	0	0.039	0.260
Compactor	3	0	0%	0	0	10	7	24	0	0.034	0.226
Crane small	8	0.5	50%	0	2	10	5	73	547.5	0.034	0.226
Crane large	0	0.5	0%	0	0	35	7	0	0	0.222	1.480
Dozer	1	0	0%	0	0	20	8	6	0	0.096	0.639
Generator	4	0	0%	0	0	0.5	9	47	0	0.000	0.002
Grader	2	0	0%	0	0	20	7	9	0	0.096	0.639
Light Tower	2	0	0%	0	0	0.25	9	21	0	0.000	0.000
Loader	3	0	0%	0	0	25	7	20	0	0.134	0.893
Maxi Sneeker (Trencher)	4	0	0%	0	0	5	9	49	0	0.012	0.079
Skid Steer (Bobcat)	3	0	0%	0	0	2	7	31	0	0.003	0.020
Welding Machine	4	0	0%	0	0	0.5	5	33	0	0.000	0.002
Equipment fueled with Propane											
Aerial Lift	3	1	50%	1	2	4	6	40	600	0.008	0.057
Fork Lift	8	1	50%	1	4	3	4	87	1305	0.005	0.037
Telehandler	3	1	50%	1	2	3	6	44	660	0.005	0.037
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	67	0	0.044	0.297
Concrete Pump	0	6	0%	0	0	20	12	0	0	0.096	0.639
Dump Truck	3	7	50%	4	11	20	12	10	1050	0.096	0.639
Flatbed Truck	9	28	100%	28	252	10	12	104	87360	0.034	0.226
Staff & Security Truck	5	33	100%	33	165	2.25	24	60	59400	0.003	0.024
Pickup Truck	10	12	95%	11	114	4	12	120	41040	0.008	0.057
Water/Soiltac Truck	4	12	25%	3	12	20	12	48	4320	0.096	0.639
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.086	0.573
Worker Passenger Vehicles	385	0.3	100%	0	116	2	12	3862	34758	0.003	0.020
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	0%	0	0	20	24	3	0	0.096	0.639
Suncatcher Pedestals Delivery Trucks	0	13	55%	7	0	20	24	0	0	0.096	0.639
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.096	0.639
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.096	0.639
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.096	0.639
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.096	0.639
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.096	0.639

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.09	0.09	0.45	0.45	0.53%	0.06	0.06	0.01	0.01	0.07	0.07	0.01	0.01
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.02	0.02	0.09	0.09	0.10%	0.02	0.02	0.00	0.00	0.01	0.01	0.00	0.00
Fork Lift	0%	0%	0.04	0.04	0.15	0.15	0.17%	0.02	0.02	0.01	0.01	0.02	0.02	0.00	0.00
Telehandler	0%	0%	0.01	0.01	0.06	0.06	0.07%	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.56	0.56	6.71	6.71	7.93%	0.34	0.34	0.08	0.08	1.00	1.00	0.05	0.05
Flatbed Truck	0%	0%	4.74	4.74	56.84	56.84	67.18%	9.85	9.85	0.70	0.70	8.45	8.45	1.47	1.47
Staff & Security Truck	0%	0%	0.16	0.16	3.90	3.90	4.61%	0.70	0.70	0.02	0.02	0.54	0.54	0.10	0.10
Pickup Truck	0%	0%	0.54	0.54	6.47	6.47	7.64%	1.16	1.16	0.08	0.08	0.94	0.94	0.17	0.17
Water/Soiltac Truck	0%	0%	0.64	0.64	7.67	7.67	9.06%	1.38	1.38	0.10	0.10	1.15	1.15	0.21	0.21
Well Water Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	0%	0.19	0.19	2.28	2.28	2.70%	0.34	0.34	0.03	0.03	0.31	0.31	0.05	0.05
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Stirling Engines	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Metal Supports	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on sealed road (paved)			**6.98**	**6.98**	**84.61**	**84.61**		**13.89**	**13.89**	**1.03**	**1.03**	**12.50**	**12.50**	**2.05**	**2.05**

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest

1.6 sL = road surface silt loading (grams per square meter) (g/m^2),
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

Rural roads CARB - Emission Inventory Database - Section 7.8 SJV - Entrained Paved Road Dust - Rural Roads (emission inventory code: 640-643-5400-0000), June 2006.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 8)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on paved road	Max Daily Distance per Vehicle to drive on paved road (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 8-19)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	0%	0	0	0.5	6	21	0	0.000	0.000
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.049	0.330
Backhoe	5	0	0%	0	0	11	7	40	0	0.014	0.096
Compactor	3	0	0%	0	0	10	7	24	0	0.012	0.083
Crane small	8	0.5	0%	0	0	10	5	73	0	0.012	0.083
Crane large	0	0.5	0%	0	0	35	7	0	0	0.082	0.547
Dozer	1	0	0%	0	0	20	8	6	0	0.035	0.236
Generator	4	0	0%	0	0	0.5	9	47	0	0.000	0.000
Grader	2	0	0%	0	0	20	7	9	0	0.035	0.236
Light Tower	2	0	0%	0	0	0.25	9	21	0	0.000	0.000
Loader	3	0	0%	0	0	25	7	20	0	0.049	0.330
Maxi Sneeker (Trencher)	4	0	0%	0	0	5	9	49	0	0.004	0.029
Skid Steer (Bobcat)	3	0	0%	0	0	2	7	31	0	0.001	0.007
Welding Machine	4	0	0%	0	0	0.5	5	33	0	0.000	0.000
Equipment fueled with Propane											
Aerial Lift	3	1	0%	0	0	4	6	40	0	0.003	0.021
Fork Lift	8	1	0%	0	0	3	4	87	0	0.002	0.013
Telehandler	3	1	0%	0	0	3	6	44	0	0.002	0.013
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	100%	12	72	12	12	67	24120	0.016	0.109
Concrete Pump	0	6	82%	4.92	0	20	12	0	0	0.035	0.236
Dump Truck	3	7	0%	0	0	20	12	10	0	0.035	0.236
Flatbed Truck	9	28	0%	0	0	10	12	104	0	0.012	0.083
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.001	0.008
Pickup Truck	10	12	0%	0	0	4	12	120	0	0.003	0.021
Water/Soiltac Truck	4	12	0%	0	0	20	12	48	0	0.035	0.236
Well Water Truck	1	39	100%	39	39	18.6	12	12	14040	0.031	0.211
Worker Passenger Vehicles	385	0.3	0%	0	0	2	12	3862	0	0.001	0.007
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	100%	6	18	20	24	3	540	0.035	0.236
Suncatcher Pedestals Delivery Trucks	0	13	45%	5.85	0	20	24	0	0	0.035	0.236
Stirling Engines	5	6	100%	6	30	20	24	60	10800	0.035	0.236
Suncatcher Metal Supports	10	6	100%	6	60	20	24	120	21600	0.035	0.236
Suncatcher Mirrors	6	6	100%	6	36	20	24	72	12960	0.035	0.236
Electrical and Control Systems	2	6	100%	6	12	20	24	24	4320	0.035	0.236
Azimuth and Elevation Drive	2	6	100%	6	12	20	24	24	4320	0.035	0.236

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Telehandler	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.66	0.66	7.87	7.87	14.13%	1.32	1.32	0.10	0.10	1.16	1.16	0.19	0.19
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.69	0.69	8.25	8.25	14.80%	1.48	1.48	0.10	0.10	1.23	1.23	0.22	0.22
Worker Passenger Vehicles	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.18	0.18	4.24	4.24	7.62%	0.06	0.06	0.03	0.03	0.63	0.63	0.01	0.01
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	0%	0%	0.29	0.29	7.07	7.07	12.69%	1.27	1.27	0.04	0.04	1.05	1.05	0.19	0.19
Suncatcher Metal Supports	0%	0%	0.59	0.59	14.15	14.15	25.39%	2.55	2.55	0.09	0.09	2.11	2.11	0.38	0.38
Suncatcher Mirrors	0%	0%	0.35	0.35	8.49	8.49	15.23%	1.53	1.53	0.05	0.05	1.26	1.26	0.23	0.23

Electrical and Control Systems	0%	0%	0.12	0.12	2.83	2.83	5.08%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
Azimuth and Elevation Drive	0%	0%	0.12	0.12	2.83	2.83	5.08%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
TOTAL Fugitive emissions for vehicles traveled on paved road			**2.99**	**2.99**	**55.73**	**55.73**		**9.23**	**9.23**	**0.44**	**0.44**	**8.28**	**8.28**	**1.37**	**1.37**

Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$

EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2
E = size-specific emission factor (lb/VMT)
k, a, b = empirical constants
8.5 s = surface material silt content (%)
W = mean vehicle weight (tons)

Construction sites - Scraper routes

constants

	$PM_{2.5}$	PM_{10}
k	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)

Vehicle Type	Number of Vehicles (Month 8)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on unpaved roads	Max Daily Distance per Vehicle to drive on unpaved roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 8-19)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	3	0	100%	0	0	0.5	6	21	0	0.047	0.475
Asphalt Paver	0	0.2	100%	0.2	0	25	7	0	0	0.276	2.762
Backhoe	5	0	100%	0	0	11	7	40	0	0.191	1.909
Compactor	3	0	100%	0	0	10	7	24	0	0.183	1.828
Crane small	8	0.5	50%	0.25	2	10	5	73	547.5	0.183	1.828
Crane large	0	0.5	100%	0.5	0	35	7	0	0	0.321	3.213
Dozer	1	0	100%	0	0	20	8	6	0	0.250	2.498
Generator	4	0	100%	0	0	0.5	9	47	0	0.047	0.475
Grader	2	0	100%	0	0	20	7	9	0	0.250	2.498
Light Tower	2	0	100%	0	0	0.25	9	21	0	0.035	0.348
Loader	3	0	100%	0	0	25	7	20	0	0.276	2.762
Maxi Sneeker (Trencher)	4	0	100%	0	0	5	9	49	0	0.134	1.339
Skid Steer (Bobcat)	3	0	100%	0	0	2	7	31	0	0.089	0.886
Welding Machine	4	0	100%	0	0	0.5	5	33	0	0.047	0.475
Equipment fueled with Propane											
Aerial Lift	3	1	50%	0.5	2	4	6	40	600	0.121	1.211
Fork Lift	8	1	50%	0.5	4	3	4	87	1305	0.106	1.064
Telehandler	3	1	50%	0.5	2	3	6	44	660	0.106	1.064
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	67	0	0.198	1.985
Concrete Pump	0	6	8%	0.48	0	20	12	0	0	0.250	2.498
Dump Truck	3	7	50%	3.5	11	20	12	10	1050	0.250	2.498
Flatbed Truck	9	28	0%	0	0	10	12	104	0	0.183	1.828
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.093	0.934
Pickup Truck	10	12	5%	0.6	6	4	12	120	2160	0.121	1.211
Water/Soiltac Truck	4	12	75%	9	36	20	12	48	12960	0.250	2.498
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.242	2.417
Worker Passenger Vehicles	385	0.3	0%	0	0	2	12	3862	0	0.089	0.886
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	3	6	0%	0	0	20	24	3	0	0.250	2.498
Suncatcher Pedestals Delivery Trucks	0	13	0%	0	0	20	24	0	0	0.250	2.498
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.250	2.498
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.250	2.498
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.250	2.498
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.250	2.498
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.250	2.498

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	68%	0.71	0.23	3.66	1.17	2.71%	0.50	0.16	0.07	0.02	0.37	0.12	0.05	0.02
Crane large	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	68%	0.33	0.11	1.82	0.58	1.35%	0.36	0.12	0.03	0.01	0.18	0.06	0.04	0.01
Fork Lift	0%	68%	1.18	0.38	4.25	1.36	3.16%	0.69	0.22	0.12	0.04	0.43	0.14	0.07	0.02
Telehandler	0%	68%	0.25	0.08	1.60	0.51	1.18%	0.35	0.11	0.02	0.01	0.16	0.05	0.04	0.01
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	68%	2.19	0.70	26.23	8.39	19.47%	1.31	0.42	0.22	0.07	2.62	0.84	0.13	0.04
Flatbed Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	68%	0.61	0.19	7.26	2.32	5.39%	1.31	0.42	0.06	0.02	0.73	0.23	0.13	0.04
Water/Soiltac Truck	0%	68%	7.49	2.40	89.92	28.77	66.74%	16.19	5.18	0.75	0.24	8.99	2.88	1.62	0.52
Well Water Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Suncatcher Metal Supports	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on unpaved surfaces			**12.75**	**4.08**	**134.73**	**43.11**		**20.71**	**6.63**	**1.27**	**0.41**	**13.47**	**4.31**	**2.07**	**0.66**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Bulldozing & grading EPA AP-42 Section 11.9

$E = p * 1 * s^{1.5} / M^{1.4}$ PM10 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.75 p = particle size multiplier for PM10
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.75 lb/hr of PM10

$E = p * 5.7 * s^{1.2} / M^{1.3}$ PM2.5 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.105 p = particle size multiplier for PM2.5
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.41 lb/hr of PM2.5

$E = p * 0.051 * S^{2.0}$ PM10 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.6 p = particle size multiplier for PM10
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
1.54 lb/VMT of PM10

$E = p * 0.040 * S^{2.5}$ PM2.5 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.031 p = particle size multiplier for PM2.5
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
0.17 lb/VMT of PM2.5

Equipment	Quantity/ month	Hours/ Day	VMT/day/ vehicle	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	VMT/year/ vehicle	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Compactor	3	7	2	68%	2.96	0.32	24	730	0.541	0.058
Dozer	1	8		68%	1.85	1.02	6		0.166	0.092
Maxi Sneeker (Trencher)	4	9	2	68%	3.95	0.43	49	730	0.721	0.078
Skid Steer (Bobcat)	3	7		68%	4.77	2.62	31		0.739	0.406
Grader	2	7	4	68%	3.95	0.43	9	1460	0.721	0.078
				Grading Total	**10.86**	**1.17**			**1.98**	**0.21**
				Bulldozing Total	**6.62**	**3.64**			**0.91**	**0.50**
				Total	**17.48**	**4.81**			**2.89**	**0.71**

12 months of earth work
12 total construction hours per work day
30 construction days per month

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Dirt Piling or Material Handling PM10 Emissions from Material Handling (lb/ton) from EPA AP-42 Chapter 13.2.4 Eq. 1

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ E = Emission factor (lb/ton material handled)

7.45 U = Mean Wind speed (mph) (from 1991-1995 Imperial Co. airport data)
12 M = Moisture content of surface material (%) (from Table 13.2.4-1 for cover at municipal landfill)

	$PM_{2.5}$	PM_{10}
k	0.053	0.35

0.00003 lb/ton of PM2.5
0.00022 lb/ton of PM10

Equipment	Quantity/ month	Hours/ Day	Material Handled per Day (ton)	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	Material Handled per year (ton)	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Backhoe	5	7	2,804	68%	0.1966	0.0298	40	1009503	0.035	0.005
Wheeled Loader	3	7	2,804	68%	0.1966	0.0298	20	1009503	0.035	0.005
Dump Trucks	3	12	5,608	68%	0.3932	0.0595	10	2,019,006	0.071	0.011
				Total	**0.79**	**0.12**			**0.14**	**0.02**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
Assume 50% soil movement from loaders and 50% from backhoes

4,033 yd3/day 5,608 ton/day
1,452,000 yd3/project 2,019,006 tons/project 2781 density of soil (lb/yd3)
(USDA NRCS Physical Soil Properti 0.5 depth of disturbance (yards)
for Niland Fine Sand and Rositas Fine Sand soil)

total project
600 acres = 1,452,000 cubic yds, assume depth of soils moved is
3000 total acres disturbed as described in Table 3-17 of Project Description
only a small portion of this soil is picked up and moved via dump druck

Cover Storage Pile

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J SCAQMD Table A9-9-E

PM10 Emission factor from wind erosion of storage piles per day per acre

15 G = Silt content (%) (from CEQA Handbook Table A9-9-E-1 for blended ore and dirt)
12 H = Number of days with >= 0.01 inches of precipitation per year (from El Centro 2 SSW weather station WRCC)
2.5 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height
0.5 J = Fraction of TSP that is PM10 = 0.5
2.128 lb/acre/day

wind speed percentage based on 2005 wind speed data as recorded at El Centro 2 SSW station

Source	Quantity	Size of Pile (acre)	Hours/Day	Days/Year per Pile	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	2	1	24	182.5	68%	1.36	0.30	0.12	0.03

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
pile size assumed
piles present only for 6 months

Construction on-site fugitive dust PM10 | **Month 8 construction on-site fugitive dust** | **Month 8-19 construction on-site fugitive dust**

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Sealed Road - PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions	Sealed Road PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions
			lb/day					ton/year				
Diesel Construction Equipment												
Air Compressor	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	5	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Compactor	3	0	0.00	0.00	0.00	2.96	2.96	0.00	0.00	0.00	0.54	0.54
Crane small	8	0.5	0.45	0.00	1.17		1.62	0.06	0.00	0.16		0.22
Crane large	0	0.5	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dozer	1	0	0.00	0.00	0.00	1.85	1.85	0.00	0.00	0.00	0.17	0.17
Generator	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	2	0	0.00	0.00	0.00	3.95	3.95	0.00	0.00	0.00	0.72	0.72
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	3	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Maxi Sneeker (Trencher)	4	0	0.00	0.00	0.00	3.95	3.95	0.00	0.00	0.00	0.72	0.72
Skid Steer (Bobcat)	3	0	0.00	0.00	0.00	4.77	4.77	0.00	0.00	0.00	0.74	0.74
Welding Machine	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	3	1	0.09	0.00	0.58		0.67	0.02	0.00	0.12		0.13
Fork Lift	8	1	0.15	0.00	1.36		1.51	0.02	0.00	0.22		0.25
Telehandler	3	1	0.06	0.00	0.51		0.57	0.01	0.00	0.11		0.12
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	7.87	0.00		7.87	0.00	1.32	0.00		1.32
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	3	7	6.71	0.00	8.39	0.39	15.49	0.34	0.00	0.42	0.07	0.83
Flatbed Truck	9	28	56.84	0.00	0.00		56.84	9.85	0.00	0.00		9.85
Staff & Security Truck	5	33	3.90	0.00	0.00		3.90	0.70	0.00	0.00		0.70
Pickup Truck	10	12	6.47	0.00	2.32		8.79	1.16	0.00	0.42		1.58
Water/Soiltac Truck	4	12	7.67	0.00	28.77		36.44	1.38	0.00	5.18		6.56
Well Water Truck	1	39	0.00	8.25	0.00		8.25	0.00	1.48	0.00		1.48
Worker Passenger Vehicles	385	0.3	2.28	0.00	0.00		2.28	0.34	0.00	0.00		0.34
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	3	6	0.00	4.24	0.00		4.24	0.00	0.06	0.00		0.06
Suncatcher Pedestals Delivery Trucks	0	13	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Stirling Engines	5	6	0.00	7.07	0.00		7.07	0.00	1.27	0.00		1.27
Suncatcher Metal Supports	10	6	0.00	14.15	0.00		14.15	0.00	2.55	0.00		2.55
Suncatcher Mirrors	6	6	0.00	8.49	0.00		8.49	0.00	1.53	0.00		1.53
Electrical and Control Systems	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Azimuth and Elevation Drive	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Storage piles						1.36	1.36				0.12	0.12
			84.61	**55.73**	**43.11**	**19.63**	**203.08**	**13.89**	**9.23**	**6.63**	**3.15**	**32.91**

Construction on-site fugitive dust PM2.5 | **Month 8 construction on-site fugitive dust** | **Month 8-19 construction on-site fugitive dust**

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Sealed Road - PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions	Sealed Road PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions
			lb/day					ton/year				
Diesel Construction Equipment												
Air Compressor	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	5	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Compactor	3	0	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.06	0.06
Crane small	8	0.5	0.07	0.00	0.12		0.18	0.01	0.00	0.02		0.03
Crane large	0	0.5	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dozer	1	0	0.00	0.00	0.00	1.02	1.02	0.00	0.00	0.00	0.09	0.09
Generator	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	2	0	0.00	0.00	0.00	0.43	0.43	0.00	0.00	0.00	0.08	0.08
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	3	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Maxi Sneeker (Trencher)	4	0	0.00	0.00	0.00	0.43	0.43	0.00	0.00	0.00	0.08	0.08
Skid Steer (Bobcat)	3	0	0.00	0.00	0.00	2.62	2.62	0.00	0.00	0.00	0.41	0.41
Welding Machine	4	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	3	1	0.01	0.00	0.06		0.07	0.00	0.00	0.01		0.01
Fork Lift	8	1	0.02	0.00	0.14		0.16	0.00	0.00	0.02		0.03
Telehandler	3	1	0.01	0.00	0.05		0.06	0.00	0.00	0.01		0.01
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	1.16	0.00		1.16	0.00	0.19	0.00		0.19
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	3	7	1.00	0.00	0.84	0.06	1.90	0.05	0.00	0.04	0.01	0.10
Flatbed Truck	9	28	8.45	0.00	0.00		8.45	1.47	0.00	0.00		1.47
Staff & Security Truck	5	33	0.54	0.00	0.00		0.54	0.10	0.00	0.00		0.10
Pickup Truck	10	12	0.94	0.00	0.23		1.17	0.17	0.00	0.04		0.21
Water/Soiltac Truck	4	12	1.15	0.00	2.88		4.02	0.21	0.00	0.52		0.72
Well Water Truck	1	39	0.00	1.23	0.00		1.23	0.00	0.22	0.00		0.22
Worker Passenger Vehicles	385	0.3	0.31	0.00	0.00		0.31	0.05	0.00	0.00		0.05
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	3	6	0.00	0.63	0.00		0.63	0.00	0.01	0.00		0.01
Suncatcher Pedestals Delivery Trucks	0	13	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Stirling Engines	5	6	0.00	1.05	0.00		1.05	0.00	0.19	0.00		0.19
Suncatcher Metal Supports	10	6	0.00	2.11	0.00		2.11	0.00	0.38	0.00		0.38
Suncatcher Mirrors	6	6	0.00	1.26	0.00		1.26	0.00	0.23	0.00		0.23
Electrical and Control Systems	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Azimuth and Elevation Drive	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Storage piles						0.30	0.30				0.03	0.03
			12.50	**8.28**	**4.31**	**5.23**	**30.32**	**2.05**	**1.37**	**0.66**	**0.76**	**4.85**

Short-term Onsite Combustion Emissions

construction schedule = 12 hours per day 7 am to 7 pm pedestal installation = 16 hours per day
delivery trucks can arrive at the site anytime during the day or nig

Equipment	Load Factor	Hours/Day	Horsepower	Emission factors (ton/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment													
Air Compressor	0.48	6	50	1.35E-05	1.25E-05	1.42E-04	5.99E-05	1.20E-04	1.44E-07	1.11E-02	5.40E-06	0.00E+00	1.12E-02
Asphalt Paver	0.62	7	120	3.47E-05	3.19E-05	2.07E-04	6.75E-05	3.98E-04	3.19E-07	2.72E-02	6.09E-06	0.00E+00	2.74E-02
Backhoe	0.55	7	120	2.77E-05	2.55E-05	1.83E-04	4.96E-05	3.03E-04	3.03E-07	2.58E-02	4.47E-06	0.00E+00	2.59E-02
Compactor	0.56	7	120	3.36E-05	3.09E-05	2.11E-04	6.39E-05	3.89E-04	3.46E-07	2.95E-02	5.77E-06	0.00E+00	2.96E-02
Crane small	0.43	5	175	2.81E-05	2.59E-05	2.45E-04	6.37E-05	4.92E-04	4.52E-07	4.01E-02	5.75E-06	0.00E+00	4.03E-02
Crane large	0.43	7	500	3.63E-05	3.34E-05	3.58E-04	9.56E-05	9.38E-04	8.83E-07	9.00E-02	8.62E-06	0.00E+00	9.02E-02
Dozer	0.64	8	250	4.15E-05	3.82E-05	3.02E-04	1.08E-04	1.02E-03	9.34E-07	8.30E-02	9.70E-06	0.00E+00	8.32E-02
Generator	0.74	9	50	1.46E-05	1.35E-05	1.47E-04	5.80E-05	1.55E-04	1.98E-07	1.53E-02	5.23E-06	0.00E+00	1.54E-02
Grader	0.61	7	175	4.11E-05	3.78E-05	3.72E-04	9.21E-05	7.19E-04	6.97E-07	6.19E-02	8.31E-06	0.00E+00	6.21E-02
Light Tower	0.78	9	50	1.41E-05	1.30E-05	1.52E-04	5.67E-05	1.42E-04	1.81E-07	1.40E-02	5.12E-06	0.00E+00	1.41E-02
Loader	0.55	7	250	3.00E-05	2.76E-05	2.22E-04	7.89E-05	8.16E-04	8.37E-07	7.44E-02	7.11E-06	0.00E+00	7.46E-02
Maxi Sneeker (Trencher)	0.75	9	50	2.10E-05	1.94E-05	2.23E-04	9.63E-05	1.83E-04	2.13E-07	1.64E-02	8.69E-06	0.00E+00	1.66E-02
Skid Steer (Bobcat)	0.55	7	50	1.19E-05	1.09E-05	1.30E-04	4.46E-05	1.25E-04	1.65E-07	1.27E-02	4.02E-06	0.00E+00	1.28E-02
Welding Machine	0.45	5	50	1.47E-05	1.35E-05	1.52E-04	6.34E-05	1.37E-04	1.68E-07	1.30E-02	5.72E-06	0.00E+00	1.31E-02
Equipment fueled with Propane				Emission factors (ton/hr)									
Aerial Lift	0.46	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Fork Lift	0.3	4	50	8.14E-07	8.14E-07	1.47E-04	1.60E-06	6.85E-05	0.00E+00	9.15E-03	1.34E-05	0.00E+00	9.43E-03
Telehandler	0.54	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Vehicles with Onroad Engines for Emissions Estimates	Onsite Miles per Day Travelled per Vehicle												
Busses	12	12	175	6.60E-02	4.63E-02	4.19E+01	3.57E+00	3.17E+00	1.70E-02	1.67E+03	1.20E-01	2.00E-01	1.74E+03
Concrete Pump Truck	6	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Dump Truck	7	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Flatbed Truck	28	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Staff & Security Truck	33	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	12	12	175	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Water/Soiltac Truck	12	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Well Water Truck	39	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Worker Passenger Vehicles	0.3	12	NA	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Delivery Transport Trucks				Emission factors (g/mile)									
General Materials Delivery Trucks	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Pedestals Delivery Truck	13	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Stirling Engines	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Metal Supports	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Mirrors	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Electrical and Control Systems	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Azimuth and Elevation Drive	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03

Equipment	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment										
Air Compressor	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.00	22.48
Asphalt Paver	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.00	54.71
Backhoe	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.00	51.87
Compactor	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.00	59.18
Crane small	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.00	80.51
Crane large	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.00	180.30
Dozer	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.00	166.39
Generator	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.00	30.82
Grader	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.00	124.16
Light Tower	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.00	28.18
Loader	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.00	149.14
Maxi Sneeker (Trencher)	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.00	33.25
Skid Steer (Bobcat)	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.00	25.67
Welding Machine	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.00	26.18
Equipment fueled with Propane										
Aerial Lift	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Fork Lift	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.86
Telehandler	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Busses	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.83
Concrete Pump Truck	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.50
Dump Truck	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.09
Flatbed Truck	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.35
Staff & Security Truck	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.05
Pickup Truck	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.93
Water/Soiltac Truck	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.01
Well Water Truck	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.78
Worker Passenger Vehicles	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.05
Delivery Transport Trucks										
General Materials Delivery Trucks	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Pedestals Delivery Truck	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.80
Stirling Engines	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Metal Supports	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Mirrors	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Electrical and Control Systems	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Azimuth and Elevation Drive	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
										Total

Equipment	Month 1 Daily Emissions (lb/day) Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	3	1.10	1.01	7.24	1.96	12.01	0.01	1023.30	0.18	0.00	1027.01
Compactor	1	0.45	0.42	2.83	0.86	5.22	0.00	396.05	0.08	0.00	397.68
Crane small	1	0.29	0.27	2.53	0.66	5.08	0.00	414.21	0.06	0.00	415.45
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	2	0.01	0.01	2.11	0.02	0.99	0.00	131.72	0.19	0.00	135.78
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
Concrete Pump Truck	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Dump Truck	3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
Flatbed Truck	2	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	67	0.00	0.00	0.46	0.04	0.04	0.00	38.13	0.00	0.00	39.01
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	**137**	**5.18**	**4.73**	**64.80**	**14.17**	**87.34**	**0.09**	**8706.39**	**1.64**	**0.10**	**8771.11**

Equipment	Month 2 Daily Emissions (lb/day) Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	1	0.52	0.48	3.07	1.00	5.92	0.00	405.11	0.09	0.00	407.01
Backhoe	9	3.29	3.02	21.72	5.89	36.02	0.04	3069.89	0.53	0.00	3081.04
Compactor	3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
Crane small	3	0.87	0.80	7.59	1.97	15.23	0.01	1242.62	0.18	0.00	1246.36
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
Maxi Sneeker (Trencher)	2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
Skid Steer (Bobcat)	1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
Welding Machine	1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
Equipment fueled with Propane											
Aerial Lift	5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
Concrete Pump Truck	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Dump Truck	8	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Flatbed Truck	9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	14	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	180	0.01	0.00	1.23	0.12	0.12	0.00	101.93	0.01	0.01	104.27
Delivery Transport Trucks											
General Materials Delivery Trucks	3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	**305**	**13.95**	**12.78**	**161.24**	**36.97**	**219.05**	**0.22**	**21021.55**	**4.36**	**0.16**	**21161.28**

Equipment	Month 21 Daily Emissions (lb/day) Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
Vehicles with Onroad Engines for Emissions Estimates											
Busses	2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	209	0.01	0.01	1.43	0.13	0.13	0.00	118.55	0.01	0.01	121.26
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
TOTALS	**285**	**5.25**	**4.80**	**100.44**	**16.18**	**103.92**	**0.10**	**11105.02**	**2.92**	**0.11**	**11199.00**

Equipment	Month 22 Daily Emissions (lb/day) Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
7	0.18	0.16	1.33	0.62	2.97	0.00	341.65	0.01	0.01	343.45
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
249	0.01	0.01	1.71	0.16	0.16	0.00	141.20	0.01	0.01	144.44
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
367	**12.16**	**11.14**	**162.26**	**33.79**	**201.35**	**0.20**	**19628.87**	**4.65**	**0.15**	**19772.83**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.16	0.14	1.14	0.53	2.55	0.00	292.84	0.01	0.00	294.39
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
343	**15.19**	**13.93**	**191.14**	**42.81**	**264.55**	**0.26**	**25577.73**	**5.47**	**0.15**	**25738.43**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
2	0.04	0.04	18.27	0.07	2.88	0.00	404.80	0.62	0.00	417.81
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
345	**15.82**	**14.51**	**214.78**	**45.52**	**271.81**	**0.27**	**26345.73**	**6.32**	**0.14**	**26523.00**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
479	0.02	0.01	3.28	0.31	0.31	0.00	271.45	0.02	0.02	277.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
620	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.04**	**8.35**	**0.15**	**30741.20**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
1	0.50	0.46	4.92	1.32	12.90	0.01	1237.98	0.12	0.00	1240.48
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
487	0.02	0.01	3.34	0.31	0.31	0.00	275.98	0.02	0.02	282.31
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
1	0.05	0.04	0.35	0.17	0.79	0.00	90.64	0.00	0.00	91.12
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
617	**16.72**	**15.35**	**237.56**	**50.57**	**260.27**	**0.26**	**25266.23**	**7.26**	**0.15**	**25464.98**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
385	0.01	0.01	2.64	0.25	0.25	0.00	218.22	0.01	0.02	223.22
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
507	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**	**22646.71**	**6.09**	**0.14**	**22818.80**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
7	2.03	1.87	17.70	4.60	35.53	0.03	2899.44	0.42	0.00	2908.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
334	0.01	0.01	2.29	0.21	0.21	0.00	189.15	0.01	0.01	193.48
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
446	**13.76**	**12.62**	**187.42**	**42.99**	**204.61**	**0.21**	**19948.69**	**5.82**	**0.14**	**20113.14**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
411	**11.66**	**10.69**	**162.25**	**37.56**	**159.77**	**0.17**	**16042.01**	**5.07**	**0.14**	**16190.34**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
4	0.06	0.06	31.13	0.13	4.90	0.00	689.66	1.06	0.00	711.83
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
357	0.01	0.01	2.44	0.23	0.23	0.00	201.98	0.01	0.01	206.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
476	**14.91**	**13.68**	**213.93**	**45.53**	**231.78**	**0.23**	**22463.06**	**6.59**	**0.14**	**22644.76**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
9	0.05	0.05	9.51	0.10	4.44	0.00	592.75	0.87	0.00	611.03
7	0.13	0.13	63.95	0.26	10.07	0.00	1416.81	2.17	0.00	1462.34
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	0.05	0.38	0.18	0.85	0.00	97.61	0.00	0.00	98.13
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
341	0.01	0.01	2.34	0.22	0.22	0.00	193.30	0.01	0.01	197.73
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
463	**14.51**	**13.32**	**247.05**	**44.73**	**232.16**	**0.23**	**22855.00**	**7.80**	**0.14**	**23061.70**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	0.05	0.38	0.18	0.85	0.00	97.61	0.00	0.00	98.13
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
347	0.01	0.01	2.38	0.22	0.22	0.00	196.70	0.01	0.01	201.21
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
461	**13.27**	**12.18**	**215.15**	**41.96**	**207.13**	**0.21**	**20521.31**	**6.65**	**0.14**	**20703.94**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
332	0.01	0.01	2.27	0.21	0.21	0.00	188.01	0.01	0.01	192.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
440	**12.36**	**11.33**	**198.43**	**39.35**	**187.51**	**0.19**	**18676.00**	**6.12**	**0.14**	**18846.89**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
5	0.01	0.01	5.54	0.47	0.42	0.00	221.00	0.02	0.03	229.53
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
325	0.01	0.01	2.22	0.21	0.20	0.00	183.86	0.01	0.01	188.08
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
420	**8.13**	**7.44**	**156.10**	**29.05**	**120.98**	**0.13**	**12916.49**	**4.89**	**0.13**	**13059.83**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
280	0.01	0.01	1.92	0.18	0.18	0.00	158.57	0.01	0.01	162.20
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
359	**5.16**	**4.71**	**102.84**	**17.84**	**78.70**	**0.08**	**8709.95**	**3.16**	**0.12**	**8812.83**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
247	0.01	0.01	1.69	0.16	0.16	0.00	139.69	0.01	0.01	142.89
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
325	**5.00**	**4.57**	**100.98**	**17.13**	**77.30**	**0.08**	**8562.91**	**3.10**	**0.12**	**8664.05**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.38	0.35	4.01	1.73	3.30	0.00	295.99	0.16	0.00	299.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
226	0.01	0.01	1.55	0.15	0.15	0.00	127.98	0.01	0.01	130.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
303	**5.63**	**5.14**	**104.56**	**17.93**	**107.22**	**0.11**	**11410.45**	**3.08**	**0.11**	**11507.94**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monthly Comparison of Construction Equipment Emissions:

		Daily Emissions (lb/day)									
Month of Contruction	**Total Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	137	5.18	4.73	64.80	14.17	87.34	0.09	8706.39	1.64	0.097	8771.11
2	305	13.95	12.78	161.24	36.97	219.05	0.22	21021.55	4.36	0.155	21161.28
3	367	12.16	11.14	162.26	33.79	201.35	0.20	19628.87	4.65	0.149	19772.83
4	343	15.19	13.93	191.14	42.81	264.55	0.26	25577.73	5.47	0.148	25738.43
5	345	15.82	14.51	214.78	45.52	271.81	0.27	26345.73	6.32	0.144	26523.00
6	620	19.09	17.53	275.73	56.88	314.71	0.31	30518.04	8.35	0.154	30741.20
7	617	16.72	15.35	237.56	50.57	260.27	0.26	25266.23	7.26	0.149	25464.98
8	507	15.35	14.08	200.27	46.44	234.90	0.24	22646.71	6.09	0.143	22818.80
9	446	13.76	12.62	187.42	42.99	204.61	0.21	19948.69	5.82	0.136	20113.14
10	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
11	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
12	411	11.66	10.69	162.25	37.56	159.77	0.17	16042.01	5.07	0.135	16190.34
13	476	14.91	13.68	213.93	45.53	231.78	0.23	22463.06	6.59	0.140	22644.76
14	463	14.51	13.32	247.05	44.73	232.16	0.23	22855.00	7.80	0.138	23061.70
15	461	13.27	12.18	215.15	41.96	207.13	0.21	20521.31	6.65	0.139	20703.94
16	440	12.36	11.33	198.43	39.35	187.51	0.19	18676.00	6.12	0.136	18846.89
17	420	8.13	7.44	156.10	29.05	120.98	0.13	12916.49	4.89	0.131	13059.83
18	359	5.16	4.71	102.84	17.84	78.70	0.08	8709.95	3.16	0.118	8812.83
19	325	5.00	4.57	100.98	17.13	77.30	0.08	8562.91	3.10	0.116	8664.05
20	303	5.63	5.14	104.56	17.93	107.22	0.11	11410.45	3.08	0.106	11507.94
21	285	5.25	4.80	100.44	16.18	103.92	0.10	11105.02	2.92	0.105	11199.00
22	282	4.94	4.51	97.26	14.97	100.54	0.10	10758.85	2.82	0.104	10850.36
23	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
24	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
25	275	3.03	2.76	78.82	9.49	56.71	0.06	6501.29	2.37	0.100	6581.93
26	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
27	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
28	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
29	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
30	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
31	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
32	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
33	249	2.66	2.41	70.15	8.09	50.02	0.05	5722.76	1.79	0.096	5790.18
34	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
35	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
36	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
37	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
38	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
39	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
40	209	2.24	2.04	89.86	6.58	46.15	0.04	5353.92	2.56	0.081	5432.89
MAX VALUE (lb/day)	**620**	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.0**	**8.35**	**0.155**	**30741.2**

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	2.44	2.24	32.78	7.26	38.11	0.039	3720.99	0.98	0.0252	3749.38
2	**13**	2.58	2.37	35.02	7.73	40.28	0.041	3927.34	1.05	0.0259	3957.48
3	**14**	2.59	2.38	36.30	7.85	40.48	0.041	3954.84	1.10	0.0256	3985.99
4	**15**	2.61	2.39	37.10	7.97	40.56	0.041	3968.23	1.13	0.0255	3999.96
5	**16**	2.57	2.35	37.21	7.92	39.41	0.040	3864.70	1.14	0.0253	3896.58
6	**17**	2.45	2.25	36.33	7.67	37.15	0.038	3663.27	1.12	0.0251	3694.63
7	**18**	2.24	2.06	33.73	7.09	33.60	0.034	3336.14	1.05	0.0245	3365.71
8	**19**	2.07	1.89	31.68	6.59	30.86	0.032	3085.59	0.98	0.0240	3113.69
9	**20**	1.92	1.76	30.25	6.16	28.95	0.030	2917.05	0.94	0.0235	2944.03
10	**21**	1.79	1.64	28.94	5.76	27.43	0.028	2784.40	0.89	0.0230	2810.32
11	**22**	1.69	1.55	27.94	5.41	26.52	0.027	2703.05	0.86	0.0226	2728.10
12	**23**	1.58	1.45	26.90	5.04	25.57	0.026	2617.62	0.82	0.0221	2641.78
13	**24**	1.48	1.35	25.89	4.69	24.64	0.025	2534.30	0.79	0.0216	2557.57
14	**25**	1.30	1.19	23.86	4.15	22.02	0.022	2294.87	0.73	0.0210	2316.63
15	**26**	1.12	1.03	21.30	3.60	19.34	0.019	2045.49	0.64	0.0204	2065.33
16	**27**	0.97	0.88	19.22	3.10	17.05	0.017	1831.12	0.58	0.0199	1849.39
17	**28**	0.82	0.75	17.37	2.63	15.02	0.015	1641.55	0.52	0.0192	1658.43
18	**29**	0.74	0.67	16.16	2.32	13.99	0.014	1538.38	0.48	0.0187	1554.26
19	**30**	0.70	0.64	15.74	2.17	13.60	0.013	1498.31	0.47	0.0184	1513.81
20	**31**	0.67	0.61	15.28	2.04	13.19	0.013	1455.51	0.45	0.0181	1470.49
21	**32**	0.62	0.57	14.76	1.89	12.33	0.012	1369.99	0.43	0.0179	1384.52
22	**33**	0.58	0.53	14.31	1.77	11.52	0.011	1289.25	0.41	0.0178	1303.38
23	**34**	0.55	0.50	14.25	1.67	10.82	0.011	1221.47	0.41	0.0177	1235.49
24	**35**	0.52	0.47	14.23	1.58	10.16	0.010	1157.76	0.40	0.0175	1171.70
25	**36**	0.48	0.44	14.17	1.47	9.40	0.009	1082.03	0.40	0.0172	1095.81
26	**37**	0.47	0.43	14.34	1.43	9.25	0.009	1066.09	0.41	0.0170	1079.85
27	**38**	0.47	0.42	14.55	1.41	9.14	0.009	1054.22	0.41	0.0167	1067.99
28	**39**	0.46	0.42	14.76	1.38	9.04	0.009	1042.35	0.41	0.0165	1056.14
29	**40**	0.45	0.41	14.97	1.36	8.94	0.009	1032.08	0.42	0.0162	1045.89
MAX VALUE (ton/year)		**2.61**	**2.39**	**37.21**	**7.97**	**40.56**	**0.041**	**3968.23**	**1.14**	**0.0259**	**3999.96**

Short-term Offsite Combustion Emissions

construction schedule = 12 hours per day 7 am to 7 pm
delivery trucks can arrive at the site anytime during the day or night

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission factors (g/mile) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	10	12	175	3.10E-02	1.41E-02	1.16E+01	4.93E-01	4.39E+00	5.00E-03	4.65E+02	1.20E-01	2.00E-01	5.29E+02
Concrete Pump Truck	40	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Dump Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Flatbed Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Staff & Security Truck	0	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	0	12	175	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Water/Soiltac Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Well Water Truck	143	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Worker Passenger Vehicles	40	12	NA	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Delivery Transport Trucks													
General Construction Materials	100	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Pedestals	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Stirling Engines	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Metal Supports	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Mirrors	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Electrical and Control Syste	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Azimuth and Elevation Driv	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03

Vehicles with Onroad Engines for Emissions Estimates	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	0.000	0.000	0.021	0.001	0.008	0.000	0.853	0.000	0.000	0.97
Concrete Pump Truck	0.004	0.004	0.022	0.005	0.109	0.000	12.266	0.000	0.000	12.39
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Water/Soiltac Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Well Water Truck	0.015	0.013	0.080	0.017	0.389	0.000	43.852	0.002	0.001	44.29
Worker Passenger Vehicles	0.000	0.000	0.039	0.002	0.005	0.000	2.596	0.000	0.000	2.74
Delivery Transport Trucks										
General Construction Materials	0.005	0.004	0.028	0.006	0.136	0.000	15.333	0.001	0.000	15.49
Suncatcher Pedestals	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Stirling Engines	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Suncatcher Metal Supports	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Suncatcher Mirrors	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Electrical and Control Syste	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Azimuth and Elevation Driv	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Total										

Vehicles with Onroad Engines for Emissions Estimates	Month 1 Daily Emissions (lb/day) Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
Concrete Pump Truck	2	0.10	0.08	0.53	0.12	2.61	0.00	294.39	0.01	0.01	297.35
Dump Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	67	0.17	0.09	31.73	1.27	3.74	0.02	2097.91	0.30	0.36	2214.48
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Driv	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
Total	**123**	**4.82**	**4.05**	**57.83**	**6.75**	**126.62**	**0.15**	**15949.58**	**0.80**	**0.79**	**16210.38**

Vehicles with Onroad Engines for Emissions Estimates	Month 2 Daily Emissions (lb/day) Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
Concrete Pump Truck	5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02	743.37
Dump Truck	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	180	0.46	0.24	84.81	3.39	10.01	0.05	5608.28	0.79	0.95	5919.91
Delivery Transport Trucks											
General Construction Materials	3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Driv	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
Total	**266**	**5.63**	**4.64**	**114.24**	**9.51**	**146.79**	**0.20**	**21025.99**	**1.36**	**1.44**	**21500.20**

Vehicles with Onroad Engines for Emissions Estimates	Month 21 Daily Emissions (lb/day) Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	209	0.53	0.28	98.64	3.95	11.64	0.06	6522.22	0.92	1.11	6884.63
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**265**	**5.97**	**4.91**	**128.51**	**10.34**	**155.21**	**0.21**	**22708.54**	**1.51**	**1.60**	**23235.97**

Vehicles with Onroad Engines for Emissions Estimates	Month 22 Daily Emissions (lb/day) Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 23 Daily Emissions (lb/day) Quantity Mo 23	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 24 Daily Emissions (lb/day) Quantity Mo 24	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Notes:
Emission factors from CARB Off-road Mobile Source Emission Factors (2006-2020) for diesel and propane equipment. (2009 data used).
Dozer = Crawler Tractor
Loaders = Rubber tired loaders
Backhoe = Tractors/Loaders/Backhoes
Light Tower = Other Construction Equipment
Utilization Load Factors from SCAQMD
PM2.5 emission factors obtained by multiplying the PM10 emissions by PM2.5 fraction in CEIDARS list for onroad or offroad diesel vehicles.
For propane equipment assumed PM2.5 and PM10 Fraction of total PM is 1.000
Onroad vehicle emissions from EMFAC2007 model
CH_4 and N_2O emission factors for the onroad vehicles are from reference source 2: Table C.5, California Climate Action Registry General Reporting Protocol Version 3.0, April 2007

CO_2 GWP (SAR, 1996) =	1
CH_4 GWP (SAR, 1996) =	21
N_2O GWP (SAR, 1996) =	310

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02	743.37
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
249	0.64	0.33	117.48	4.70	13.86	0.07	7768.50	1.10	1.32	8200.17
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
328	**5.81**	**4.74**	**146.91**	**10.81**	**150.64**	**0.21**	**23186.21**	**1.67**	**1.80**	**23780.46**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
295	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
291	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 26 Daily Emissions (lb/day)

Quantity Mo 26	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 27 Daily Emissions (lb/day)

Quantity Mo 27	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
479	1.22	0.63	225.86	9.04	26.65	0.13	14934.63	2.11	2.53	15764.49
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
551	**7.04**	**5.59**	**258.76**	**15.90**	**180.40**	**0.29**	**32265.90**	**2.75**	**3.08**	**33277.53**

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
487	1.25	0.64	229.63	9.19	27.09	0.13	15183.89	2.15	2.58	16027.60
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
1	0.30	0.25	1.60	0.35	7.83	0.01	883.18	0.03	0.03	892.04
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
555	**6.46**	**5.09**	**259.32**	**15.36**	**165.18**	**0.28**	**30748.80**	**2.72**	**3.07**	**31756.56**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
385	0.98	0.51	181.56	7.27	21.42	0.10	12005.87	1.70	2.04	12672.99
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
451	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**	**26687.60**	**2.24**	**2.50**	**27509.91**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
334	0.85	0.44	157.38	6.30	18.57	0.09	10406.47	1.47	1.77	10984.72
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
394	**5.40**	**4.32**	**183.46**	**11.69**	**139.03**	**0.22**	**23984.22**	**1.97**	**2.20**	**24706.59**

Month 28 Daily Emissions (lb/day)

Quantity Mo 28	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 30 Daily Emissions (lb/day)

Quantity Mo 30	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 31 Daily Emissions (lb/day)

Quantity Mo 31	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
357	0.91	0.47	168.06	6.72	19.83	0.09	11112.70	1.57	1.89	11730.19
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
420	**5.46**	**4.35**	**194.14**	**12.11**	**140.29**	**0.22**	**24690.45**	**2.07**	**2.32**	**25452.06**

Month 32 Daily Emissions (lb/day)

Quantity Mo 32	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 34 Daily Emissions (lb/day)

Quantity Mo 34	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 35 Daily Emissions (lb/day)

Quantity Mo 35	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
341	0.87	0.45	160.83	6.44	18.98	0.09	10634.95	1.50	1.80	11225.90
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
403	**5.42**	**4.33**	**186.92**	**11.82**	**139.44**	**0.22**	**24212.71**	**2.00**	**2.24**	**24947.77**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
347	0.89	0.46	163.66	6.55	19.31	0.09	10821.90	1.53	1.84	11423.23
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
409	**5.44**	**4.34**	**189.75**	**11.94**	**139.77**	**0.22**	**24399.65**	**2.03**	**2.27**	**25145.10**

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
332	0.85	0.44	156.43	6.26	18.46	0.09	10344.15	1.46	1.76	10918.94
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
392	**5.40**	**4.32**	**182.52**	**11.65**	**138.92**	**0.22**	**23921.91**	**1.96**	**2.19**	**24640.82**

Month 36 Daily Emissions (lb/day)

Quantity Mo 36	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 37 Daily Emissions (lb/day)

Quantity Mo 37	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
5	0.00	0.00	1.28	0.05	0.48	0.00	51.21	0.01	0.02	58.31
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
325	0.83	0.43	152.98	6.12	18.05	0.09	10115.67	1.43	1.72	10677.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
384	**5.38**	**4.31**	**178.81**	**11.50**	**138.42**	**0.22**	**23683.18**	**1.93**	**2.14**	**24387.97**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
280	0.72	0.37	131.93	5.28	15.57	0.07	8723.99	1.23	1.48	9208.74
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
336	**5.26**	**4.25**	**157.51**	**10.65**	**135.84**	**0.20**	**22281.26**	**1.73**	**1.90**	**22907.30**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
247	0.63	0.33	116.23	4.65	13.71	0.07	7685.42	1.09	1.30	8112.46
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
303	**5.18**	**4.20**	**141.80**	**10.02**	**133.98**	**0.20**	**21242.69**	**1.58**	**1.73**	**21811.02**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
226	0.58	0.30	106.49	4.26	12.56	0.06	7041.50	1.00	1.19	7432.77
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
282	**6.02**	**4.94**	**136.36**	**10.65**	**156.14**	**0.21**	**23227.83**	**1.58**	**1.69**	**23784.11**

Month 39 Daily Emissions (lb/day)

Quantity Mo 39	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 40 Daily Emissions (lb/day)

Quantity Mo 40	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
152	0.39	0.20	71.62	2.87	8.45	0.04	4735.88	0.67	0.80	4999.03
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
197	**4.94**	**4.08**	**96.68**	**8.21**	**128.53**	**0.17**	**18272.67**	**1.16**	**1.22**	**18674.26**

Monthly Comparison of Construction Equipment Emissions:

		Daily Emissions (lb/day)									
Month of Contruction	**Offroad Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	123	4.82	4.05	57.83	6.75	126.62	0.15	15949.58	0.80	0.79	16210.38
2	266	5.63	4.64	114.24	9.51	146.79	0.20	21025.99	1.36	1.44	21500.20
3	328	5.81	4.74	146.91	10.81	150.64	0.21	23186.21	1.67	1.80	23780.46
4	295	6.37	5.24	135.94	10.99	165.91	0.22	24144.28	1.60	1.70	24704.63
5	291	6.37	5.24	135.94	10.99	165.91	0.22	24144.28	1.60	1.70	24704.63
6	551	7.04	5.59	258.76	15.90	180.40	0.29	32265.90	2.75	3.08	33277.53
7	555	6.46	5.09	259.32	15.36	165.18	0.28	30748.80	2.72	3.07	31756.56
8	451	5.91	4.70	209.66	13.09	151.68	0.24	26687.60	2.24	2.50	27509.91
9	394	5.40	4.32	183.46	11.69	139.03	0.22	23984.22	1.97	2.20	24706.59
10	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
11	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
12	365	5.33	4.28	169.64	11.13	137.40	0.21	23070.28	1.84	2.04	23741.87
13	420	5.46	4.35	194.14	12.11	140.29	0.22	24690.45	2.07	2.32	25452.06
14	403	5.42	4.33	186.92	11.82	139.44	0.22	24212.71	2.00	2.24	24947.77
15	409	5.44	4.34	189.75	11.94	139.77	0.22	24399.65	2.03	2.27	25145.10
16	392	5.40	4.32	182.52	11.65	138.92	0.22	23921.91	1.96	2.19	24640.82
17	384	5.38	4.31	178.81	11.50	138.42	0.22	23683.18	1.93	2.14	24387.97
18	336	5.26	4.25	157.51	10.65	135.84	0.20	22281.26	1.73	1.90	22907.30
19	303	5.18	4.20	141.80	10.02	133.98	0.20	21242.69	1.58	1.73	21811.02
20	282	6.02	4.94	136.36	10.65	156.14	0.21	23227.83	1.58	1.69	23784.11
21	265	5.97	4.91	128.51	10.34	155.21	0.21	22708.54	1.51	1.60	23235.97
22	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
23	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
24	263	5.97	4.91	127.88	10.31	155.14	0.21	22667.00	1.50	1.59	23192.12
25	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
26	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
27	260	5.08	4.15	123.07	9.27	131.64	0.18	20017.47	1.41	1.51	20516.01
28	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
29	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
30	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
31	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
32	216	4.97	4.10	103.28	8.48	129.30	0.17	18708.87	1.22	1.29	19134.70
33	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
34	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
35	240	5.03	4.13	114.59	8.93	130.64	0.18	19456.64	1.33	1.42	19924.02
36	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
37	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
38	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
39	199	4.94	4.08	97.31	8.24	128.60	0.17	18314.21	1.17	1.22	18718.11
40	197	4.94	4.08	96.68	8.21	128.53	0.17	18272.67	1.16	1.22	18674.26
MAX VALUE (lb/day)	**555**	**7.04**	**5.59**	**259.32**	**15.90**	**180.40**	**0.29**	**32265.90**	**2.75**	**3.08**	**33277.53**

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	1.05	0.85	30.16	2.08	27.07	0.040	4370.22	0.33	0.3659	4490.65
2	**13**	1.06	0.85	32.21	2.16	27.27	0.041	4501.33	0.35	0.3888	4629.27
3	**14**	1.05	0.85	33.30	2.19	27.16	0.042	4549.13	0.36	0.4008	4680.99
4	**15**	1.05	0.84	33.94	2.21	27.00	0.042	4567.33	0.37	0.4077	4701.46
5	**16**	1.03	0.83	34.64	2.22	26.59	0.042	4564.00	0.37	0.4151	4700.50
6	**17**	1.02	0.81	35.28	2.23	26.18	0.041	4557.08	0.38	0.4217	4695.75
7	**18**	0.99	0.79	33.77	2.15	25.51	0.040	4407.31	0.36	0.4041	4540.20
8	**19**	0.97	0.78	32.00	2.07	25.04	0.039	4264.72	0.35	0.3840	4391.01
9	**20**	0.97	0.78	30.90	2.03	25.11	0.038	4212.82	0.34	0.3718	4335.13
10	**21**	0.98	0.79	30.08	2.01	25.35	0.038	4193.69	0.33	0.3628	4313.07
11	**22**	0.99	0.80	29.45	2.00	25.62	0.038	4187.64	0.32	0.3561	4304.82
12	**23**	1.00	0.81	28.83	1.99	25.89	0.038	4181.59	0.32	0.3493	4296.57
13	**24**	1.01	0.82	28.20	1.97	26.15	0.038	4175.54	0.31	0.3426	4288.33
14	**25**	1.01	0.82	27.13	1.93	26.02	0.038	4105.44	0.30	0.3305	4214.29
15	**26**	1.00	0.81	26.18	1.89	25.90	0.037	4042.52	0.29	0.3197	4147.81
16	**27**	1.00	0.81	25.18	1.85	25.78	0.037	3976.78	0.29	0.3084	4078.37
17	**28**	0.99	0.81	23.99	1.81	25.64	0.036	3898.59	0.27	0.2950	3995.78
18	**29**	0.98	0.81	22.85	1.76	25.50	0.035	3823.97	0.26	0.2822	3916.98
19	**30**	0.98	0.80	22.04	1.73	25.40	0.035	3770.39	0.26	0.2730	3860.39
20	**31**	0.98	0.80	21.46	1.70	25.33	0.035	3732.38	0.25	0.2665	3820.25
21	**32**	0.96	0.79	20.97	1.67	24.93	0.034	3664.59	0.25	0.2605	3750.51
22	**33**	0.95	0.78	20.76	1.65	24.56	0.033	3615.82	0.24	0.2578	3700.83
23	**34**	0.93	0.77	20.56	1.63	24.19	0.033	3567.66	0.24	0.2552	3651.81
24	**35**	0.92	0.75	20.36	1.61	23.83	0.033	3519.50	0.24	0.2526	3602.79
25	**36**	0.90	0.74	19.90	1.58	23.43	0.032	3454.21	0.23	0.2471	3535.67
26	**37**	0.90	0.74	19.51	1.56	23.38	0.032	3428.66	0.23	0.2427	3508.71
27	**38**	0.90	0.74	19.13	1.55	23.34	0.032	3403.12	0.22	0.2384	3481.74
28	**39**	0.90	0.74	18.74	1.53	23.29	0.031	3377.57	0.22	0.2340	3454.77
29	**40**	0.90	0.74	18.64	1.53	23.28	0.031	3371.02	0.22	0.2329	3447.86
MAX VALUE (ton/year)		**1.06**	**0.85**	**35.28**	**2.23**	**27.27**	**0.042**	**4567.33**	**0.38**	**0.4217**	**4701.46**

Annual Offsite Combustion Emissions

Month 8-19

Construction Assumptions - 30 days per month

Equipment	Number of Vehicles per year	Offsite Miles per Day Travelled per Vehicle	Offsite Miles per Year Travelled all Vehicle	Emission factors (g/mile)										Annual Emissions (ton/year)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Vehicles with Onroad Engines for Emissions Estimates																							
Busses	67	10	20100	0.031	0.014	11.649	0.493	4.394	0.005	464.95	0.120	0.200	529.47	0.00	0.00	0.26	0.01	0.10	0.00	10.29	0.00	0.00	11.72
Concrete Pump Truck	0	40	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	10	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	104	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	60	0	0	0.010	0.010	2.100	0.055	0.030	0.010	326.30	0.050	0.060	345.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	120	0	0	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	48	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	12	143	51480	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.03	0.03	0.17	0.04	0.84	0.00	94.72	0.00	0.00	95.67
Worker Passenger Vehicles	3862	40	4634400	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.15	0.08	27.30	1.09	3.22	0.02	1804.93	0.26	0.31	1905.22
Delivery Transport Trucks																							
General Materials Delivery T	3	100	9000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.01	0.00	0.03	0.01	0.15	0.00	16.56	0.00	0.00	16.73
Suncatcher Pedestals Delive	0	240	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	60	50	90000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.06	0.05	0.30	0.07	1.47	0.00	165.60	0.01	0.00	167.26
Suncatcher Metal Supports	120	240	864000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.53	0.46	2.89	0.63	14.10	0.02	1589.72	0.06	0.05	1605.67
Suncatcher Mirrors	72	50	108000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.07	0.06	0.36	0.08	1.76	0.00	198.72	0.01	0.01	200.71
Electrical and Control Systen	24	240	172800	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.11	0.09	0.58	0.13	2.82	0.00	317.94	0.01	0.01	321.13
Azimuth and Elevation Drive	24	50	36000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.02	0.02	0.12	0.03	0.59	0.00	66.24	0.00	0.00	66.90
												Total		**0.97**	**0.78**	**32.00**	**2.07**	**25.04**	**0.04**	**4264.72**	**0.35**	**0.38**	**4391.01**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months

Imperial Valley Solar
Fugitive Dust Emissions (offsite)

Annual : Month 8-19
Month: Month 8

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest

0.32 sL = road surface silt loading (grams per square meter) (g/m^2), Local CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust -
0.02 sL = road surface silt loading (grams per square meter) (g/m^2), Freeway Local Streets & Freeways (emission inventory code: 640-641-5400-0000), July 1997
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 8)	Number of Vehicles per Year (Month 8-19)	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Max Daily VMT (all vehicles)	Max Annual VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Vehicles with Onroad Engines for Emissions Estimates										
Busses	6	67	10	60	20100	12	12	30	0.005	0.038
Concrete Pump	0	0	40	0	0	20	12	30	0.012	0.083
Dump Truck	3	10	0	0	0	20	12	30	0.012	0.083
Flatbed Truck	9	104	0	0	0	10	12	30	0.004	0.029
Staff & Security Truck	5	60	0	0	0	2.25	24	30	0.000	0.003
Pickup Truck	10	120	0	0	0	4	12	30	0.001	0.007
Water/Soiltac Truck	4	48	0	0	0	20	12	30	0.012	0.083
Well Water Truck	1	12	143	143	51480	18.6	12	30	0.011	0.074
Worker Passenger Vehicles	385	3862	40	15413	4634400	2	12	30	0.000	0.002
Suncatcher Delivery Trucks										
General Materials Delivery Trucks	3	3	100	300	9000	20	24	30	0.012	0.083
Suncatcher Pedestals Delivery Trucks	0	0	240	0	0	20	24	30	0.012	0.083
Stirling Engines	5	60	50	250	90000	20	24	30	0.002	0.013
Suncatcher Metal Supports	10	120	240	2400	864000	20	24	30	0.002	0.013
Suncatcher Mirrors	6	72	50	300	108000	20	24	30	0.002	0.013
Electrical and Control Systems	2	24	240	480	172800	20	24	30	0.002	0.013
Azimuth and Elevation Drive	2	24	50	100	36000	20	24	30	0.002	0.013

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.19	0.19	2.29	2.29	1.94%	0.38	0.38	0.03	0.03	0.33	0.33	0.05	0.05
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.88	0.88	10.58	10.58	9.00%	1.90	1.90	0.13	0.13	1.55	1.55	0.28	0.28
Worker Passenger Vehicles	0%	0%	2.77	2.77	33.27	33.27	28.30%	5.00	5.00	0.05	0.05	0.57	0.57	0.08	0.08
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	1.03	1.03	24.76	24.76	21.06%	0.37	0.37	0.15	0.15	3.63	3.63	0.05	0.05
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	0%	0%	0.14	0.14	3.31	3.31	2.81%	0.60	0.60	0.02	0.02	0.42	0.42	0.08	0.08
Suncatcher Metal Supports	0%	0%	1.32	1.32	31.74	31.74	26.99%	5.71	5.71	0.17	0.17	4.07	4.07	0.73	0.73
Suncatcher Mirrors	0%	0%	0.17	0.17	3.97	3.97	3.37%	0.71	0.71	0.02	0.02	0.51	0.51	0.09	0.09
Electrical and Control Systems	0%	0%	0.26	0.26	6.35	6.35	5.40%	1.14	1.14	0.03	0.03	0.81	0.81	0.15	0.15
Azimuth and Elevation Drive	0%	0%	0.06	0.06	1.32	1.32	1.12%	0.24	0.24	0.01	0.01	0.17	0.17	0.03	0.03
TOTAL Fugitive emissions for vehicle travel offsite paved roads			**6.82**	**6.82**	**117.57**	**117.57**		**16.06**	**16.06**	**0.60**	**0.60**	**12.05**	**12.05**	**1.55**	**1.55**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months
delivery trucks can arrive at the site anytime during the day or night

CONSTRUCTION VEHICLES REQUIREMENTS

Description	Activity	Make / Model	Fuel	Quantity	Frequency	Horse-power	Vehicle Weight (tons)	Max Daily Onsite Distance per Vehicle (mile/day)	Assumed distance percentage to drive on onsite sealed roads	Assumed distance percentage to drive on onsite unpaved roads	Assumed distance percentage to drive on onsite paved roads	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Travel to and from
Busses	Shuttle between laydown area and main construction area	Bus	Gasoline	variable	Daily	175	12	12	0%	0%	100%	10	Laydown area
Concrete Pump Truck			Diesel	variable	Daily	250	20	6	0%	8%	82%	40	El Centro
Dump Truck			Diesel	variable	Daily	250	20	7	50%	50%	0%	0	on-site only
Flatbed Truck			Diesel	variable	Daily	250	10	28	100%	0%	0%	0	on-site only
Staff & Security Truck	Site Inspections & Security	Toyota Highlander or similar	Gasoline - Hybrid	5	Daily	187	2.25	33	100%	0%	0%	0	on-site only
Pickup Truck			Gasoline	variable	Daily	175	4	12	95%	5%	0%	0	on-site only
Water /Soiltac Truck			Diesel	variable	Daily	250	20	12	25%	75%	0%	0	on-site only
Worker Passenger Vehicles	Community to Work	Passenger vehicles	Gasoline & diesel	variable	Daily	100	2	0.3	100%	0%	0%	40	El Centro
General Construction Materials	Delivery trucks	transport truck	Diesel	variable	Daily	250	20	6	0%	0%	100%	100	Various locations
Suncatcher Delivery Trucks	Suncatcher Pedestals	transport truck	Diesel	variable	Daily	250	20	13	55%	0%	45%	240	Phoenix Area
	Stirling Engines	transport truck	Diesel	5	Daily	250	20	6	0%	0%	100%	50	Detroit
	Suncatcher Metal Supports	transport truck	Diesel	10	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Suncatcher Mirrors	transport truck	Diesel	6	Daily	250	20	6	0%	0%	100%	50	Detroit
	Electrical and Control Systems	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Azimuth and Elevation Drive	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	50	Midwest
Water Delivery Trucks	All onsite water will be delivered by truck	7000 gal truck	Diesel	1	Daily	250	18.6	39	0%	0%	100%	143	Westwind Well, Ocotillo

Note:

Vehicles with variable quantities, the quantity per month can be found in Table 5.2-19 Construction Equipment Projection
Deliveries coming from Midwest (Detroit and elsewhere) will travel by rail to Los Angeles then by transport truck to the site
Average distance from main service complex to center of east or west portion of the site is 3.5 miles thus the average round trip distance each maintenance vehicle travels is 7 miles
Bus circuit is 11 miles (6 miles onsite, 5 miles offsite) - each bus does this loop twice a day
East access road will be heavily sealed and is 3.5 miles, the sealant will be applied in sufficient quantity that the road can be washed as needed. Thus this road will be considered the same as the paved northern access road for emissions estimates.
North access road and MSC parking area will be paved, route is 1.5 miles
All deliveries will travel an onsite loop starting near east laydown area traveling to the MSC then to the north exit, the loop will consist of 3.5 miles eastern access road + 1 (delivery area) miles + 1.5 miles
Construction laydown area is sealed
Each flatbed truck is assumed to make 4 trips per day to SunCatcher instalation locations delivering assembled dishes and misc parts
The water well truck is assumed to make 13 round trips per day from Ocotillo Westwind well.
The fenceline perimeter is approximately 20.5 miles. Each security vehicle is assumed to travel from the MSC around the perimeter plus one trip to the center of the site and back (plus 10% for misc trips) = 33 m

CONSTRUCTION VEHICLES REQUIREMENTS

Description	Activity	Make / Model	Fuel	Quantity	Frequency	Horse-power	Vehicle Weight (tons)	Max Daily Onsite Distance per Vehicle (mile/day)	Assumed distance percentage to drive on onsite sealed roads	Assumed distance percentage to drive on onsite unpaved roads	Assumed distance percentage to drive on onsite paved roads	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Travel to and from
Busses	Shuttle between laydown area and main construction area	Bus	Gasoline	variable	Daily	175	12	12	0%	0%	100%	10	Laydown area
Concrete Pump Truck			Diesel	variable	Daily	250	20	6	0%	8%	82%	40	El Centro
Dump Truck			Diesel	variable	Daily	250	20	7	50%	50%	0%	0	on-site only
Flatbed Truck			Diesel	variable	Daily	250	10	28	100%	0%	0%	0	on-site only
Staff & Security Truck	Site Inspections & Security	Toyota Highlander or similar	Gasoline - Hybrid	5	Daily	187	2.25	33	100%	0%	0%	0	on-site only
Pickup Truck			Gasoline	variable	Daily	175	4	12	95%	5%	0%	0	on-site only
Water /Soiltac Truck			Diesel	variable	Daily	250	20	12	25%	75%	0%	0	on-site only
Worker Passenger Vehicles	Community to Work	Passenger vehicles	Gasoline & diesel	variable	Daily	100	2	0.3	100%	0%	0%	40	El Centro
General Construction Materials	Delivery trucks	transport truck	Diesel	variable	Daily	250	20	6	0%	0%	100%	100	Various locations
Suncatcher Delivery Trucks	Suncatcher Pedestals	transport truck	Diesel	variable	Daily	250	20	13	55%	0%	45%	240	Phoenix Area
	Stirling Engines	transport truck	Diesel	5	Daily	250	20	6	0%	0%	100%	50	Detroit
	Suncatcher Metal Supports	transport truck	Diesel	10	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Suncatcher Mirrors	transport truck	Diesel	6	Daily	250	20	6	0%	0%	100%	50	Detroit
	Electrical and Control Systems	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Azimuth and Elevation Drive	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	50	Midwest
Water Delivery Trucks	All onsite water will be delivered by truck	7000 gal truck	Diesel	1	Daily	250	18.6	39	0%	0%	100%	143	Westwind Well, Ocotillo

Note:

Vehicles with variable quantities, the quantity per month can be found in Table 5.2-19 Construction Equipment Projection
Deliveries coming from Midwest (Detroit and elsewhere) will travel by rail to Los Angeles then by transport truck to the site
Average distance from main service complex to center of east or west portion of the site is 3.5 miles thus the average round trip distance each maintenance vehicle travels is 7 miles
Bus circuit is 11 miles (6 miles onsite, 5 miles offsite) - each bus does this loop twice a day
East access road will be heavily sealed and is 3.5 miles, the sealant will be applied in sufficient quantity that the road can be washed as needed. Thus this road will be considered the same as the paved northern access road for emissions estimates.
North access road and MSC parking area will be paved, route is 1.5 miles
All deliveries will travel an onsite loop starting near east laydown area traveling to the MSC then to the north exit, the loop will consist of 3.5 miles eastern access road + 1 (delivery area) miles + 1.5 miles
Construction laydown area is sealed
Each flatbed truck is assumed to make 4 trips per day to SunCatcher instalation locations delivering assembled dishes and misc parts
The water well truck is assumed to make 13 round trips per day from Ocotillo Westwind well.
The fenceline perimeter is approximately 20.5 miles. Each security vehicle is assumed to travel from the MSC around the perimeter plus one trip to the center of the site and back (plus 10% for misc trips) = 33 m

Appendix B-3b
Construction and Operation Overlap Emissions
(March 31, 2010 rev.)

Estimated Maximum Daily Construction and Operations Overlapping Emissions for Month 13 (lbs/day)

CONSTRUCTION						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_x**	**SO_x**
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	12.96	11.94	187.46	37.96	199.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.44	0.23	0.23	0.00
Security Vehicles	0.00	0.00	0.76	0.02	0.01	0.00
Water Well Trucks	0.15	0.13	1.06	0.50	2.37	0.00
Suncatcher Delivery Trucks	0.56	0.50	4.08	1.91	9.10	0.01
Subtotal of On-site Combustion Emissions	**14.91**	**13.68**	**213.93**	**45.53**	**231.78**	**0.23**
On-Site Fugitive Dust Emissions						
Construction Equipment	25.22	6.36				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.11	0.29				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	35.37	5.26				
Subtotal of On-Site Fugitive Dust Emissions	**201.66**	**30.69**				
Subtotal of On-Site Emissions	**216.57**	**44.37**	**213.93**	**45.53**	**231.78**	**0.23**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.00
Worker Vehicles	0.91	0.47	168.06	6.72	19.83	0.09
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.37	3.73	23.59	5.12	115.21	0.12
Subtotal of Off-Site Combustion Emissions	**5.46**	**4.35**	**194.14**	**12.11**	**140.29**	**0.22**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	30.80	0.52				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	46.68	5.99				
Subtotal of Off-Site Fugitive Emissions	**90.34**	**8.38**				
Subtotal of Off-Site Emissions	**95.80**	**12.73**	**194.14**	**12.11**	**140.29**	**0.22**
Total Maximum Annual Emissions	**312.37**	**57.10**	**408.08**	**57.64**	**372.07**	**0.46**
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.02	0.02	14.72	1.94	1.88	0.01
Worker Vehicles	0.01	0.00	0.99	0.09	0.09	0.00
Water Delivery Trucks from Westwind Well	0.01	0.01	0.08	0.04	0.18	0.00
Visitor Cars and Delivery Trucks	0.01	0.01	0.14	0.04	0.15	0.00
Subtotal of On-site Combustion Emissions	**0.06**	**0.06**	**16.01**	**2.14**	**3.16**	**0.03**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	16.21	2.40				
Worker Vehicles	0.34	0.04				
Water Delivery Trucks from Westwind Well	0.64	0.10				
Visitor Cars and Delivery Trucks	0.99	0.15				
Subtotal of On-Site Fugitive Dust Emissions	**18.18**	**2.68**		**5.05**		
Subtotal of On-Site Emissions	**18.24**	**2.74**	**16.01**	**7.19**	**3.16**	**0.03**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.04	0.02	6.85	0.27	0.80	0.00
Water Delivery Trucks from Westwind Well	0.01	0.01	0.07	0.02	0.36	0.00
Visitor Cars and Delivery Trucks	0.03	0.02	0.82	0.06	0.81	0.00
Subtotal of Off-Site Combustion Emissions	**0.08**	**0.06**	**7.74**	**0.35**	**1.98**	**0.01**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	1.40	0.04	0.00	0.00	0.00	0.00
Water Delivery Trucks from Westwind Well	0.82	0.12	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	1.86	0.25	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	**4.08**	**0.41**	**0.00**	**0.00**	**0.00**	**0.00**
Subtotal of Off-Site Emissions	**4.17**	**0.47**	**7.74**	**0.35**	**1.98**	**0.01**
Total Maximum Emissions	**22.41**	**3.21**	**23.76**	**7.54**	**5.13**	**0.04**
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	**234.81**	**47.11**	**229.94**	**52.72**	**234.94**	**0.26**
Total of Off-Site Emissions Construction & Operations	**99.97**	**13.20**	**201.89**	**12.46**	**142.27**	**0.23**
Construction & Operations Overlap Total	**334.78**	**60.31**	**431.83**	**65.18**	**377.20**	**0.49**

Estimated Maximum Annual Construction and Operations Overlapping Emissions for Months 13-24 (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
CONSTRUCTION						
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.16	1.07	21.88	3.48	19.46	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.18	0.16	2.53	0.70	2.91	0.004
Worker Vehicles	0.002	0.001	0.338	0.032	0.032	0.0003
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.112	0.100	0.814	0.381	1.816	0.002
Subtotal of On-site Combustion Emissions	**1.48**	**1.35**	**25.89**	**4.69**	**24.64**	**0.02**
On-Site Fugitive Dust Emissions						
Construction Equipment	3.57	0.65				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	17.81	2.38				
Worker Vehicles	0.29	0.04				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	7.70	1.15				
Subtotal of On-Site Fugitive Dust Emissions	**31.57**	**4.53**				
Subtotal of On-Site Emissions	**33.05**	**5.89**	**25.89**	**4.69**	**24.64**	**0.02**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.18	0.01	0.07	0.00
Worker Vehicles	0.13	0.07	23.24	0.93	2.74	0.01
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.85	0.73	4.61	1.00	22.50	0.02
Subtotal of Off-Site Combustion Emissions	**1.01**	**0.82**	**28.20**	**1.97**	**26.15**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.27	0.04				
Worker Vehicles	4.26	0.07				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	12.86	1.73				
Subtotal of Off-Site Fugitive Emissions	**19.29**	**2.12**				
Subtotal of Off-Site Emissions	**20.30**	**2.94**	**28.20**	**1.97**	**26.15**	**0.04**
Total Maximum Annual Emissions	**53.35**	**8.83**	**54.09**	**6.66**	**50.79**	**0.06**
OPERATIONS						
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.00	0.00	0.00	0.00	0.02	0.00
Maintenance & Security Vehicles and Equipment	0.01	0.01	5.47	0.72	0.70	0.00
Worker Vehicles	0.00	0.00	0.37	0.03	0.03	0.00
Water Delivery Trucks from Westwind Well	0.00	0.00	0.03	0.01	0.07	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.03	0.00	0.01	0.00
Subtotal of On-site Combustion Emissions	**0.02**	**0.01**	**5.89**	**0.77**	**0.83**	**0.00**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	6.02	0.89				
Worker Vehicles	0.13	0.01				
Water Delivery Trucks from Westwind Well	0.24	0.04				
Visitor Cars and Delivery Trucks	0.07	0.01				
Subtotal of On-Site Fugitive Dust Emissions	**6.45**	**0.95**		**0.92**		
Subtotal of On-Site Emissions	**6.47**	**0.97**	**5.89**	**1.70**	**0.83**	**0.00**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.01	0.01	2.54	0.10	0.30	0.00
Water Delivery Trucks from Westwind Well	0.01	0.00	0.03	0.01	0.13	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.19	0.01	0.07	0.00
Subtotal of Off-Site Combustion Emissions	**0.02**	**0.01**	**2.76**	**0.12**	**0.50**	**0.00**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	0.52	0.01	0.00	0.00	0.00	0.00
Water Delivery Trucks from Westwind Well	0.30	0.02	0.00	0.00	0.00	0.00
Visitor Cars and Delivery Trucks	0.14	0.26	0.00	0.00	0.00	0.00
Subtotal of Off-Site FugitiveEmissions	**0.97**	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**
Subtotal of Off-Site Emissions	**0.99**	**0.31**	**2.76**	**0.12**	**0.50**	**0.00**
Total Maximum Emissions	**7.45**	**1.28**	**8.65**	**1.81**	**1.33**	**0.01**
Construction and Operations Overlapping Emissions						
Total of On-Site Emissions Construction & Operations	**39.51**	**6.85**	**31.78**	**6.38**	**25.47**	**0.03**
Total of Off-Site Emissions Construction & Operations	**21.29**	**3.25**	**30.96**	**2.09**	**26.65**	**0.04**
Construction & Operations Overlap Total	**60.80**	**10.10**	**62.74**	**8.48**	**52.13**	**0.07**

Anticipated Operational Capacity by Month of Construction Schedule

Month in Construction Schedule	MW Online	Fraction of peak MW
8	18	0.024
9	36	0.048
10	54	0.072
11	72	0.096
12	90	0.120
13	108	0.144
14	126	0.168
15	144	0.192
16	162	0.216
17	180	0.240
18	198	0.264
19	225	0.300
20	252	0.336
21	279	0.372
22	306	0.408
23	333	0.444
24	360	0.480
25	387	0.516
26	414	0.552
27	441	0.588
28	468	0.624
29	495	0.660
30	522	0.696
31	549	0.732
32	576	0.768
33	603	0.804
34	630	0.840
35	657	0.876
36	684	0.912
37	711	0.948
38	738	0.984
39	750	1.000
40	750	1.000

Year in Construction Schedule	Average Annual MW Online	Fraction of peak MW
8-19	118	0.16
9-20	137	0.18
10-21	158	0.21
11-22	179	0.24
12-23	200	0.27
13-24	223	0.30
14-25	246	0.33
15-26	270	0.36
16-27	295	0.39
17-28	320	0.43
18-29	347	0.46
19-30	374	0.50
20-31	401	0.53
21-32	428	0.57
22-33	455	0.61
23-34	482	0.64
24-35	509	0.68
25-36	536	0.71
26-37	563	0.75
27-38	590	0.79
28-39	615	0.82
29-40	639	0.85

Note: from month 8 - 18 18 MW will come online per month
after that 27 MW will come online per month until full 750MW buildout

Estimated Annual Maximum Operational Emissions of Criteria Pollutants (tons/year)

Activity	PM10	PM2.5	CO	ROC	NOx	SOx
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.0003	0.0003	0.0019	0.0007	0.0221	0.0006
Maintenance & Security Vehicles and Equipment	0.03	0.03	18.40	2.43	2.34	0.01
Worker Vehicles	0.01	0.01	1.24	0.12	0.12	0.00
Water Delivery Trucks from Westwind Well	0.01	0.01	0.10	0.05	0.23	0.00
Visitor Cars and Delivery Trucks	0.00	0.00	0.09	0.01	0.04	0.00
Subtotal of On-site Combustion Emissions	**0.05**	**0.05**	**19.83**	**2.61**	**2.75**	**0.01**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				0.92		
Maintenance & Security Vehicles and Equipment	20.27	3.01				
Worker Vehicles	0.42	0.05				
Water Delivery Trucks from Westwind Well	0.80	0.12				
Visitor Cars and Delivery Trucks	0.22	0.03				
Subtotal of On-Site Fugitive Emissions	**21.71**	**3.20**	**0.00**	**0.92**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**21.77**	**3.25**	**19.83**	**3.53**	**2.75**	**0.01**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.05	0.02	8.56	0.34	1.01	0.01
Water Delivery Trucks from Westwind Well	0.02	0.01	0.09	0.02	0.45	0.00
Visitor Cars and Delivery Trucks	0.01	0.01	0.65	0.03	0.23	0.00
Subtotal of Off-Site Combustion Emissions	**0.07**	**0.05**	**9.30**	**0.39**	**1.68**	**0.01**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	1.75	0.05				
Water Delivery Trucks from Westwind Well	1.03	0.07				
Visitor Cars and Delivery Trucks	0.48	0.88				
Subtotal of Off-Site FugitiveEmissions	**3.26**	**1.00**				
Subtotal of Off-Site Emissions	**3.33**	**1.04**	**9.30**	**0.39**	**1.68**	**0.01**
Total Maximum Emissions	**25.10**	**4.29**	**29.14**	**3.92**	**4.43**	**0.02**

Estimated Daily Maximum Operational Emissions of Criteria Pollutants(lbs/day)

Activity	PM10	PM2.5	CO	ROC	NOx	SOx
On-Site Operational Emissions						
On-Site Combustion Emissions						
Diesel Generator	0.01	0.01	0.07	0.03	0.85	0.02
Maintenance & Security Vehicles and Equipment	0.17	0.16	102.24	13.49	13.02	0.04
Worker Vehicles	0.04	0.03	6.88	0.64	0.64	0.01
Water Delivery Trucks from Westwind Well	0.08	0.07	0.57	0.27	1.27	0.00
Visitor Cars and Delivery Trucks	0.06	0.06	1.00	0.26	1.06	0.00
Subtotal of On-site Combustion Emissions	**0.36**	**0.32**	**110.76**	**14.68**	**16.85**	**0.07**
On-Site Fugitive Emissions						
Diesel Generator						
Gasoline Tank				5.05		
Maintenance & Security Vehicles and Equipment	112.60	16.70				
Worker Vehicles	2.35	0.26				
Water Delivery Trucks from Westwind Well	4.44	0.66				
Visitor Cars and Delivery Trucks	6.85	1.02				
Subtotal of On-Site Fugitive Emissions	**126.24**	**18.64**	**0.00**	**5.05**	**0.00**	**0.00**
Subtotal of On-Site Emissions	**126.61**	**18.96**	**110.76**	**19.74**	**16.85**	**0.07**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.27	0.14	47.55	1.90	5.58	0.03
Water Delivery Trucks from Westwind Well	0.10	0.08	0.51	0.11	2.51	0.00
Visitor Cars and Delivery Trucks	0.20	0.16	5.71	0.40	5.62	0.01
Subtotal of Off-Site Combustion Emissions	**0.57**	**0.38**	**53.78**	**2.41**	**13.72**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Worker Vehicles	9.75	0.27				
Water Delivery Trucks from Westwind Well	5.70	0.83				
Visitor Cars and Delivery Trucks	12.91	1.77				
Subtotal of Off-Site Fugitive Emissions	**28.36**	**2.87**				
Subtotal of Off-Site Emissions	**28.92**	**3.25**	**53.78**	**2.41**	**13.72**	**0.04**
Total Maximum Emissions	**155.53**	**22.22**	**164.54**	**22.15**	**30.57**	**0.11**

Estimated Annual Construction Emissions of Criteria Pollutants (tons/year) during Month 13-24

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	1.16	1.07	21.88	3.48	19.46	0.02
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.177	0.158	2.531	0.701	2.910	0.004
Worker Vehicles	0.002	0.001	0.338	0.032	0.032	0.000
Security Vehicles	0.001	0.001	0.137	0.004	0.002	0.001
Water Well Trucks	0.026	0.024	0.191	0.089	0.426	0.000
Suncatcher Delivery Trucks	0.112	0.100	0.814	0.381	1.816	0.002
Subtotal of On-site Combustion Emissions	**1.48**	**1.35**	**25.89**	**4.69**	**24.64**	**0.02**
On-Site Fugitive Dust Emissions						
Construction Equipment	3.57	0.65				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	17.81	2.38				
Worker Vehicles	0.29	0.04				
Security Vehicles	0.70	0.10				
Water Well Trucks	1.48	0.22				
Suncatcher Delivery Trucks	7.70	1.15				
Subtotal of On-Site Fugitive Emissions	**31.57**	**4.53**				
Subtotal of On-Site Emissions	**33.05**	**5.89**	**25.89**	**4.69**	**24.64**	**0.02**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	0.18	0.01	0.07	0.00
Worker Vehicles	0.13	0.07	23.24	0.93	2.74	0.01
Water Well Trucks	0.03	0.03	0.17	0.04	0.84	0.00
Suncatcher Delivery Trucks	0.85	0.73	4.61	1.00	22.50	0.02
Subtotal of Off-Site Combustion Emissions	**1.01**	**0.82**	**28.20**	**1.97**	**26.15**	**0.04**
Off-Site Paved Road Fugitive Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.27	0.04				
Worker Vehicles	4.26	0.07				
Water Well Trucks	1.90	0.28				
Suncatcher Delivery Trucks	12.86	1.73				
Subtotal of Off-Site Fugitive Emissions	**19.29**	**2.12**				
Subtotal of Off-Site Emissions	**20.30**	**2.94**	**28.20**	**1.97**	**26.15**	**0.04**
Total Maximum Annual Emissions	**53.35**	**8.83**	**54.09**	**6.66**	**50.79**	**0.06**

Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day) in Month 13

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
On-Site Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment	12.96	11.94	187.46	37.96	199.84	0.19
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	1.23	1.10	18.12	4.91	20.24	0.03
Worker Vehicles	0.01	0.01	2.44	0.23	0.23	0.00
Security Vehicles	0.004	0.004	0.763	0.020	0.011	0.004
Water Well Trucks	0.146	0.131	1.061	0.497	2.366	0.003
Suncatcher Delivery Trucks	0.56	0.50	4.08	1.91	9.10	0.01
Subtotal of On-site Combustion Emissions	**14.91**	**13.68**	**213.93**	**45.53**	**231.78**	**0.23**
On-Site Fugitive Emissions						
Construction Equipment	25.22	6.36				
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	126.80	17.01				
Worker Vehicles	2.11	0.29				
Security Vehicles	3.90	0.54				
Water Well Trucks	8.25	1.23				
Suncatcher Delivery Trucks	35.37	5.26				
Subtotal of On-Site Fugitive Emissions	**201.66**	**30.69**				
Subtotal of On-Site Emissions	**216.57**	**44.37**	**213.93**	**45.53**	**231.78**	**0.23**
Off-Site On-Road Emissions						
Off-Site Combustion Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	0.00	0.00	1.54	0.07	0.58	0.00
Worker Vehicles	0.91	0.47	168.06	6.72	19.83	0.09
Water Well Trucks	0.18	0.15	0.96	0.21	4.67	0.01
Suncatcher Delivery Trucks	4.37	3.73	23.59	5.12	115.21	0.12
Subtotal of Off-Site Combustion Emissions	**5.46**	**4.35**	**194.14**	**12.11**	**140.29**	**0.22**
Off-Site Paved Road Fugitive Dust Emissions						
Construction Trucks (Concrete, Dump Trucks, Flatbed Trucks, …)	2.29	0.33				
Worker Vehicles	30.80	0.52				
Water Well Trucks	10.58	1.55				
Suncatcher Delivery Trucks	46.68	5.99				
Subtotal of Off-Site Fugitive Emissions	**90.34**	**8.38**				
Subtotal of Off-Site Emissions	**95.80**	**12.73**	**194.14**	**12.11**	**140.29**	**0.22**
Total Maximum Daily Emissions	**312.37**	**57.10**	**408.08**	**57.64**	**372.07**	**0.46**

Construction Equipment Projection (750 MW)

Month After Construction Start

Construction Equipment Description	HP	D	G	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	1-12	2-13	3-14	4-15	5-16	6-17	7-18	8-19	9-20	10-21	11-22	12-23	13-24	14-25	15-26	16-27	17-28	18-29	19-30	20-31	21-32	22-33	23-34	24-35	25-36	26-37	27-38	28-39	29-40	1-40 (entire construction)
Air Compressor	50	X			1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	1	1																							24	25	26	27	28	26	24	21	18	16	14	12	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	34
Asphalt Paver	120	X				1																																							1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Backhoe	120	X			3	9	5	5	5	6	6	5	4	4	4	4	4	4	4	4	1	1	1																						60	61	56	55	54	50	45	40	35	31	27	23	19	15	11	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	79
Compactor	120	X			1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2																									34	36	35	34	33	30	27	24	21	18	15	12	9	6	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
Crane small	175	X			1	3	4	5	5	8	8	8	7	6	6	6	8	8	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	67	74	79	81	81	81	77	73	69	66	64	62	60	56	52	50	49	48	48	48	48	48	48	48	48	48	48	48	48	48	191
Crane large	500	X						3	3	3	1													3	3	3	3	3																	10	10	10	10	7	4	1	0	3	6	9	12	15	15	15	15	15	15	15	12	9	6	3	0	0	0	0	0	0	25
Dozer	250	X			1	1	1	1	1	1	1	1	1				1	1	1	1																									9	9	9	9	9	8	7	6	5	4	4	4	4	3	2	1	0	0	0	0	0	0	6	0	0	0	0	0	0	13
Generator	50	X			1	1	1	2	2	4	4	4	6	6	6	6	3	3	3	3	3	2	2	2	2	2	1	1	1																43	45	47	49	50	51	49	47	45	41	37	32	27	25	22	19	16	13	11	9	7	5	3	2	1	0	0	0	0	71
Grader	175	X			1	3	3	3	3	3	2	2	1				2	2	1	1																									21	22	21	19	17	14	11	9	7	6	6	6	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Light Tower	50	X						1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1																			17	19	21	23	24	23	22	21	20	19	17	15	13	11	9	7	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	30
Loader	250	X			1	3	3	4	4	4	3	3	2	1	1	1	3	3	3	2	1																							30	32	32	32	30	27	23	20	17	15	14	13	12	9	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
Maxi Sneeker (Trencher)	50	X				2	2	2	2	5	5	4	4	4	4	4	5	5	5	5	5	2	2	1																				38	43	46	49	52	55	52	49	46	42	38	34	30	25	20	15	10	5	3	1	0	0	0	0	0	0	0	0	0	0	0	68
Skid Steer (Bobcat)	50	X				1	1	2	2	4	3	3	2	2	2	2	4	4	4	4	4																							24	28	31	34	36	38	34	31	28	26	24	22	20	16	12	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44
Welding Machine	50	X				1	2	3	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1																					37	40	42	43	42	39	36	33	29	25	21	17	14	11	8	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	51
Equipment fueled with Propane																		

Construction Trade Projection (750 MW)

Discipline	Hours	Month After Construction Start																																														Highest Per Day Requirement by Solar Two During Project	El Centro Total Available for the Project
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
Carpenters	83,472	10	14	31	31	31	43	47	40	36	28	28	28	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	47	80
Concrete Crews	81,008	9	15	29	29	29	46	46	42	36	24	24	24	21	11	11	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	46	140
Electricians	212,010	17	28	57	57	57	84	84	60	54	54	54	54	69	69	113	105	105	88	48	48	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	0	0	0	0	0	113	210
Ironworkers	100,330	19	23	41	41	41	44	48	36	32	24	24	24	36	26	26	25	25	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	48	130
Laborers	153,557	17	43	65	62	62	142	142	68	30	30	30	30	56	41	51	46	46	32	22	17	17	17	17	17	17	17	17	10	10	10	10	10	10	10	10	0	0	0	0	0	142	540
Miscellaneous Crews	10,000	0	0	0	0	0	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	630
Operators	205,183	25	82	93	75	75	86	86	72	59	51	51	51	84	88	67	61	52	34	34	27	26	25	25	25	25	25	25	2	2	2	2	2	2	2	2	1	1	1	1	0	88	190
Plumbers	25,040	0	5	9	9	9	22	26	26	22	14	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	100
Solar Two Technicians	145,920	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Assemblers	371,200	0	0	0	0	0	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	N/A
SunCatcher Electricians	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Ironworkers	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
SunCatcher Laborers	58,880	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Material Handlers	92,800	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	N/A
SunCatcher Operators	29,440	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	8	8	8	8	N/A
SunCatcher Teamsters	44,160	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12	12	12	12	12	12	12	N/A
SunCatcher Technicians	185,600	0	0	0	0	0	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	N/A
Teamsters	65,160	4	60	49	24	24	25	25	7	5	5	5	5	31	53	29	28	26	24	24	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	0	60	680
Technicians	3,504	0	0	0	0	0	5	5	5	5	5	5	5	5	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	60
Totals	**2,145,663**	**101**	**270**	**374**	**328**	**328**	**719**	**731**	**578**	**501**	**457**	**457**	**457**	**535**	**512**	**521**	**498**	**487**	**420**	**370**	**339**	**314**	**312**	**312**	**312**	**312**	**312**	**312**	**249**	**249**	**249**	**249**	**249**	**285**	**285**	**285**	**230**	**230**	**230**	**230**	**228**	**813**	**2,760**

Source: Bureau of Labor Statistics, 2008.

Note:

N/A = not applicable

14417 total personnel for 40 months
360 avg monthly personnel
731 max monthly personnel

Annual Onsite Combustion Emissions

Month 13-24

Construction Assumptions - 30 days per month

Equipment	Number of Vehicles per year	Hours/Day	Emission rate per piece of equipment (lb/hr)										Annual Emissions (ton/year)									
			PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment																						
Air Compressor	10	6	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.000	22.478	0.02	0.02	0.24	0.10	0.21	0.00	19.23	0.01	0.00	19.42
Asphalt Paver	0	7	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.000	54.706	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	19	7	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.000	51.869	0.10	0.10	0.69	0.19	1.14	0.00	97.21	0.02	0.00	97.57
Compactor	9	7	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.000	59.178	0.06	0.06	0.38	0.12	0.71	0.00	53.47	0.01	0.00	53.69
Crane small	60	5	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.000	80.514	0.26	0.24	2.28	0.59	4.57	0.00	372.79	0.05	0.00	373.91
Crane large	15	7	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.000	180.302	0.11	0.10	1.11	0.30	2.90	0.00	278.55	0.03	0.00	279.11
Dozer	4	8	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.000	166.390	0.04	0.04	0.28	0.10	0.94	0.00	76.48	0.01	0.00	76.67
Generator	27	9	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.000	30.815	0.11	0.10	1.06	0.42	1.11	0.00	110.03	0.04	0.00	110.82
Grader	6	7	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.000	124.159	0.05	0.05	0.49	0.12	0.95	0.00	81.57	0.01	0.00	81.80
Light Tower	13	9	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.000	28.179	0.05	0.05	0.55	0.21	0.52	0.00	51.04	0.02	0.00	51.43
Loader	12	7	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.000	149.142	0.07	0.07	0.53	0.19	1.94	0.00	176.83	0.02	0.00	177.18
Maxi Sneeker (Trencher)	30	9	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.000	33.253	0.17	0.16	1.81	0.78	1.48	0.00	133.20	0.07	0.00	134.68
Skid Steer (Bobcat)	20	7	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.000	25.665	0.05	0.04	0.52	0.18	0.50	0.00	50.48	0.02	0.00	50.82
Welding Machine	14	5	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.000	26.175	0.03	0.03	0.35	0.14	0.31	0.00	29.41	0.01	0.00	29.68
Equipment fueled with Propane	0																					
Aerial Lift	38	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	4.44	0.02	0.70	0.00	98.28	0.15	0.00	101.44
Fork Lift	72	4	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.859	0.01	0.01	1.14	0.01	0.53	0.00	71.13	0.10	0.00	73.32
Telehandler	44	6	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.239	0.01	0.01	6.03	0.02	0.95	0.00	133.58	0.20	0.00	137.88
Vehicles with Onroad Engines for Emissions Estimates																						
Busses	47	12	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.826	0.00	0.00	0.78	0.07	0.06	0.00	31.16	0.00	0.00	32.36
Concrete Pump Truck	0	12	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.505	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	7	12	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.089	0.00	0.00	0.02	0.01	0.04	0.00	5.12	0.00	0.00	5.15
Flatbed Truck	89	12	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.355	0.14	0.13	1.02	0.48	2.27	0.00	260.63	0.00	0.00	262.01
Staff & Security Truck	60	24	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.048	0.00	0.00	0.14	0.00	0.00	0.00	21.35	0.00	0.00	22.63
Pickup Truck	120	12	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.931	0.00	0.00	0.49	0.05	0.05	0.00	40.77	0.00	0.00	41.71
Water/Soiltac Truck	45	12	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.009	0.03	0.03	0.22	0.10	0.49	0.00	56.48	0.00	0.00	56.78
Well Water Truck	12	12	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.780	0.03	0.02	0.19	0.09	0.43	0.00	48.95	0.00	0.00	49.21
Worker Passenger Vehicles	3288	12	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.048	0.00	0.00	0.34	0.03	0.03	0.00	27.93	0.00	0.00	28.57
Delivery Transport Trucks																						
General Materials Delivery T	0	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delive	15	24	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.797	0.01	0.01	0.08	0.04	0.18	0.00	20.39	0.00	0.00	20.50
Stirling Engines	60	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.15	0.07	0.33	0.00	37.65	0.00	0.00	37.85
Suncatcher Metal Supports	120	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.04	0.04	0.29	0.14	0.66	0.00	75.30	0.00	0.00	75.70
Suncatcher Mirrors	72	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.02	0.02	0.18	0.08	0.39	0.00	45.18	0.00	0.00	45.42
Electrical and Control Systen	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14
Azimuth and Elevation Drive	24	24	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.752	0.01	0.01	0.06	0.03	0.13	0.00	15.06	0.00	0.00	15.14
												Total	**1.48**	**1.35**	**25.89**	**4.69**	**24.64**	**0.02**	**2534.30**	**0.79**	**0.02**	**2557.57**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months
delivery trucks can arrive at the site anytime during the day or night

Imperial Valley Solar
Fugitive Dust Emissions (on-site)

Annual : Month 13-24
Month: Month 13

Travel on sealed roads (paved)

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$ EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
7.4 sL = road surface silt loading (grams per square meter) (g/m^2), from Table 13.2.1-4 for Municipal solid waste landfill
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 13)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on sealed roads	Max Daily Distance per Vehicle to drive on sealed roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 13-24)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	2	0	0%	0	0	0.5	6	10	0	0.000	0.002
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.134	0.893
Backhoe	4	0	0%	0	0	11	7	19	0	0.039	0.260
Compactor	3	0	0%	0	0	10	7	9	0	0.034	0.226
Crane small	8	0.5	50%	0	2	10	5	60	450	0.034	0.226
Crane large	0	0.5	0%	0	0	35	7	15	0	0.222	1.480
Dozer	1	0	0%	0	0	20	8	4	0	0.096	0.639
Generator	3	0	0%	0	0	0.5	9	27	0	0.000	0.002
Grader	2	0	0%	0	0	20	7	6	0	0.096	0.639
Light Tower	2	0	0%	0	0	0.25	9	13	0	0.000	0.000
Loader	3	0	0%	0	0	25	7	12	0	0.134	0.893
Maxi Sneeker (Trencher)	5	0	0%	0	0	5	9	30	0	0.012	0.079
Skid Steer (Bobcat)	4	0	0%	0	0	2	7	20	0	0.003	0.020
Welding Machine	3	0	0%	0	0	0.5	5	14	0	0.000	0.002
Equipment fueled with Propane											
Aerial Lift	4	1	50%	1	2	4	6	38	570	0.008	0.057
Fork Lift	8	1	50%	1	4	3	4	72	1080	0.005	0.037
Telehandler	4	1	50%	1	2	3	6	44	660	0.005	0.037
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	47	0	0.044	0.297
Concrete Pump	0	6	0%	0	0	20	12	0	0	0.096	0.639
Dump Truck	3	7	50%	4	11	20	12	7	735	0.096	0.639
Flatbed Truck	9	28	100%	28	252	10	12	89	74760	0.034	0.226
Staff & Security Truck	5	33	100%	33	165	2.25	24	60	59400	0.003	0.024
Pickup Truck	10	12	95%	11	114	4	12	120	41040	0.008	0.057
Water/Soiltac Truck	4	12	25%	3	12	20	12	45	4050	0.096	0.639
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.086	0.573
Worker Passenger Vehicles	357	0.3	100%	0	107	2	12	3288	29592	0.003	0.020
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	0	6	0%	0	0	20	24	0	0	0.096	0.639
Suncatcher Pedestals Delivery Trucks	0	13	55%	7	0	20	24	15	3217.5	0.096	0.639
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.096	0.639
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.096	0.639
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.096	0.639
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.096	0.639
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.096	0.639

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.09	0.09	0.45	0.45	0.53%	0.05	0.05	0.01	0.01	0.07	0.07	0.01	0.01
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.02	0.02	0.11	0.11	0.13%	0.02	0.02	0.00	0.00	0.02	0.02	0.00	0.00
Fork Lift	0%	0%	0.04	0.04	0.15	0.15	0.17%	0.02	0.02	0.01	0.01	0.02	0.02	0.00	0.00
Telehandler	0%	0%	0.01	0.01	0.07	0.07	0.09%	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.56	0.56	6.71	6.71	7.94%	0.23	0.23	0.08	0.08	1.00	1.00	0.04	0.04
Flatbed Truck	0%	0%	4.74	4.74	56.84	56.84	67.28%	8.43	8.43	0.70	0.70	8.45	8.45	1.25	1.25
Staff & Security Truck	0%	0%	0.16	0.16	3.90	3.90	4.62%	0.70	0.70	0.02	0.02	0.54	0.54	0.10	0.10
Pickup Truck	0%	0%	0.54	0.54	6.47	6.47	7.65%	1.16	1.16	0.08	0.08	0.94	0.94	0.17	0.17
Water/Soiltac Truck	0%	0%	0.64	0.64	7.67	7.67	9.07%	1.29	1.29	0.10	0.10	1.15	1.15	0.19	0.19
Well Water Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	0%	0.18	0.18	2.11	2.11	2.50%	0.29	0.29	0.02	0.02	0.29	0.29	0.04	0.04
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	1.03	1.03	0.00	0.00	0.00	0.00	0.15	0.15

Stirling Engines	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Metal Supports	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on sealed road (paved)			**6.97**	**6.97**	**84.49**	**84.49**		**13.25**	**13.25**	**1.03**	**1.03**	**12.48**	**12.48**	**1.96**	**1.96**

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest

1.6 sL = road surface silt loading (grams per square meter) (g/m^2),
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

Rural roads CARB - Emission Inventory Database - Section 7.8 SJV - Entrained Paved Road Dust - Rural Roads (emission inventory code: 640-643-5400-0000), June 2006.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 13)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on paved road	Max Daily Distance per Vehicle to drive on paved road (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 13-24)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	2	0	0%	0	0	0.5	6	10	0	0.000	0.000
Asphalt Paver	0	0.2	0%	0	0	25	7	0	0	0.049	0.330
Backhoe	4	0	0%	0	0	11	7	19	0	0.014	0.096
Compactor	3	0	0%	0	0	10	7	9	0	0.012	0.083
Crane small	8	0.5	0%	0	0	10	5	60	0	0.012	0.083
Crane large	0	0.5	0%	0	0	35	7	15	0	0.082	0.547
Dozer	1	0	0%	0	0	20	8	4	0	0.035	0.236
Generator	3	0	0%	0	0	0.5	9	27	0	0.000	0.000
Grader	2	0	0%	0	0	20	7	6	0	0.035	0.236
Light Tower	2	0	0%	0	0	0.25	9	13	0	0.000	0.000
Loader	3	0	0%	0	0	25	7	12	0	0.049	0.330
Maxi Sneeker (Trencher)	5	0	0%	0	0	5	9	30	0	0.004	0.029
Skid Steer (Bobcat)	4	0	0%	0	0	2	7	20	0	0.001	0.007
Welding Machine	3	0	0%	0	0	0.5	5	14	0	0.000	0.000
Equipment fueled with Propane											
Aerial Lift	4	1	0%	0	0	4	6	38	0	0.003	0.021
Fork Lift	8	1	0%	0	0	3	4	72	0	0.002	0.013
Telehandler	4	1	0%	0	0	3	6	44	0	0.002	0.013
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	100%	12	72	12	12	47	16920	0.016	0.109
Concrete Pump	0	6	82%	4.92	0	20	12	0	0	0.035	0.236
Dump Truck	3	7	0%	0	0	20	12	7	0	0.035	0.236
Flatbed Truck	9	28	0%	0	0	10	12	89	0	0.012	0.083
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.001	0.008
Pickup Truck	10	12	0%	0	0	4	12	120	0	0.003	0.021
Water/Soiltac Truck	4	12	0%	0	0	20	12	45	0	0.035	0.236
Well Water Truck	1	39	100%	39	39	18.6	12	12	14040	0.031	0.211
Worker Passenger Vehicles	357	0.3	0%	0	0	2	12	3288	0	0.001	0.007
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	0	6	100%	6	0	20	24	0	0	0.035	0.236
Suncatcher Pedestals Delivery Trucks	0	13	45%	5.85	0	20	24	15	2632.5	0.035	0.236
Stirling Engines	5	6	100%	6	30	20	24	60	10800	0.035	0.236
Suncatcher Metal Supports	10	6	100%	6	60	20	24	120	21600	0.035	0.236
Suncatcher Mirrors	6	6	100%	6	36	20	24	72	12960	0.035	0.236
Electrical and Control Systems	2	6	100%	6	12	20	24	24	4320	0.035	0.236
Azimuth and Elevation Drive	2	6	100%	6	12	20	24	24	4320	0.035	0.236

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane large	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lift	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Telehandler	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.66	0.66	7.87	7.87	15.29%	0.93	0.93	0.10	0.10	1.16	1.16	0.14	0.14
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.69	0.69	8.25	8.25	16.01%	1.48	1.48	0.10	0.10	1.23	1.23	0.22	0.22
Worker Passenger Vehicles	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.31	0.31	0.00	0.00	0.00	0.00	0.05	0.05
Stirling Engines	0%	0%	0.29	0.29	7.07	7.07	13.74%	1.27	1.27	0.04	0.04	1.05	1.05	0.19	0.19
Suncatcher Metal Supports	0%	0%	0.59	0.59	14.15	14.15	27.48%	2.55	2.55	0.09	0.09	2.11	2.11	0.38	0.38
Suncatcher Mirrors	0%	0%	0.35	0.35	8.49	8.49	16.49%	1.53	1.53	0.05	0.05	1.26	1.26	0.23	0.23

Electrical and Control Systems	0%	0%	0.12	0.12	2.83	2.83	5.50%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
Azimuth and Elevation Drive	0%	0%	0.12	0.12	2.83	2.83	5.50%	0.51	0.51	0.02	0.02	0.42	0.42	0.08	0.08
TOTAL Fugitive emissions for vehicles traveled on paved road			**2.82**	**2.82**	**51.49**	**51.49**		**9.09**	**9.09**	**0.42**	**0.42**	**7.65**	**7.65**	**1.35**	**1.35**

Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$

EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2
E = size-specific emission factor (lb/VMT)
k, a, b = empirical constants
8.5 s = surface material silt content (%)
W = mean vehicle weight (tons)

Construction sites - Scraper routes

constants

	$PM_{2.5}$	PM_{10}
k	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)

Vehicle Type	Number of Vehicles (Month 13)	Max Daily Distance per Vehicle (mile/day)	Assumed distance percentage to drive on unpaved roads	Max Daily Distance per Vehicle to drive on unpaved roads (mile/day)	Max Daily VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Number of Vehicles per Year (Month 13-24)	Max Annual VMT (all vehicles)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Diesel Construction Equipment											
Air Compressor	2	0	100%	0	0	0.5	6	10	0	0.047	0.475
Asphalt Paver	0	0.2	100%	0.2	0	25	7	0	0	0.276	2.762
Backhoe	4	0	100%	0	0	11	7	19	0	0.191	1.909
Compactor	3	0	100%	0	0	10	7	9	0	0.183	1.828
Crane small	8	0.5	50%	0.25	2	10	5	60	450	0.183	1.828
Crane large	0	0.5	100%	0.5	0	35	7	15	225	0.321	3.213
Dozer	1	0	100%	0	0	20	8	4	0	0.250	2.498
Generator	3	0	100%	0	0	0.5	9	27	0	0.047	0.475
Grader	2	0	100%	0	0	20	7	6	0	0.250	2.498
Light Tower	2	0	100%	0	0	0.25	9	13	0	0.035	0.348
Loader	3	0	100%	0	0	25	7	12	0	0.276	2.762
Maxi Sneeker (Trencher)	5	0	100%	0	0	5	9	30	0	0.134	1.339
Skid Steer (Bobcat)	4	0	100%	0	0	2	7	20	0	0.089	0.886
Welding Machine	3	0	100%	0	0	0.5	5	14	0	0.047	0.475
Equipment fueled with Propane											
Aerial Lift	4	1	50%	0.5	2	4	6	38	570	0.121	1.211
Fork Lift	8	1	50%	0.5	4	3	4	72	1080	0.106	1.064
Telehandler	4	1	50%	0.5	2	3	6	44	660	0.106	1.064
Vehicles with Onroad Engines for Emissions Estimates											
Busses	6	12	0%	0	0	12	12	47	0	0.198	1.985
Concrete Pump	0	6	8%	0.48	0	20	12	0	0	0.250	2.498
Dump Truck	3	7	50%	3.5	11	20	12	7	735	0.250	2.498
Flatbed Truck	9	28	0%	0	0	10	12	89	0	0.183	1.828
Staff & Security Truck	5	33	0%	0	0	2.25	24	60	0	0.093	0.934
Pickup Truck	10	12	5%	0.6	6	4	12	120	2160	0.121	1.211
Water/Soiltac Truck	4	12	75%	9	36	20	12	45	12150	0.250	2.498
Well Water Truck	1	39	0%	0	0	18.6	12	12	0	0.242	2.417
Worker Passenger Vehicles	357	0.3	0%	0	0	2	12	3288	0	0.089	0.886
Suncatcher Delivery Trucks											
General Materials Delivery Trucks	0	6	0%	0	0	20	24	0	0	0.250	2.498
Suncatcher Pedestals Delivery Trucks	0	13	0%	0	0	20	24	15	0	0.250	2.498
Stirling Engines	5	6	0%	0	0	20	24	60	0	0.250	2.498
Suncatcher Metal Supports	10	6	0%	0	0	20	24	120	0	0.250	2.498
Suncatcher Mirrors	6	6	0%	0	0	20	24	72	0	0.250	2.498
Electrical and Control Systems	2	6	0%	0	0	20	24	24	0	0.250	2.498
Azimuth and Elevation Drive	2	6	0%	0	0	20	24	24	0	0.250	2.498

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Diesel Construction Equipment															
Air Compressor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	0%	68%	0.71	0.23	3.66	1.17	2.69%	0.41	0.13	0.07	0.02	0.37	0.12	0.04	0.01
Crane large	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.36	0.12	0.00	0.00	0.00	0.00	0.04	0.01
Dozer	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane															
Aerial Lift	0%	68%	0.44	0.14	2.42	0.77	1.78%	0.35	0.11	0.04	0.01	0.24	0.08	0.03	0.01
Fork Lift	0%	68%	1.18	0.38	4.25	1.36	3.13%	0.57	0.18	0.12	0.04	0.43	0.14	0.06	0.02
Telehandler	0%	68%	0.33	0.11	2.13	0.68	1.57%	0.35	0.11	0.03	0.01	0.21	0.07	0.04	0.01
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pump	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	68%	2.19	0.70	26.23	8.39	19.30%	0.92	0.29	0.22	0.07	2.62	0.84	0.09	0.03
Flatbed Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	68%	0.61	0.19	7.26	2.32	5.35%	1.31	0.42	0.06	0.02	0.73	0.23	0.13	0.04
Water/Soiltac Truck	0%	68%	7.49	2.40	89.92	28.77	66.18%	15.17	4.86	0.75	0.24	8.99	2.88	1.52	0.49
Well Water Truck	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Passenger Vehicles	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Suncatcher Metal Supports	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Mirrors	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrical and Control Systems	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Azimuth and Elevation Drive	0%	68%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL Fugitive emissions for vehicles traveled on unpaved surfaces			**12.94**	**4.14**	**135.87**	**43.48**		**19.44**	**6.22**	**1.29**	**0.41**	**13.59**	**4.35**	**1.94**	**0.62**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Bulldozing & grading EPA AP-42 Section 11.9

$E = p * 1 * s^{1.0} / M^{1.4}$ PM10 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.75 p = particle size multiplier for PM10
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.75 lb/hr of PM10

$E = p * 5.7 * s^{1.2} / M^{1.3}$ PM2.5 Emissions from bulldozing (lb/hr) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.105 p = particle size multiplier for PM2.5
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.41 lb/hr of PM2.5

$E = p * 0.051 * S^{2.0}$ PM10 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.6 p = particle size multiplier for PM10
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
1.54 lb/VMT of PM10

$E = p * 0.040 * S^{2.5}$ PM2.5 Emissions from grading (lb/VMT) Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)

0.031 p = particle size multiplier for PM2.5
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
0.17 lb/VMT of PM2.5

Equipment	Quantity/ month	Hours/ Day	VMT/day/ vehicle	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	VMT/year/ vehicle	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Compactor	3	7	2	68%	2.96	0.32	9	730	0.541	0.058
Dozer	1	8		68%	1.85	1.02	4		0.111	0.061
Maxi Sneeker (Trencher)	5	9	2	68%	4.94	0.53	30	730	0.901	0.097
Skid Steer (Bobcat)	4	7		68%	6.36	3.50	20		0.477	0.262
Grader	2	7	4	68%	3.95	0.43	6	1460	0.721	0.078
				Grading Total	**11.85**	**1.28**			**2.16**	**0.23**
				Bulldozing Total	**8.21**	**4.51**			**0.59**	**0.32**
				Total	**20.06**	**5.79**			**2.75**	**0.56**

12 months of earth work
12 total construction hours per work day
30 construction days per month

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily

Dirt Piling or Material Handling PM10 Emissions from Material Handling (lb/ton) from EPA AP-42 Chapter 13.2.4 Eq. 1

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ E = Emission factor (lb/ton material handled)

7.45 U = Mean Wind speed (mph) (from 1991-1995 Imperial Co. airport data)
12 M = Moisture content of surface material (%) (from Table 13.2.4-1 for cover at municipal landfill)

	$PM_{2.5}$	PM_{10}
k	0.053	0.35

0.00003 lb/ton of PM2.5
0.00022 lb/ton of PM10

Equipment	Quantity/ month	Hours/ Day	Material Handled per Day (ton)	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	Number of Vehicles per year (months 4-15)	Material Handled per year (ton)	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Backhoe	4	7	2,804	68%	0.1966	0.0298	19	1009503	0.035	0.005
Wheeled Loader	3	7	2,804	68%	0.1966	0.0298	12	1009503	0.035	0.005
Dump Trucks	3	12	5,608	68%	0.3932	0.0595	7	2,019,006	0.071	0.011
				Total	**0.79**	**0.12**			**0.14**	**0.02**

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
Assume 50% soil movement from loaders and 50% from backhoes

4,033 yd3/day 5,608 ton/day
1,452,000 yd3/project 2,019,006 tons/project 2781 density of soil (lb/yd3)
(USDA NRCS Physical Soil Properti 0.5 depth of disturbance (yards)
for Niland Fine Sand and Rositas Fine Sand soil)

total project
600 acres = 1,452,000 cubic yds, assume depth of soils moved is
3000 total acres disturbed as described in Table 3-17 of Project Description
only a small portion of this soil is picked up and moved via dump druck

Cover Storage Pile

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J SCAQMD Table A9-9-E

PM10 Emission factor from wind erosion of storage piles per day per acre

15 G = Silt content (%) (from CEQA Handbook Table A9-9-E-1 for blended ore and dirt)
12 H = Number of days with >= 0.01 inches of precipitation per year (from El Centro 2 SSW weather station WRCC)
2.5 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height
0.5 J = Fraction of TSP that is PM10 = 0.5
2.128 lb/acre/day

wind speed percentage based on 2005 wind speed data as recorded at El Centro 2 SSW station

Source	Quantity	Size of Pile (acre)	Hours/Day	Days/Year per Pile	Watering Control Efficiency	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	2	1	24	182.5	68%	1.36	0.30	0.12	0.03

Water efficiency from CEQA Table 11-4 maximum value for watering active sites 2 times daily
pile size assumed
piles present only for 6 months

Construction on-site fugitive dust PM10

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Month 13 construction on-site fugitive dust: Sealed Road - PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions	Month 13-24 construction on-site fugitive dust: Sealed Road PM_{10} Fugitive Emissions	Paved Road - PM_{10} Fugitive Emissions	Unpaved Road - PM_{10} Fugitive Emissions	Earthmoving Equipment - PM_{10} Fugitive Emissions	Total PM_{10} Fugitive Emissions
			lb/day					ton/year				
Diesel Construction Equipment												
Air Compressor	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	4	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Compactor	3	0	0.00	0.00	0.00	2.96	2.96	0.00	0.00	0.00	0.54	0.54
Crane small	8	0.5	0.45	0.00	1.17		1.62	0.05	0.00	0.13		0.18
Crane large	0	0.5	0.00	0.00	0.00		0.00	0.00	0.00	0.12		0.12
Dozer	1	0	0.00	0.00	0.00	1.85	1.85	0.00	0.00	0.00	0.11	0.11
Generator	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	2	0	0.00	0.00	0.00	3.95	3.95	0.00	0.00	0.00	0.72	0.72
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	3	0	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.04	0.04
Maxi Sneeker (Trencher)	5	0	0.00	0.00	0.00	4.94	4.94	0.00	0.00	0.00	0.90	0.90
Skid Steer (Bobcat)	4	0	0.00	0.00	0.00	6.36	6.36	0.00	0.00	0.00	0.48	0.48
Welding Machine	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	4	1	0.11	0.00	0.77		0.89	0.02	0.00	0.11		0.13
Fork Lift	8	1	0.15	0.00	1.36		1.51	0.02	0.00	0.18		0.20
Telehandler	4	1	0.07	0.00	0.68		0.75	0.01	0.00	0.11		0.12
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	7.87	0.00		7.87	0.00	0.93	0.00		0.93
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	3	7	6.71	0.00	8.39	0.39	15.49	0.23	0.00	0.29	0.07	0.60
Flatbed Truck	9	28	56.84	0.00	0.00		56.84	8.43	0.00	0.00		8.43
Staff & Security Truck	5	33	3.90	0.00	0.00		3.90	0.70	0.00	0.00		0.70
Pickup Truck	10	12	6.47	0.00	2.32		8.79	1.16	0.00	0.42		1.58
Water/Soiltac Truck	4	12	7.67	0.00	28.77		36.44	1.29	0.00	4.86		6.15
Well Water Truck	1	39	0.00	8.25	0.00		8.25	0.00	1.48	0.00		1.48
Worker Passenger Vehicles	357	0.3	2.11	0.00	0.00		2.11	0.29	0.00	0.00		0.29
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Suncatcher Pedestals Delivery Trucks	0	13	0.00	0.00	0.00		0.00	1.03	0.31	0.00		1.34
Stirling Engines	5	6	0.00	7.07	0.00		7.07	0.00	1.27	0.00		1.27
Suncatcher Metal Supports	10	6	0.00	14.15	0.00		14.15	0.00	2.55	0.00		2.55
Suncatcher Mirrors	6	6	0.00	8.49	0.00		8.49	0.00	1.53	0.00		1.53
Electrical and Control Systems	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Azimuth and Elevation Drive	2	6	0.00	2.83	0.00		2.83	0.00	0.51	0.00		0.51
Storage piles						1.36	1.36				0.12	0.12
			84.49	**51.49**	**43.48**	**22.20**	**201.66**	**13.25**	**9.09**	**6.22**	**3.02**	**31.57**

Construction on-site fugitive dust PM2.5

Vehicle Type	Number of Vehicles (month 6)	Max Daily Distance per Vehicle (mile/day)	Month 13 construction on-site fugitive dust: Sealed Road - PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions	Month 13-24 construction on-site fugitive dust: Sealed Road PM2.5 Fugitive Emissions	Paved Road - PM2.5 Fugitive Emissions	Unpaved Road - PM2.5 Fugitive Emissions	Earthmoving Equipment - PM2.5 Fugitive Emissions	Total PM2.5 Fugitive Emissions
			lb/day					ton/year				
Diesel Construction Equipment												
Air Compressor	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Asphalt Paver	0	0.2	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Backhoe	4	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Compactor	3	0	0.00	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.06	0.06
Crane small	8	0.5	0.07	0.00	0.12		0.18	0.01	0.00	0.01		0.02
Crane large	0	0.5	0.00	0.00	0.00		0.00	0.00	0.00	0.01		0.01
Dozer	1	0	0.00	0.00	0.00	1.02	1.02	0.00	0.00	0.00	0.06	0.06
Generator	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Grader	2	0	0.00	0.00	0.00	0.43	0.43	0.00	0.00	0.00	0.08	0.08
Light Tower	2	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Loader	3	0	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.01
Maxi Sneeker (Trencher)	5	0	0.00	0.00	0.00	0.53	0.53	0.00	0.00	0.00	0.10	0.10
Skid Steer (Bobcat)	4	0	0.00	0.00	0.00	3.50	3.50	0.00	0.00	0.00	0.26	0.26
Welding Machine	3	0	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Equipment fueled with Propane												
Aerial Lift	4	1	0.02	0.00	0.08		0.09	0.00	0.00	0.01		0.01
Fork Lift	8	1	0.02	0.00	0.14		0.16	0.00	0.00	0.02		0.02
Telehandler	4	1	0.01	0.00	0.07		0.08	0.00	0.00	0.01		0.01
Vehicles with Onroad Engines for Emissions Estimates												
Busses	6	12	0.00	1.16	0.00		1.16	0.00	0.14	0.00		0.14
Concrete Pump	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Dump Truck	3	7	1.00	0.00	0.84	0.06	1.90	0.04	0.00	0.03	0.01	0.08
Flatbed Truck	9	28	8.45	0.00	0.00		8.45	1.25	0.00	0.00		1.25
Staff & Security Truck	5	33	0.54	0.00	0.00		0.54	0.10	0.00	0.00		0.10
Pickup Truck	10	12	0.94	0.00	0.23		1.17	0.17	0.00	0.04		0.21
Water/Soiltac Truck	4	12	1.15	0.00	2.88		4.02	0.19	0.00	0.49		0.68
Well Water Truck	1	39	0.00	1.23	0.00		1.23	0.00	0.22	0.00		0.22
Worker Passenger Vehicles	357	0.3	0.29	0.00	0.00		0.29	0.04	0.00	0.00		0.04
Suncatcher Delivery Trucks												
General Materials Delivery Trucks	0	6	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00
Suncatcher Pedestals Delivery Trucks	0	13	0.00	0.00	0.00		0.00	0.15	0.05	0.00		0.20
Stirling Engines	5	6	0.00	1.05	0.00		1.05	0.00	0.19	0.00		0.19
Suncatcher Metal Supports	10	6	0.00	2.11	0.00		2.11	0.00	0.38	0.00		0.38
Suncatcher Mirrors	6	6	0.00	1.26	0.00		1.26	0.00	0.23	0.00		0.23
Electrical and Control Systems	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Azimuth and Elevation Drive	2	6	0.00	0.42	0.00		0.42	0.00	0.08	0.00		0.08
Storage piles						0.30	0.30				0.03	0.03
			12.48	**7.65**	**4.35**	**6.21**	**30.69**	**1.96**	**1.35**	**0.62**	**0.61**	**4.53**

Short-term Onsite Combustion Emissions

construction schedule = 12 hours per day 7 am to 7 pm pedestal installation = 16 hours per day
delivery trucks can arrive at the site anytime during the day or nig

Equipment	Load Factor	Hours/Day	Horsepower	Emission factors (ton/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment													
Air Compressor	0.48	6	50	1.35E-05	1.25E-05	1.42E-04	5.99E-05	1.20E-04	1.44E-07	1.11E-02	5.40E-06	0.00E+00	1.12E-02
Asphalt Paver	0.62	7	120	3.47E-05	3.19E-05	2.07E-04	6.75E-05	3.98E-04	3.19E-07	2.72E-02	6.09E-06	0.00E+00	2.74E-02
Backhoe	0.55	7	120	2.77E-05	2.55E-05	1.83E-04	4.96E-05	3.03E-04	3.03E-07	2.58E-02	4.47E-06	0.00E+00	2.59E-02
Compactor	0.56	7	120	3.36E-05	3.09E-05	2.11E-04	6.39E-05	3.89E-04	3.46E-07	2.95E-02	5.77E-06	0.00E+00	2.96E-02
Crane small	0.43	5	175	2.81E-05	2.59E-05	2.45E-04	6.37E-05	4.92E-04	4.52E-07	4.01E-02	5.75E-06	0.00E+00	4.03E-02
Crane large	0.43	7	500	3.63E-05	3.34E-05	3.58E-04	9.56E-05	9.38E-04	8.83E-07	9.00E-02	8.62E-06	0.00E+00	9.02E-02
Dozer	0.64	8	250	4.15E-05	3.82E-05	3.02E-04	1.08E-04	1.02E-03	9.34E-07	8.30E-02	9.70E-06	0.00E+00	8.32E-02
Generator	0.74	9	50	1.46E-05	1.35E-05	1.47E-04	5.80E-05	1.55E-04	1.98E-07	1.53E-02	5.23E-06	0.00E+00	1.54E-02
Grader	0.61	7	175	4.11E-05	3.78E-05	3.72E-04	9.21E-05	7.19E-04	6.97E-07	6.19E-02	8.31E-06	0.00E+00	6.21E-02
Light Tower	0.78	9	50	1.41E-05	1.30E-05	1.52E-04	5.67E-05	1.42E-04	1.81E-07	1.40E-02	5.12E-06	0.00E+00	1.41E-02
Loader	0.55	7	250	3.00E-05	2.76E-05	2.22E-04	7.89E-05	8.16E-04	8.37E-07	7.44E-02	7.11E-06	0.00E+00	7.46E-02
Maxi Sneeker (Trencher)	0.75	9	50	2.10E-05	1.94E-05	2.23E-04	9.63E-05	1.83E-04	2.13E-07	1.64E-02	8.69E-06	0.00E+00	1.66E-02
Skid Steer (Bobcat)	0.55	7	50	1.19E-05	1.09E-05	1.30E-04	4.46E-05	1.25E-04	1.65E-07	1.27E-02	4.02E-06	0.00E+00	1.28E-02
Welding Machine	0.45	5	50	1.47E-05	1.35E-05	1.52E-04	6.34E-05	1.37E-04	1.68E-07	1.30E-02	5.72E-06	0.00E+00	1.31E-02
Equipment fueled with Propane				Emission factors (ton/hr)									
Aerial Lift	0.46	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Fork Lift	0.3	4	50	8.14E-07	8.14E-07	1.47E-04	1.60E-06	6.85E-05	0.00E+00	9.15E-03	1.34E-05	0.00E+00	9.43E-03
Telehandler	0.54	6	120	1.39E-06	1.39E-06	7.05E-04	2.85E-06	1.11E-04	0.00E+00	1.56E-02	2.39E-05	0.00E+00	1.61E-02
Vehicles with Onroad Engines for Emissions Estimates	Onsite Miles per Day Travelled per Vehicle												
Busses	12	12	175	6.60E-02	4.63E-02	4.19E+01	3.57E+00	3.17E+00	1.70E-02	1.67E+03	1.20E-01	2.00E-01	1.74E+03
Concrete Pump Truck	6	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Dump Truck	7	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Flatbed Truck	28	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Staff & Security Truck	33	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	12	12	175	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Water/Soiltac Truck	12	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Well Water Truck	39	12	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Worker Passenger Vehicles	0.3	12	NA	5.80E-02	4.18E-02	1.04E+01	9.73E-01	9.71E-01	8.00E-03	8.57E+02	5.00E-02	6.00E-02	8.77E+02
Delivery Transport Trucks				Emission factors (g/mile)									
General Materials Delivery Trucks	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Pedestals Delivery Truck	13	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Stirling Engines	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Metal Supports	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Suncatcher Mirrors	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Electrical and Control Systems	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03
Azimuth and Elevation Drive	6	24	250	1.70E+00	1.52E+00	1.24E+01	5.78E+00	2.75E+01	3.00E-02	3.17E+03	6.00E-02	5.00E-02	3.18E+03

Equipment	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment										
Air Compressor	0.027	0.025	0.283	0.120	0.240	0.000	22.251	0.011	0.00	22.48
Asphalt Paver	0.069	0.064	0.413	0.135	0.796	0.001	54.450	0.012	0.00	54.71
Backhoe	0.055	0.051	0.366	0.099	0.606	0.001	51.682	0.009	0.00	51.87
Compactor	0.067	0.062	0.422	0.128	0.777	0.001	58.936	0.012	0.00	59.18
Crane small	0.056	0.052	0.490	0.127	0.984	0.001	80.272	0.011	0.00	80.51
Crane large	0.073	0.067	0.716	0.191	1.876	0.002	179.940	0.017	0.00	180.30
Dozer	0.083	0.076	0.604	0.215	2.050	0.002	165.982	0.019	0.00	166.39
Generator	0.029	0.027	0.294	0.116	0.310	0.000	30.595	0.010	0.00	30.82
Grader	0.082	0.076	0.744	0.184	1.437	0.001	123.810	0.017	0.00	124.16
Light Tower	0.028	0.026	0.303	0.113	0.283	0.000	27.964	0.010	0.00	28.18
Loader	0.060	0.055	0.443	0.158	1.631	0.002	148.843	0.014	0.00	149.14
Maxi Sneeker (Trencher)	0.042	0.039	0.446	0.193	0.366	0.000	32.888	0.017	0.00	33.25
Skid Steer (Bobcat)	0.024	0.022	0.261	0.089	0.250	0.000	25.496	0.008	0.00	25.67
Welding Machine	0.029	0.027	0.305	0.127	0.275	0.000	25.935	0.011	0.00	26.18
Equipment fueled with Propane										
Aerial Lift	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Fork Lift	0.002	0.002	0.294	0.003	0.137	0.000	18.295	0.027	0.000	18.86
Telehandler	0.003	0.003	1.410	0.006	0.222	0.000	31.235	0.048	0.000	32.24
Busses	0.000	0.000	0.092	0.008	0.007	0.000	3.683	0.000	0.000	3.83
Concrete Pump Truck	0.002	0.002	0.014	0.006	0.030	0.000	3.486	0.000	0.000	3.50
Dump Truck	0.002	0.002	0.016	0.007	0.035	0.000	4.067	0.000	0.000	4.09
Flatbed Truck	0.009	0.008	0.063	0.030	0.142	0.000	16.269	0.000	0.000	16.35
Staff & Security Truck	0.000	0.000	0.006	0.000	0.000	0.000	0.988	0.000	0.000	1.05
Pickup Truck	0.000	0.000	0.023	0.002	0.002	0.000	1.888	0.000	0.000	1.93
Water/Soiltac Truck	0.004	0.003	0.027	0.013	0.061	0.000	6.972	0.000	0.000	7.01
Well Water Truck	0.012	0.011	0.088	0.041	0.197	0.000	22.660	0.000	0.000	22.78
Worker Passenger Vehicles	0.000	0.000	0.001	0.000	0.000	0.000	0.047	0.000	0.000	0.05
Delivery Transport Trucks										
General Materials Delivery Trucks	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Pedestals Delivery Truck	0.002	0.002	0.015	0.007	0.033	0.000	3.777	0.000	0.000	3.80
Stirling Engines	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Metal Supports	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Suncatcher Mirrors	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Electrical and Control Systems	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
Azimuth and Elevation Drive	0.001	0.001	0.007	0.003	0.015	0.000	1.743	0.000	0.000	1.75
										Total

Equipment	Month 1 Daily Emissions (lb/day) Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	3	1.10	1.01	7.24	1.96	12.01	0.01	1023.30	0.18	0.00	1027.01
Compactor	1	0.45	0.42	2.83	0.86	5.22	0.00	396.05	0.08	0.00	397.68
Crane small	1	0.29	0.27	2.53	0.66	5.08	0.00	414.21	0.06	0.00	415.45
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	2	0.01	0.01	2.11	0.02	0.99	0.00	131.72	0.19	0.00	135.78
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
Concrete Pump Truck	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Dump Truck	3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
Flatbed Truck	2	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	67	0.00	0.00	0.46	0.04	0.04	0.00	38.13	0.00	0.00	39.01
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	137	5.18	4.73	64.80	14.17	87.34	0.09	8706.39	1.64	0.10	8771.11

Equipment	Month 2 Daily Emissions (lb/day) Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
Asphalt Paver	1	0.52	0.48	3.07	1.00	5.92	0.00	405.11	0.09	0.00	407.01
Backhoe	9	3.29	3.02	21.72	5.89	36.02	0.04	3069.89	0.53	0.00	3081.04
Compactor	3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
Crane small	3	0.87	0.80	7.59	1.97	15.23	0.01	1242.62	0.18	0.00	1246.36
Crane large	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
Generator	1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
Grader	3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
Maxi Sneeker (Trencher)	2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
Skid Steer (Bobcat)	1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
Welding Machine	1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
Equipment fueled with Propane											
Aerial Lift	5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Busses	6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
Concrete Pump Truck	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Dump Truck	8	0.21	0.19	1.52	0.71	3.40	0.00	390.45	0.01	0.01	392.52
Flatbed Truck	9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water/Soiltac Truck	14	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	180	0.01	0.00	1.23	0.12	0.12	0.00	101.93	0.01	0.01	104.27
Delivery Transport Trucks											
General Materials Delivery Trucks	3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
Suncatcher Pedestals Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	252.33	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Total	305	13.95	12.78	161.24	36.97	219.05	0.22	21021.55	4.36	0.16	21161.28

Equipment	Month 21 Daily Emissions (lb/day) Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maxi Sneeker (Trencher)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skid Steer (Bobcat)	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Machine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment fueled with Propane											
Aerial Lift	2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
Fork Lift	5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
Telehandler	3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
Vehicles with Onroad Engines for Emissions Estimates											
Busses	2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
Staff & Security Truck	5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
Pickup Truck	10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
Water Truck	4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
Well Water Truck	1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Worker Passenger Vehicles	209	0.01	0.01	1.43	0.13	0.13	0.00	118.55	0.01	0.01	121.26
Delivery Transport Trucks											
General Materials Delivery Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
Stirling Engines	5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
Suncatcher Metal Supports	10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
Suncatcher Mirrors	6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
Electrical and Control Systems	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
Azimuth and Elevation Drive	2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
TOTALS	**285**	**5.25**	**4.80**	**100.44**	**16.18**	**103.92**	**0.10**	**11105.02**	**2.92**	**0.11**	**11199.00**

Equipment	Month 22 Daily Emissions (lb/day) Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Diesel Construction Equipment											
Air Compressor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Paver	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compactor	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane small	4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
Crane large	3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
Dozer	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
Grader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Tower	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
1	0.16	0.14	1.72	0.59	1.65	0.00	168.28	0.05	0.00	169.39
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
7	0.18	0.16	1.33	0.62	2.97	0.00	341.65	0.01	0.01	343.45
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
249	0.01	0.01	1.71	0.16	0.16	0.00	141.20	0.01	0.01	144.44
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
367	**12.16**	**11.14**	**162.26**	**33.79**	**201.35**	**0.20**	**19628.87**	**4.65**	**0.15**	**19772.83**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
1	0.02	0.02	9.14	0.04	1.44	0.00	202.40	0.31	0.00	208.91
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.16	0.14	1.14	0.53	2.55	0.00	292.84	0.01	0.00	294.39
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
8	0.36	0.32	2.61	1.22	5.83	0.01	669.35	0.01	0.01	672.89
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
343	**15.19**	**13.93**	**191.14**	**42.81**	**264.55**	**0.26**	**25577.73**	**5.47**	**0.15**	**25738.43**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
7	0.04	0.04	7.40	0.08	3.45	0.00	461.03	0.68	0.00	475.25
2	0.04	0.04	18.27	0.07	2.88	0.00	404.80	0.62	0.00	417.81
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
219	0.01	0.01	1.50	0.14	0.14	0.00	123.83	0.01	0.01	126.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
345	**15.82**	**14.51**	**214.78**	**45.52**	**271.81**	**0.27**	**26345.73**	**6.32**	**0.14**	**26523.00**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
3	1.80	1.66	16.33	4.05	31.56	0.03	2718.87	0.37	0.00	2726.54
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
4	1.58	1.46	11.70	4.16	43.06	0.04	3929.45	0.38	0.00	3937.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
6	0.09	0.09	46.70	0.19	7.35	0.00	1034.50	1.58	0.00	1067.74
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
6	0.27	0.24	1.96	0.92	4.37	0.00	502.01	0.01	0.01	504.67
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
479	0.02	0.01	3.28	0.31	0.31	0.00	271.45	0.02	0.02	277.67
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
620	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.04**	**8.35**	**0.15**	**30741.20**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.61	1.03	2.75	0.00	271.69	0.09	0.00	273.64
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.19	2.02	14.48	3.92	24.01	0.02	2046.59	0.35	0.00	2054.03
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
1	0.50	0.46	4.92	1.32	12.90	0.01	1237.98	0.12	0.00	1240.48
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.10	0.09	0.76	0.36	1.70	0.00	195.23	0.00	0.00	196.26
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
487	0.02	0.01	3.34	0.31	0.31	0.00	275.98	0.02	0.02	282.31
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
1	0.05	0.04	0.35	0.17	0.79	0.00	90.64	0.00	0.00	91.12
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
617	**16.72**	**15.35**	**237.56**	**50.57**	**260.27**	**0.26**	**25266.23**	**7.26**	**0.15**	**25464.98**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
3	0.47	0.43	4.90	2.07	4.15	0.00	384.50	0.19	0.00	388.42
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.83	1.68	12.07	3.27	20.01	0.02	1705.49	0.30	0.00	1711.69
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
4	1.04	0.96	10.44	4.12	11.01	0.01	1086.75	0.37	0.00	1094.56
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
3	0.47	0.43	5.16	1.77	4.95	0.01	504.83	0.16	0.00	508.17
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
385	0.01	0.01	2.64	0.25	0.25	0.00	218.22	0.01	0.02	223.22
3	0.07	0.06	0.49	0.23	1.09	0.00	125.50	0.00	0.00	126.17
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
507	**15.35**	**14.08**	**200.27**	**46.44**	**234.90**	**0.24**	**22646.71**	**6.09**	**0.14**	**22818.80**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
230	**2.68**	**2.44**	**75.27**	**8.13**	**52.47**	**0.05**	**6038.48**	**2.27**	**0.10**	**6115.74**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
7	2.03	1.87	17.70	4.60	35.53	0.03	2899.44	0.42	0.00	2908.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
3	0.05	0.05	23.35	0.09	3.68	0.00	517.25	0.79	0.00	533.87
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
334	0.01	0.01	2.29	0.21	0.21	0.00	189.15	0.01	0.01	193.48
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
446	**13.76**	**12.62**	**187.42**	**42.99**	**204.61**	**0.21**	**19948.69**	**5.82**	**0.14**	**20113.14**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
1	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
166	0.01	0.00	1.14	0.11	0.11	0.00	94.01	0.01	0.01	96.16
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
225	**2.65**	**2.41**	**69.98**	**8.07**	**50.01**	**0.05**	**5709.17**	**1.79**	**0.10**	**5776.28**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
412	**11.82**	**10.83**	**163.90**	**38.25**	**161.26**	**0.17**	**16182.06**	**5.13**	**0.14**	**16331.68**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1.56	1.43	15.66	6.18	16.51	0.02	1630.13	0.56	0.00	1641.84
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
4	1.52	1.39	16.05	6.94	13.19	0.02	1183.98	0.63	0.00	1197.12
2	0.31	0.29	3.44	1.18	3.30	0.00	336.55	0.11	0.00	338.78
4	0.64	0.59	6.59	2.74	5.93	0.01	560.19	0.25	0.00	565.38
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
305	0.01	0.01	2.09	0.20	0.20	0.00	172.53	0.01	0.01	176.49
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
411	**11.66**	**10.69**	**162.25**	**37.56**	**159.77**	**0.17**	**16042.01**	**5.07**	**0.14**	**16190.34**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
3	1.35	1.25	8.50	2.58	15.67	0.01	1188.15	0.23	0.00	1193.03
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
4	0.06	0.06	31.13	0.13	4.90	0.00	689.66	1.06	0.00	711.83
8	0.05	0.05	8.45	0.09	3.94	0.00	526.89	0.77	0.00	543.14
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.08	0.07	0.57	0.27	1.27	0.00	146.42	0.00	0.00	147.19
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
357	0.01	0.01	2.44	0.23	0.23	0.00	201.98	0.01	0.01	206.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
476	**14.91**	**13.68**	**213.93**	**45.53**	**231.78**	**0.23**	**22463.06**	**6.59**	**0.14**	**22644.76**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
8	2.32	2.14	20.23	5.26	40.61	0.04	3313.65	0.47	0.00	3323.61
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
2	1.20	1.11	10.89	2.70	21.04	0.02	1812.58	0.24	0.00	1817.69
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
9	0.05	0.05	9.51	0.10	4.44	0.00	592.75	0.87	0.00	611.03
7	0.13	0.13	63.95	0.26	10.07	0.00	1416.81	2.17	0.00	1462.34
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	0.05	0.38	0.18	0.85	0.00	97.61	0.00	0.00	98.13
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
341	0.01	0.01	2.34	0.22	0.22	0.00	193.30	0.01	0.01	197.73
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
463	**14.51**	**13.32**	**247.05**	**44.73**	**232.16**	**0.23**	**22855.00**	**7.80**	**0.14**	**23061.70**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
6	1.74	1.60	15.17	3.95	30.46	0.03	2485.23	0.36	0.00	2492.71
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
3	1.19	1.09	8.77	3.12	32.30	0.03	2947.09	0.28	0.00	2953.01
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
3	0.48	0.44	4.94	2.05	4.45	0.01	420.14	0.19	0.00	424.04
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
5	0.09	0.09	45.68	0.18	7.19	0.00	1012.01	1.55	0.00	1044.53
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	0.05	0.38	0.18	0.85	0.00	97.61	0.00	0.00	98.13
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
347	0.01	0.01	2.38	0.22	0.22	0.00	196.70	0.01	0.01	201.21
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
461	**13.27**	**12.18**	**215.15**	**41.96**	**207.13**	**0.21**	**20521.31**	**6.65**	**0.14**	**20703.94**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.31	0.29	3.26	1.38	2.77	0.00	256.33	0.12	0.00	258.95
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.46	1.34	9.66	2.62	16.01	0.02	1364.39	0.24	0.00	1369.35
2	0.90	0.83	5.67	1.72	10.45	0.01	792.10	0.15	0.00	795.35
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.64	0.59	4.64	1.65	15.74	0.01	1274.74	0.15	0.00	1277.88
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
1	0.60	0.55	5.44	1.35	10.52	0.01	906.29	0.12	0.00	908.85
2	0.53	0.49	5.67	2.12	5.30	0.01	523.49	0.19	0.00	527.52
2	0.79	0.73	5.85	2.08	21.53	0.02	1964.73	0.19	0.00	1968.67
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
2	0.32	0.29	3.29	1.37	2.97	0.00	280.10	0.12	0.00	282.69
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
4	0.07	0.07	36.54	0.15	5.76	0.00	809.61	1.24	0.00	835.62
6	0.01	0.01	6.64	0.57	0.50	0.00	265.21	0.02	0.03	275.44
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
332	0.01	0.01	2.27	0.21	0.21	0.00	188.01	0.01	0.01	192.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
440	**12.36**	**11.33**	**198.43**	**39.35**	**187.51**	**0.19**	**18676.00**	**6.12**	**0.14**	**18846.89**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.45	1.34	12.64	3.29	25.38	0.02	2071.03	0.30	0.00	2077.26
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.78	0.72	7.83	3.09	8.26	0.01	815.06	0.28	0.00	820.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
1	0.40	0.36	2.92	1.04	10.77	0.01	982.36	0.09	0.00	984.34
5	1.89	1.74	20.06	8.67	16.48	0.02	1479.97	0.78	0.00	1496.40
4	0.63	0.58	6.89	2.35	6.61	0.01	673.10	0.21	0.00	677.56
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
5	0.08	0.08	38.91	0.16	6.13	0.00	862.08	1.32	0.00	889.78
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
5	0.01	0.01	5.54	0.47	0.42	0.00	221.00	0.02	0.03	229.53
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.94	0.85	6.86	3.21	15.29	0.02	1757.03	0.03	0.03	1766.33
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
325	0.01	0.01	2.22	0.21	0.20	0.00	183.86	0.01	0.01	188.08
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
420	**8.13**	**7.44**	**156.10**	**29.05**	**120.98**	**0.13**	**12916.49**	**4.89**	**0.13**	**13059.83**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
1	0.16	0.14	1.63	0.69	1.38	0.00	128.17	0.06	0.00	129.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
280	0.01	0.01	1.92	0.18	0.18	0.00	158.57	0.01	0.01	162.20
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
359	**5.16**	**4.71**	**102.84**	**17.84**	**78.70**	**0.08**	**8709.95**	**3.16**	**0.12**	**8812.83**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.37	0.34	2.41	0.65	4.00	0.00	341.10	0.06	0.00	342.34
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.76	0.70	8.02	3.47	6.59	0.01	591.99	0.31	0.00	598.56
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.16	0.15	1.65	0.68	1.48	0.00	140.05	0.06	0.00	141.35
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
6	0.04	0.04	6.34	0.07	2.96	0.00	395.16	0.58	0.00	407.35
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
4	0.01	0.00	4.43	0.38	0.34	0.00	176.80	0.01	0.02	183.63
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.73	0.66	5.33	2.50	11.89	0.01	1366.58	0.03	0.02	1373.82
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
247	0.01	0.01	1.69	0.16	0.16	0.00	139.69	0.01	0.01	142.89
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
325	**5.00**	**4.57**	**100.98**	**17.13**	**77.30**	**0.08**	**8562.91**	**3.10**	**0.12**	**8664.05**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
3	1.50	1.38	14.77	3.95	38.71	0.04	3713.95	0.36	0.00	3721.43
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.52	0.48	5.22	2.06	5.50	0.01	543.38	0.19	0.00	547.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.26	0.24	2.84	1.06	2.65	0.00	261.75	0.10	0.00	263.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.38	0.35	4.01	1.73	3.30	0.00	295.99	0.16	0.00	299.28
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.03	0.03	15.57	0.06	2.45	0.00	344.83	0.53	0.00	355.91
5	0.03	0.03	5.28	0.06	2.46	0.00	329.30	0.48	0.00	339.46
3	0.05	0.05	27.41	0.11	4.32	0.00	607.20	0.93	0.00	626.72
2	0.00	0.00	2.21	0.19	0.17	0.00	88.40	0.01	0.01	91.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.63	0.56	4.57	2.14	10.19	0.01	1171.35	0.02	0.02	1177.56
5	0.00	0.00	0.76	0.02	0.01	0.00	118.59	0.02	0.02	125.73
10	0.02	0.01	2.74	0.26	0.26	0.00	226.52	0.01	0.02	231.72
4	0.18	0.16	1.31	0.61	2.91	0.00	334.67	0.01	0.01	336.44
1	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
226	0.01	0.01	1.55	0.15	0.15	0.00	127.98	0.01	0.01	130.92
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.15	0.13	1.06	0.50	2.37	0.00	271.92	0.01	0.00	273.36
5	0.11	0.10	0.82	0.38	1.82	0.00	209.17	0.00	0.00	210.28
10	0.22	0.20	1.63	0.76	3.64	0.00	418.34	0.01	0.01	420.56
6	0.13	0.12	0.98	0.46	2.18	0.00	251.00	0.00	0.00	252.33
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
2	0.04	0.04	0.33	0.15	0.73	0.00	83.67	0.00	0.00	84.11
303	**5.63**	**5.14**	**104.56**	**17.93**	**107.22**	**0.11**	**11410.45**	**3.08**	**0.11**	**11507.94**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.16	1.07	10.11	2.63	20.31	0.02	1656.82	0.24	0.00	1661.81
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monthly Comparison of Construction Equipment Emissions:

		Daily Emissions (lb/day)									
Month of Contruction	**Total Equipment Quantity**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	137	5.18	4.73	64.80	14.17	87.34	0.09	8706.39	1.64	0.097	8771.11
2	305	13.95	12.78	161.24	36.97	219.05	0.22	21021.55	4.36	0.155	21161.28
3	367	12.16	11.14	162.26	33.79	201.35	0.20	19628.87	4.65	0.149	19772.83
4	343	15.19	13.93	191.14	42.81	264.55	0.26	25577.73	5.47	0.148	25738.43
5	345	15.82	14.51	214.78	45.52	271.81	0.27	26345.73	6.32	0.144	26523.00
6	620	19.09	17.53	275.73	56.88	314.71	0.31	30518.04	8.35	0.154	30741.20
7	617	16.72	15.35	237.56	50.57	260.27	0.26	25266.23	7.26	0.149	25464.98
8	507	15.35	14.08	200.27	46.44	234.90	0.24	22646.71	6.09	0.143	22818.80
9	446	13.76	12.62	187.42	42.99	204.61	0.21	19948.69	5.82	0.136	20113.14
10	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
11	412	11.82	10.83	163.90	38.25	161.26	0.17	16182.06	5.13	0.135	16331.68
12	411	11.66	10.69	162.25	37.56	159.77	0.17	16042.01	5.07	0.135	16190.34
13	476	14.91	13.68	213.93	45.53	231.78	0.23	22463.06	6.59	0.140	22644.76
14	463	14.51	13.32	247.05	44.73	232.16	0.23	22855.00	7.80	0.138	23061.70
15	461	13.27	12.18	215.15	41.96	207.13	0.21	20521.31	6.65	0.139	20703.94
16	440	12.36	11.33	198.43	39.35	187.51	0.19	18676.00	6.12	0.136	18846.89
17	420	8.13	7.44	156.10	29.05	120.98	0.13	12916.49	4.89	0.131	13059.83
18	359	5.16	4.71	102.84	17.84	78.70	0.08	8709.95	3.16	0.118	8812.83
19	325	5.00	4.57	100.98	17.13	77.30	0.08	8562.91	3.10	0.116	8664.05
20	303	5.63	5.14	104.56	17.93	107.22	0.11	11410.45	3.08	0.106	11507.94
21	285	5.25	4.80	100.44	16.18	103.92	0.10	11105.02	2.92	0.105	11199.00
22	282	4.94	4.51	97.26	14.97	100.54	0.10	10758.85	2.82	0.104	10850.36
23	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
24	281	4.68	4.27	94.65	13.94	97.79	0.09	10487.16	2.73	0.104	10576.72
25	275	3.03	2.76	78.82	9.49	56.71	0.06	6501.29	2.37	0.100	6581.93
26	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
27	274	2.77	2.52	76.21	8.46	53.95	0.05	6229.60	2.27	0.100	6308.29
28	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
29	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
30	230	2.68	2.44	75.27	8.13	52.47	0.05	6038.48	2.27	0.095	6115.74
31	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
32	225	2.65	2.41	69.98	8.07	50.01	0.05	5709.17	1.79	0.095	5776.28
33	249	2.66	2.41	70.15	8.09	50.02	0.05	5722.76	1.79	0.096	5790.18
34	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
35	252	2.70	2.46	93.50	8.18	53.70	0.05	6240.01	2.58	0.096	6324.05
36	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
37	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
38	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
39	211	2.28	2.08	90.20	6.73	46.88	0.04	5438.35	2.56	0.083	5517.77
40	209	2.24	2.04	89.86	6.58	46.15	0.04	5353.92	2.56	0.081	5432.89
MAX VALUE (lb/day)	**620**	**19.09**	**17.53**	**275.73**	**56.88**	**314.71**	**0.31**	**30518.0**	**8.35**	**0.155**	**30741.2**

		Annual Emissions (ton/year)									
Months for Annual Contruction		**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**	**NO_x**	**SO_2**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
1	**12**	2.44	2.24	32.78	7.26	38.11	0.039	3720.99	0.98	0.0252	3749.38
2	**13**	2.58	2.37	35.02	7.73	40.28	0.041	3927.34	1.05	0.0259	3957.48
3	**14**	2.59	2.38	36.30	7.85	40.48	0.041	3954.84	1.10	0.0256	3985.99
4	**15**	2.61	2.39	37.10	7.97	40.56	0.041	3968.23	1.13	0.0255	3999.96
5	**16**	2.57	2.35	37.21	7.92	39.41	0.040	3864.70	1.14	0.0253	3896.58
6	**17**	2.45	2.25	36.33	7.67	37.15	0.038	3663.27	1.12	0.0251	3694.63
7	**18**	2.24	2.06	33.73	7.09	33.60	0.034	3336.14	1.05	0.0245	3365.71
8	**19**	2.07	1.89	31.68	6.59	30.86	0.032	3085.59	0.98	0.0240	3113.69
9	**20**	1.92	1.76	30.25	6.16	28.95	0.030	2917.05	0.94	0.0235	2944.03
10	**21**	1.79	1.64	28.94	5.76	27.43	0.028	2784.40	0.89	0.0230	2810.32
11	**22**	1.69	1.55	27.94	5.41	26.52	0.027	2703.05	0.86	0.0226	2728.10
12	**23**	1.58	1.45	26.90	5.04	25.57	0.026	2617.62	0.82	0.0221	2641.78
13	**24**	1.48	1.35	25.89	4.69	24.64	0.025	2534.30	0.79	0.0216	2557.57
14	**25**	1.30	1.19	23.86	4.15	22.02	0.022	2294.87	0.73	0.0210	2316.63
15	**26**	1.12	1.03	21.30	3.60	19.34	0.019	2045.49	0.64	0.0204	2065.33
16	**27**	0.97	0.88	19.22	3.10	17.05	0.017	1831.12	0.58	0.0199	1849.39
17	**28**	0.82	0.75	17.37	2.63	15.02	0.015	1641.55	0.52	0.0192	1658.43
18	**29**	0.74	0.67	16.16	2.32	13.99	0.014	1538.38	0.48	0.0187	1554.26
19	**30**	0.70	0.64	15.74	2.17	13.60	0.013	1498.31	0.47	0.0184	1513.81
20	**31**	0.67	0.61	15.28	2.04	13.19	0.013	1455.51	0.45	0.0181	1470.49
21	**32**	0.62	0.57	14.76	1.89	12.33	0.012	1369.99	0.43	0.0179	1384.52
22	**33**	0.58	0.53	14.31	1.77	11.52	0.011	1289.25	0.41	0.0178	1303.38
23	**34**	0.55	0.50	14.25	1.67	10.82	0.011	1221.47	0.41	0.0177	1235.49
24	**35**	0.52	0.47	14.23	1.58	10.16	0.010	1157.76	0.40	0.0175	1171.70
25	**36**	0.48	0.44	14.17	1.47	9.40	0.009	1082.03	0.40	0.0172	1095.81
26	**37**	0.47	0.43	14.34	1.43	9.25	0.009	1066.09	0.41	0.0170	1079.85
27	**38**	0.47	0.42	14.55	1.41	9.14	0.009	1054.22	0.41	0.0167	1067.99
28	**39**	0.46	0.42	14.76	1.38	9.04	0.009	1042.35	0.41	0.0165	1056.14
29	**40**	0.45	0.41	14.97	1.36	8.94	0.009	1032.08	0.42	0.0162	1045.89
MAX VALUE (ton/year)		**2.61**	**2.39**	**37.21**	**7.97**	**40.56**	**0.041**	**3968.23**	**1.14**	**0.0259**	**3999.96**

Short-term Offsite Combustion Emissions

construction schedule = 12 hours per day 7 am to 7 pm
delivery trucks can arrive at the site anytime during the day or night

Vehicles with Onroad Engines for Emissions Estimates	Offsite Miles per Day Travelled per Vehicle	Hours/Day	Horsepower	Emission factors (g/mile) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	10	12	175	3.10E-02	1.41E-02	1.16E+01	4.93E-01	4.39E+00	5.00E-03	4.65E+02	1.20E-01	2.00E-01	5.29E+02
Concrete Pump Truck	40	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Dump Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Flatbed Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Staff & Security Truck	0	24	187	1.00E-02	1.00E-02	2.10E+00	5.50E-02	3.00E-02	1.00E-02	3.26E+02	5.00E-02	6.00E-02	3.46E+02
Pickup Truck	0	12	175	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Water/Soiltac Truck	0	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Well Water Truck	143	12	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Worker Passenger Vehicles	40	12	NA	2.90E-02	1.50E-02	5.35E+00	2.14E-01	6.31E-01	3.00E-03	3.54E+02	5.00E-02	6.00E-02	3.73E+02
Delivery Transport Trucks													
General Construction Materials	100	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Pedestals	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Stirling Engines	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Metal Supports	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Suncatcher Mirrors	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Electrical and Control Syste	240	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03
Azimuth and Elevation Drive	50	24	250	5.62E-01	4.79E-01	3.03E+00	6.58E-01	1.48E+01	1.60E-02	1.67E+03	6.00E-02	5.00E-02	1.69E+03

Vehicles with Onroad Engines for Emissions Estimates	Emission rate per piece of equipment (lb/hr) PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	0.000	0.000	0.021	0.001	0.008	0.000	0.853	0.000	0.000	0.97
Concrete Pump Truck	0.004	0.004	0.022	0.005	0.109	0.000	12.266	0.000	0.000	12.39
Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Flatbed Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Staff & Security Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Pickup Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Water/Soiltac Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Well Water Truck	0.015	0.013	0.080	0.017	0.389	0.000	43.852	0.002	0.001	44.29
Worker Passenger Vehicles	0.000	0.000	0.039	0.002	0.005	0.000	2.596	0.000	0.000	2.74
Delivery Transport Trucks										
General Construction Materials	0.005	0.004	0.028	0.006	0.136	0.000	15.333	0.001	0.000	15.49
Suncatcher Pedestals	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Stirling Engines	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Suncatcher Metal Supports	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Suncatcher Mirrors	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Electrical and Control Syste	0.012	0.011	0.067	0.014	0.326	0.000	36.799	0.001	0.001	37.17
Azimuth and Elevation Drive	0.003	0.002	0.014	0.003	0.068	0.000	7.666	0.000	0.000	7.74
Total										

Vehicles with Onroad Engines for Emissions Estimates	Month 1 Daily Emissions (lb/day) Quantity Mo 1	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
Concrete Pump Truck	2	0.10	0.08	0.53	0.12	2.61	0.00	294.39	0.01	0.01	297.35
Dump Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	67	0.17	0.09	31.73	1.27	3.74	0.02	2097.91	0.30	0.36	2214.48
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
Total	**123**	**4.82**	**4.05**	**57.83**	**6.75**	**126.62**	**0.15**	**15949.58**	**0.80**	**0.79**	**16210.38**

Vehicles with Onroad Engines for Emissions Estimates	Month 2 Daily Emissions (lb/day) Quantity Mo 2	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O
Busses	6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03
Concrete Pump Truck	5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02
Dump Truck	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02
Worker Passenger Vehicles	180	0.46	0.24	84.81	3.39	10.01	0.05	5608.28	0.79	0.95
Delivery Transport Trucks										
General Construction Materials	3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Suncatcher Pedestals	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Electrical and Control Syste	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01
Total	**266**	**5.63**	**4.64**	**114.24**	**9.51**	**146.79**	**0.20**	**21025.99**	**1.36**	**1.44**

Vehicles with Onroad Engines for Emissions Estimates	Month 21 Daily Emissions (lb/day) Quantity Mo 21	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	209	0.53	0.28	98.64	3.95	11.64	0.06	6522.22	0.92	1.11	6884.63
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**265**	**5.97**	**4.91**	**128.51**	**10.34**	**155.21**	**0.21**	**22708.54**	**1.51**	**1.60**	**23235.97**

Vehicles with Onroad Engines for Emissions Estimates	Month 22 Daily Emissions (lb/day) Quantity Mo 22	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 23 Daily Emissions (lb/day) Quantity Mo 23	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
Delivery Transport Trucks											
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**	**23192.12**

Vehicles with Onroad Engines for Emissions Estimates	Month 24 Daily Emissions (lb/day) Quantity Mo 24	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O
Busses	2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01
Concrete Pump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02
Worker Passenger Vehicles	208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10
Delivery Transport Trucks										
General Construction Materials	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals	3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08
Stirling Engines	5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03
Suncatcher Metal Supports	10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26
Suncatcher Mirrors	6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03
Electrical and Control Systems	2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05
Azimuth and Elevation Drive	2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01
TOTALS	**263**	**5.97**	**4.91**	**127.88**	**10.31**	**155.14**	**0.21**	**22667.00**	**1.50**	**1.59**

Notes:
Emission factors from CARB Off-road Mobile Source Emission Factors (2006-2020) for diesel and propane equipment. (2009 data used).
Dozer = Crawler Tractor
Loaders = Rubber tired loaders
Backhoe = Tractors/Loaders/Backhoes
Light Tower = Other Construction Equipment
Utilization Load Factors from SCAQMD
PM2.5 emission factors obtained by multiplying the PM10 emissions by PM2.5 fraction in CEIDARS list for onroad or offroad diesel vehicles.
For propane equipment assumed PM2.5 and PM10 Fraction of total PM is 1.000
Onroad vehicle emissions from EMFAC2007 model
CH_4 and N_2O emission factors for the onroad vehicles are from reference source 2: Table C.5, California Climate Action Registry General Reporting Protocol Version 3.0, April 2007

CO_2 GWP (SAR, 1996) =	1
CH_4 GWP (SAR, 1996) =	21
N_2O GWP (SAR, 1996) =	310

CO_2e
69.97
743.37
0.00
0.00
0.00
0.00
0.00
531.51
5919.91
1115.05
0.00
929.21
8920.38
1115.05
1784.08
371.68
21500.20

CO_2e
23.32
0.00
0.00
0.00
0.00
0.00
0.00
531.51
6840.78
0.00
2676.11
929.21
8920.38
1115.05
1784.08
371.68
23192.12

Month 3 Daily Emissions (lb/day)

Quantity Mo 3	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
5	0.25	0.21	1.34	0.29	6.53	0.01	735.98	0.03	0.02	743.37
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
249	0.64	0.33	117.48	4.70	13.86	0.07	7768.50	1.10	1.32	8200.17
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
328	**5.81**	**4.74**	**146.91**	**10.81**	**150.64**	**0.21**	**23186.21**	**1.67**	**1.80**	**23780.46**

Month 4 Daily Emissions (lb/day)

Quantity Mo 4	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
295	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 5 Daily Emissions (lb/day)

Quantity Mo 5	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
219	0.56	0.29	103.03	4.12	12.16	0.06	6813.02	0.96	1.16	7191.59
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
291	**6.37**	**5.24**	**135.94**	**10.99**	**165.91**	**0.22**	**24144.28**	**1.60**	**1.70**	**24704.63**

Month 25 Daily Emissions (lb/day)

Quantity Mo 25	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 26 Daily Emissions (lb/day)

Quantity Mo 26	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 27 Daily Emissions (lb/day)

Quantity Mo 27	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
208	0.53	0.27	98.01	3.92	11.56	0.05	6480.68	0.92	1.10	6840.78
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
260	**5.08**	**4.15**	**123.07**	**9.27**	**131.64**	**0.18**	**20017.47**	**1.41**	**1.51**	**20516.01**

Month 6 Daily Emissions (lb/day)

Quantity Mo 6	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
479	1.22	0.63	225.86	9.04	26.65	0.13	14934.63	2.11	2.53	15764.49
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
551	**7.04**	**5.59**	**258.76**	**15.90**	**180.40**	**0.29**	**32265.90**	**2.75**	**3.08**	**33277.53**

Month 7 Daily Emissions (lb/day)

Quantity Mo 7	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
487	1.25	0.64	229.63	9.19	27.09	0.13	15183.89	2.15	2.58	16027.60
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
1	0.30	0.25	1.60	0.35	7.83	0.01	883.18	0.03	0.03	892.04
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
555	**6.46**	**5.09**	**259.32**	**15.36**	**165.18**	**0.28**	**30748.80**	**2.72**	**3.07**	**31756.56**

Month 8 Daily Emissions (lb/day)

Quantity Mo 8	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
385	0.98	0.51	181.56	7.27	21.42	0.10	12005.87	1.70	2.04	12672.99
3	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
451	**5.91**	**4.70**	**209.66**	**13.09**	**151.68**	**0.24**	**26687.60**	**2.24**	**2.50**	**27509.91**

Month 9 Daily Emissions (lb/day)

Quantity Mo 9	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
334	0.85	0.44	157.38	6.30	18.57	0.09	10406.47	1.47	1.77	10984.72
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
394	**5.40**	**4.32**	**183.46**	**11.69**	**139.03**	**0.22**	**23984.22**	**1.97**	**2.20**	**24706.59**

Month 28 Daily Emissions (lb/day)

Quantity Mo 28	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 29 Daily Emissions (lb/day)

Quantity Mo 29	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 30 Daily Emissions (lb/day)

Quantity Mo 30	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 31 Daily Emissions (lb/day)

Quantity Mo 31	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 10 Daily Emissions (lb/day)

Quantity Mo 10	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 11 Daily Emissions (lb/day)

Quantity Mo 11	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 12 Daily Emissions (lb/day)

Quantity Mo 12	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
305	0.78	0.40	143.56	5.74	16.94	0.08	9492.53	1.34	1.61	10019.99
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
365	**5.33**	**4.28**	**169.64**	**11.13**	**137.40**	**0.21**	**23070.28**	**1.84**	**2.04**	**23741.87**

Month 13 Daily Emissions (lb/day)

Quantity Mo 13	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
357	0.91	0.47	168.06	6.72	19.83	0.09	11112.70	1.57	1.89	11730.19
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
420	**5.46**	**4.35**	**194.14**	**12.11**	**140.29**	**0.22**	**24690.45**	**2.07**	**2.32**	**25452.06**

Month 32 Daily Emissions (lb/day)

Quantity Mo 32	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
166	0.42	0.22	78.22	3.13	9.23	0.04	5172.08	0.73	0.88	5459.47
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
216	**4.97**	**4.10**	**103.28**	**8.48**	**129.30**	**0.17**	**18708.87**	**1.22**	**1.29**	**19134.70**

Month 33 Daily Emissions (lb/day)

Quantity Mo 33	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 34 Daily Emissions (lb/day)

Quantity Mo 34	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 35 Daily Emissions (lb/day)

Quantity Mo 35	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
190	0.49	0.25	89.53	3.58	10.56	0.05	5919.85	0.84	1.00	6248.79
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
240	**5.03**	**4.13**	**114.59**	**8.93**	**130.64**	**0.18**	**19456.64**	**1.33**	**1.42**	**19924.02**

Month 14 Daily Emissions (lb/day)

Quantity Mo 14	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
341	0.87	0.45	160.83	6.44	18.98	0.09	10634.95	1.50	1.80	11225.90
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
403	**5.42**	**4.33**	**186.92**	**11.82**	**139.44**	**0.22**	**24212.71**	**2.00**	**2.24**	**24947.77**

Month 15 Daily Emissions (lb/day)

Quantity Mo 15	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
347	0.89	0.46	163.66	6.55	19.31	0.09	10821.90	1.53	1.84	11423.23
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
409	**5.44**	**4.34**	**189.75**	**11.94**	**139.77**	**0.22**	**24399.65**	**2.03**	**2.27**	**25145.10**

Month 16 Daily Emissions (lb/day)

Quantity Mo 16	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
6	0.00	0.00	1.54	0.07	0.58	0.00	61.45	0.02	0.03	69.97
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
332	0.85	0.44	156.43	6.26	18.46	0.09	10344.15	1.46	1.76	10918.94
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
392	**5.40**	**4.32**	**182.52**	**11.65**	**138.92**	**0.22**	**23921.91**	**1.96**	**2.19**	**24640.82**

Month 36 Daily Emissions (lb/day)

Quantity Mo 36	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 37 Daily Emissions (lb/day)

Quantity Mo 37	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 38 Daily Emissions (lb/day)

Quantity Mo 38	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 17 Daily Emissions (lb/day)

Quantity Mo 17	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
5	0.00	0.00	1.28	0.05	0.48	0.00	51.21	0.01	0.02	58.31
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
325	0.83	0.43	152.98	6.12	18.05	0.09	10115.67	1.43	1.72	10677.76
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
384	**5.38**	**4.31**	**178.81**	**11.50**	**138.42**	**0.22**	**23683.18**	**1.93**	**2.14**	**24387.97**

Month 18 Daily Emissions (lb/day)

Quantity Mo 18	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
280	0.72	0.37	131.93	5.28	15.57	0.07	8723.99	1.23	1.48	9208.74
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
336	**5.26**	**4.25**	**157.51**	**10.65**	**135.84**	**0.20**	**22281.26**	**1.73**	**1.90**	**22907.30**

Month 19 Daily Emissions (lb/day)

Quantity Mo 19	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
4	0.00	0.00	1.03	0.04	0.39	0.00	40.97	0.01	0.02	46.65
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
247	0.63	0.33	116.23	4.65	13.71	0.07	7685.42	1.09	1.30	8112.46
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
303	**5.18**	**4.20**	**141.80**	**10.02**	**133.98**	**0.20**	**21242.69**	**1.58**	**1.73**	**21811.02**

Month 20 Daily Emissions (lb/day)

Quantity Mo 20	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
226	0.58	0.30	106.49	4.26	12.56	0.06	7041.50	1.00	1.19	7432.77
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.89	0.76	4.81	1.04	23.50	0.03	2649.53	0.10	0.08	2676.11
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
282	**6.02**	**4.94**	**136.36**	**10.65**	**156.14**	**0.21**	**23227.83**	**1.58**	**1.69**	**23784.11**

Month 39 Daily Emissions (lb/day)

Quantity Mo 39	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
153	0.39	0.20	72.25	2.89	8.52	0.04	4777.42	0.68	0.81	5042.88
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
199	**4.94**	**4.08**	**97.31**	**8.24**	**128.60**	**0.17**	**18314.21**	**1.17**	**1.22**	**18718.11**

Month 40 Daily Emissions (lb/day)

Quantity Mo 40	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
2	0.00	0.00	0.51	0.02	0.19	0.00	20.48	0.01	0.01	23.32
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.18	0.15	0.96	0.21	4.67	0.01	526.23	0.02	0.02	531.51
152	0.39	0.20	71.62	2.87	8.45	0.04	4735.88	0.67	0.80	4999.03
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.31	0.26	1.67	0.36	8.16	0.01	919.98	0.03	0.03	929.21
10	2.97	2.53	16.04	3.48	78.33	0.08	8831.78	0.32	0.26	8920.38
6	0.37	0.32	2.00	0.43	9.79	0.01	1103.97	0.04	0.03	1115.05
2	0.59	0.51	3.21	0.70	15.67	0.02	1766.36	0.06	0.05	1784.08
2	0.12	0.11	0.67	0.14	3.26	0.00	367.99	0.01	0.01	371.68
197	**4.94**	**4.08**	**96.68**	**8.21**	**128.53**	**0.17**	**18272.67**	**1.16**	**1.22**	**18674.26**

Annual Offsite Combustion Emissions

Month 13-24

Construction Assumptions - 30 days per month

Equipment	Number of Vehicles per year	Offsite Miles per Day Travelled per Vehicle	Offsite Miles per Year Travelled all Vehicle	Emission factors (g/mile)										Annual Emissions (ton/year)									
				PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e	PM_{10}	$PM_{2.5}$	CO	VOC	NO_x	SO_2	CO_2	CH_4	N_2O	CO_2e
Vehicles with Onroad Engines for Emissions Estimates																							
Busses	47	10	14100	0.031	0.014	11.649	0.493	4.394	0.005	464.95	0.120	0.200	529.47	0.00	0.00	0.18	0.01	0.07	0.00	7.22	0.00	0.00	8.22
Concrete Pump Truck	0	40	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	7	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	89	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	60	0	0	0.010	0.010	2.100	0.055	0.030	0.010	326.30	0.050	0.060	345.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	120	0	0	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	45	0	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	12	143	51480	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.03	0.03	0.17	0.04	0.84	0.00	94.72	0.00	0.00	95.67
Worker Passenger Vehicles	3288	40	3945600	0.029	0.015	5.348	0.214	0.631	0.003	353.63	0.050	0.060	373.28	0.13	0.07	23.24	0.93	2.74	0.01	1536.67	0.22	0.26	1622.05
Delivery Transport Trucks																							
General Materials Delivery T	0	100	0	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delive	15	240	108000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.07	0.06	0.36	0.08	1.76	0.00	198.72	0.01	0.01	200.71
Stirling Engines	60	50	90000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.06	0.05	0.30	0.07	1.47	0.00	165.60	0.01	0.00	167.26
Suncatcher Metal Supports	120	240	864000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.53	0.46	2.89	0.63	14.10	0.02	1589.72	0.06	0.05	1605.67
Suncatcher Mirrors	72	50	108000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.07	0.06	0.36	0.08	1.76	0.00	198.72	0.01	0.01	200.71
Electrical and Control Systen	24	240	172800	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.11	0.09	0.58	0.13	2.82	0.00	317.94	0.01	0.01	321.13
Azimuth and Elevation Drive	24	50	36000	0.562	0.479	3.034	0.658	14.818	0.016	1670.68	0.060	0.050	1687.44	0.02	0.02	0.12	0.03	0.59	0.00	66.24	0.00	0.00	66.90
												Total		**1.01**	**0.82**	**28.20**	**1.97**	**26.15**	**0.04**	**4175.54**	**0.31**	**0.34**	**4288.33**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months

Imperial Valley Solar
Fugitive Dust Emissions (offsite)

Annual : Month 13-24
Month: Month 13

Travel on paved road

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] (1 - P/4N)$

EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest

0.32 sL = road surface silt loading (grams per square meter) (g/m^2), Local CARB - Emission Inventory Database - Section 7.9 Entrained Paved Road Dust -
0.02 sL = road surface silt loading (grams per square meter) (g/m^2), Freeway Local Streets & Freeways (emission inventory code: 640-641-5400-0000), July 1997
W = average weight (tons) of the vehicles traveling the road, and
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

constants

	$PM_{2.5}$	PM_{10}
k	0.0024	0.016
C	0.00036	0.00047

12 P = Mean number of days per year with at least 0.01 inches of precipitation (from EL CENTRO 2 SSW COOP Station)
365 N = number of days in the year (averaging period)

Vehicle Type	Number of Vehicles (Month 13)	Number of Vehicles per Year (Month 13-24)	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Max Daily VMT (all vehicles)	Max Annual VMT (all vehicles)	Mean Vehicle Weight (tons)	Max. Operating Hours / Day	Max. Operating Days / Month	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)
Vehicles with Onroad Engines for Emissions Estimates										
Busses	6	47	10	60	14100	12	12	30	0.005	0.038
Concrete Pump	0	0	40	0	0	20	12	30	0.012	0.083
Dump Truck	3	7	0	0	0	20	12	30	0.012	0.083
Flatbed Truck	9	89	0	0	0	10	12	30	0.004	0.029
Staff & Security Truck	5	60	0	0	0	2.25	24	30	0.000	0.003
Pickup Truck	10	120	0	0	0	4	12	30	0.001	0.007
Water/Soiltac Truck	4	45	0	0	0	20	12	30	0.012	0.083
Well Water Truck	1	12	143	143	51480	18.6	12	30	0.011	0.074
Worker Passenger Vehicles	357	3288	40	14267	3945600	2	12	30	0.000	0.002
Suncatcher Delivery Trucks										
General Materials Delivery Trucks	0	0	100	0	0	20	24	30	0.012	0.083
Suncatcher Pedestals Delivery Trucks	0	15	240	0	108000	20	24	30	0.012	0.083
Stirling Engines	5	60	50	250	90000	20	24	30	0.002	0.013
Suncatcher Metal Supports	10	120	240	2400	864000	20	24	30	0.002	0.013
Suncatcher Mirrors	6	72	50	300	108000	20	24	30	0.002	0.013
Electrical and Control Systems	2	24	240	480	172800	20	24	30	0.002	0.013
Azimuth and Elevation Drive	2	24	50	100	36000	20	24	30	0.002	0.013

Vehicle Type	Watering Control Efficiency		PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/day)		% of daily emissions	PM_{10} Emissions (tons/year)		$PM_{2.5}$ Emissions (lb/hr)		$PM_{2.5}$ Emissions (lb/day)		$PM_{2.5}$ Emissions (tons/year)	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated		Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Vehicles with Onroad Engines for Emissions Estimates															
Busses	0%	0%	0.19	0.19	2.29	2.29	2.53%	0.27	0.27	0.03	0.03	0.33	0.33	0.04	0.04
Concrete Pump	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flatbed Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Staff & Security Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickup Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Soiltac Truck	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Water Truck	0%	0%	0.88	0.88	10.58	10.58	11.71%	1.90	1.90	0.13	0.13	1.55	1.55	0.28	0.28
Worker Passenger Vehicles	0%	0%	2.57	2.57	30.80	30.80	34.09%	4.26	4.26	0.04	0.04	0.52	0.52	0.07	0.07
Suncatcher Delivery Trucks															
General Materials Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suncatcher Pedestals Delivery Trucks	0%	0%	0.00	0.00	0.00	0.00	0.00%	4.46	4.46	0.00	0.00	0.00	0.00	0.65	0.65
Stirling Engines	0%	0%	0.14	0.14	3.31	3.31	3.66%	0.60	0.60	0.02	0.02	0.42	0.42	0.08	0.08
Suncatcher Metal Supports	0%	0%	1.32	1.32	31.74	31.74	35.13%	5.71	5.71	0.17	0.17	4.07	4.07	0.73	0.73
Suncatcher Mirrors	0%	0%	0.17	0.17	3.97	3.97	4.39%	0.71	0.71	0.02	0.02	0.51	0.51	0.09	0.09
Electrical and Control Systems	0%	0%	0.26	0.26	6.35	6.35	7.03%	1.14	1.14	0.03	0.03	0.81	0.81	0.15	0.15
Azimuth and Elevation Drive	0%	0%	0.06	0.06	1.32	1.32	1.46%	0.24	0.24	0.01	0.01	0.17	0.17	0.03	0.03
TOTAL Fugitive emissions for vehicle travel offsite paved roads			**5.58**	**5.58**	**90.34**	**90.34**		**19.29**	**19.29**	**0.45**	**0.45**	**8.38**	**8.38**	**2.12**	**2.12**

Number of Vehicles per year = sum of monthly daily maximum vehicle usage for the peak 12 months
delivery trucks can arrive at the site anytime during the day or night

CONSTRUCTION VEHICLES REQUIREMENTS

Description	Activity	Make / Model	Fuel	Quantity	Frequency	Horse-power	Vehicle Weight (tons)	Max Daily Onsite Distance per Vehicle (mile/day)	Assumed distance percentage to drive on onsite sealed roads	Assumed distance percentage to drive on onsite unpaved roads	Assumed distance percentage to drive on onsite paved roads	Max Daily Offsite Round-trip Distance per Vehicle within Imperial County (mile/day)	Travel to and from
Busses	Shuttle between laydown area and main construction area	Bus	Gasoline	variable	Daily	175	12	12	0%	0%	100%	10	Laydown area
Concrete Pump Truck			Diesel	variable	Daily	250	20	6	0%	8%	82%	40	El Centro
Dump Truck			Diesel	variable	Daily	250	20	7	50%	50%	0%	0	on-site only
Flatbed Truck			Diesel	variable	Daily	250	10	28	100%	0%	0%	0	on-site only
Staff & Security Truck	Site Inspections & Security	Toyota Highlander or similar	Gasoline - Hybrid	5	Daily	187	2.25	33	100%	0%	0%	0	on-site only
Pickup Truck			Gasoline	variable	Daily	175	4	12	95%	5%	0%	0	on-site only
Water /Soiltac Truck			Diesel	variable	Daily	250	20	12	25%	75%	0%	0	on-site only
Worker Passenger Vehicles	Community to Work	Passenger vehicles	Gasoline & diesel	variable	Daily	100	2	0.3	100%	0%	0%	40	El Centro
General Construction Materials	Delivery trucks	transport truck	Diesel	variable	Daily	250	20	6	0%	0%	100%	100	Various locations
Suncatcher Delivery Trucks	Suncatcher Pedestals	transport truck	Diesel	variable	Daily	250	20	13	55%	0%	45%	240	Phoenix Area
	Stirling Engines	transport truck	Diesel	5	Daily	250	20	6	0%	0%	100%	50	Detroit
	Suncatcher Metal Supports	transport truck	Diesel	10	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Suncatcher Mirrors	transport truck	Diesel	6	Daily	250	20	6	0%	0%	100%	50	Detroit
	Electrical and Control Systems	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	240	Phoenix Area
	Azimuth and Elevation Drive	transport truck	Diesel	2	Daily	250	20	6	0%	0%	100%	50	Midwest
Water Delivery Trucks	All onsite water will be delivered by truck	7000 gal truck	Diesel	1	Daily	250	18.6	39	0%	0%	100%	143	Westwind Well, Ocotillo

Note:

Vehicles with variable quantities, the quantity per month can be found in Table 5.2-19 Construction Equipment Projection
Deliveries coming from Midwest (Detroit and elsewhere) will travel by rail to Los Angeles then by transport truck to the site
Average distance from main service complex to center of east or west portion of the site is 3.5 miles thus the average round trip distance each maintenance vehicle travels is 7 miles
Bus circuit is 11 miles (6 miles onsite, 5 miles offsite) - each bus does this loop twice a day
East access road will be heavily sealed and is 3.5 miles, the sealant will be applied in sufficient quantity that the road can be washed as needed. Thus this road will be considered the same as the paved northern access road for emissions estimates.
North access road and MSC parking area will be paved, route is 1.5 miles
All deliveries will travel an onsite loop starting near east laydown area traveling to the MSC then to the north exit, the loop will consist of 3.5 miles eastern access road + 1 (delivery area) miles + 1.5 miles
Construction laydown area is sealed
Each flatbed truck is assumed to make 4 trips per day to SunCatcher instalation locations delivering assembled dishes and misc parts
The water well truck is assumed to make 13 round trips per day from Ocotillo Westwind well.
The fenceline perimeter is approximately 20.5 miles. Each security vehicle is assumed to travel from the MSC around the perimeter plus one trip to the center of the site and back (plus 10% for misc trips) = 33 m

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hani	Port	County	Air B	Air D	Population	Activity (hr/day) total population	Consumptio	PM Exhaust (tons/day)	CO Exhaust (tons/day)	ROG Exhaust (tons/day)	NOX Exhaust (tons/day)	SO2 Exhaust (tons/day)	CO2 Exhaust (tons/day)	CH4 Exhaust (tons/day)	N2O Exhaust (tons/day)	PM Exhaust/Activity (tons/hr)	CO Exhaust/Activity (tons/hr)	ROG Exhaust/Activity (tons/hr)	NOX Exhaust/Activity (tons/hr)	SO2 Exhaust/Activity (tons/hr)	CO2 Exhaust/Activity (tons/hr)	CH4 Exhaust/Activity (tons/hr)	N2O Exhaust/Activity (tons/hr)
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	15	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	2.70E-02	6.00E-02	2.83E-02	1.14E-07	1.89E-06	3.62E-07	2.27E-06	4.82E-09	3.10E-04	3.26E-08	0.00E+00	1.90E-06	3.16E-05	6.03E-06	3.78E-05	8.04E-08	5.17E-03	5.44E-07	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	25	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	8.09E-02	1.80E-01	1.31E-01	6.45E-07	5.97E-06	1.81E-06	1.16E-05	1.82E-08	1.44E-03	1.63E-07	0.00E+00	3.58E-06	3.32E-05	1.01E-05	6.48E-05	1.01E-07	7.99E-03	9.09E-07	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	50	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	3.53E-01	8.18E-01	1.17E+00	9.06E-06	1.07E-04	2.73E-05	1.17E-04	1.64E-07	1.27E-02	2.47E-06	0.00E+00	1.11E-05	1.30E-04	3.34E-05	1.43E-04	2.00E-07	1.55E-02	3.02E-06	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	120	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	1.08E+00	2.51E+00	8.84E+00	6.54E-05	6.10E-04	1.08E-04	8.54E-04	1.13E-06	9.67E-02	9.71E-06	0.00E+00	2.60E-05	2.43E-04	4.29E-05	3.40E-04	4.52E-07	3.85E-02	3.87E-06	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	175	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	2.51E-01	5.81E-01	3.73E+00	1.53E-05	2.19E-04	3.05E-05	2.96E-04	4.61E-07	4.09E-02	2.75E-06	0.00E+00	2.64E-05	3.77E-04	5.25E-05	5.10E-04	7.93E-07	7.05E-02	4.74E-06	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	250	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	2.16E-01	5.00E-01	4.25E+00	9.87E-06	8.68E-05	2.49E-05	3.27E-04	5.28E-07	4.69E-02	2.25E-06	0.00E+00	1.97E-05	1.74E-04	4.99E-05	6.55E-04	1.06E-06	9.40E-02	4.50E-06	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	500	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	4.80E-01	1.11E+00	1.56E+01	3.47E-05	3.11E-04	8.44E-05	1.03E-03	1.70E-06	1.73E-01	7.61E-06	0.00E+00	3.12E-05	2.79E-04	7.59E-05	9.22E-04	1.53E-06	1.56E-01	6.85E-06	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	750	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	1.24E+00	2.86E+00	7.97E+01	1.80E-04	1.58E-03	4.41E-04	5.43E-03	8.85E-06	8.80E-01	3.98E-05	0.00E+00	6.28E-05	5.52E-04	1.54E-04	1.89E-03	3.09E-06	3.07E-01	1.39E-05	0.00E+00
2009	Annual	Mon-Sun	2270002033	Bore/Drill Rigs	D	1000	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	2.07E+00	4.80E+00	2.02E+02	5.19E-04	4.15E-03	1.38E-03	2.10E-02	2.24E-05	2.23E+00	1.24E-04	0.00E+00	1.08E-04	8.64E-04	2.87E-04	4.38E-03	4.66E-06	4.64E-01	2.59E-05	0.00E+00
2009	Annual	Mon-Sun	2270002042	Cement and Mortar Mixers	D	15	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.38E+00	1.13E+00	3.27E-01	1.86E-06	2.21E-05	4.67E-06	3.01E-05	5.57E-08	3.58E-03	4.21E-07	0.00E+00	1.64E-06	1.95E-05	4.12E-06	2.66E-05	4.91E-08	3.16E-03	3.72E-07	0.00E+00
2009	Annual	Mon-Sun	2270002042	Cement and Mortar Mixers	D	25	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.24E-01	1.02E-01	8.20E-02	5.92E-07	5.05E-06	1.91E-06	8.55E-06	1.14E-08	8.95E-04	1.72E-07	0.00E+00	5.80E-06	4.95E-05	1.87E-05	8.38E-05	1.11E-07	8.77E-03	1.69E-06	0.00E+00
2009	Annual	Mon-Sun	2270002039	Concrete/Industrial Saws	D	25	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.08E-02	1.75E-02	1.31E-02	6.17E-08	5.93E-07	1.76E-07	1.13E-06	1.83E-09	1.44E-04	1.59E-08	0.00E+00	3.53E-06	3.39E-05	1.01E-05	6.47E-05	1.04E-07	8.23E-03	9.09E-07	0.00E+00
2009	Annual	Mon-Sun	2270002039	Concrete/Industrial Saws	D	50	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	9.44E-02	1.50E-01	2.11E-01	2.38E-06	2.48E-05	9.92E-06	2.34E-05	2.93E-08	2.26E-03	8.95E-07	0.00E+00	1.59E-05	1.65E-04	6.61E-05	1.56E-04	1.95E-07	1.51E-02	5.97E-06	0.00E+00
2009	Annual	Mon-Sun	2270002039	Concrete/Industrial Saws	D	120	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.64E-01	2.62E-01	8.89E-01	9.87E-06	6.57E-05	1.88E-05	1.19E-04	1.14E-07	9.69E-03	1.70E-06	0.00E+00	3.77E-05	2.51E-04	7.20E-05	4.55E-04	4.35E-07	3.70E-02	6.49E-06	0.00E+00
2009	Annual	Mon-Sun	2270002039	Concrete/Industrial Saws	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	5.39E-03	8.58E-03	6.27E-02	3.87E-07	3.78E-06	8.80E-07	7.49E-06	7.72E-09	6.86E-04	7.94E-08	0.00E+00	4.51E-05	4.41E-04	1.03E-04	8.73E-04	9.00E-07	8.00E-02	9.26E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	50	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	9.17E-02	3.22E-01	3.52E-01	4.89E-06	5.25E-05	2.21E-05	4.16E-05	4.82E-08	3.73E-03	2.00E-06	0.00E+00	1.52E-05	1.63E-04	6.87E-05	1.29E-04	1.50E-07	1.16E-02	6.20E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	120	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	1.01E+00	3.53E+00	8.14E+00	1.12E-04	6.64E-04	2.09E-04	1.22E-03	1.04E-06	8.85E-02	1.89E-05	0.00E+00	3.16E-05	1.88E-04	5.93E-05	3.45E-04	2.94E-07	2.51E-02	5.35E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	175	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	1.01E+00	3.53E+00	1.30E+01	9.94E-05	8.66E-04	2.25E-04	1.74E-03	1.60E-06	1.42E-01	2.03E-05	0.00E+00	2.81E-05	2.45E-04	6.37E-05	4.92E-04	4.52E-07	4.01E-02	5.75E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	250	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	1.95E+00	6.85E+00	3.49E+01	1.72E-04	1.25E-03	4.50E-04	4.48E-03	4.32E-06	3.84E-01	4.06E-05	0.00E+00	2.51E-05	1.83E-04	6.57E-05	6.55E-04	6.30E-07	5.60E-02	5.92E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	500	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	7.15E-01	2.51E+00	2.05E+01	9.11E-05	8.98E-04	2.40E-04	2.35E-03	2.22E-06	2.26E-01	2.16E-05	0.00E+00	3.63E-05	3.58E-04	9.56E-05	9.38E-04	8.83E-07	9.00E-02	8.62E-06	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	750	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	2.59E+00	9.11E+00	1.26E+02	5.63E-04	5.49E-03	1.48E-03	1.47E-02	1.39E-05	1.38E+00	1.33E-04	0.00E+00	6.18E-05	6.02E-04	1.62E-04	1.61E-03	1.52E-06	1.51E-01	1.46E-05	0.00E+00
2009	Annual	Mon-Sun	2270002045	Cranes	D	9999	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	3.26E+00	1.14E+01	5.05E+02	2.27E-03	2.55E-02	6.57E-03	7.22E-02	5.57E-05	5.54E+00	5.93E-04	0.00E+00	1.98E-04	2.23E-03	5.74E-04	6.32E-03	4.88E-06	4.85E-01	5.18E-05	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	50	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	3.77E-02	1.09E-01	1.28E-01	1.83E-06	1.97E-05	8.39E-06	1.53E-05	1.75E-08	1.36E-03	7.57E-07	0.00E+00	1.68E-05	1.81E-04	7.69E-05	1.41E-04	1.61E-07	1.24E-02	6.94E-06	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	120	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	2.14E+01	6.19E+01	1.87E+02	2.66E-03	1.57E-02	5.08E-03	2.94E-02	2.39E-05	2.03E+00	4.58E-04	0.00E+00	4.29E-05	2.54E-04	8.21E-05	4.76E-04	3.86E-07	3.29E-02	7.41E-06	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	7.25E+00	2.09E+01	1.16E+02	9.37E-04	8.01E-03	2.13E-03	1.63E-02	1.43E-05	1.27E+00	1.92E-04	0.00E+00	4.47E-05	3.83E-04	1.02E-04	7.80E-04	6.81E-07	6.05E-02	9.19E-06	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	250	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	6.23E+00	1.80E+01	1.36E+02	7.47E-04	5.43E-03	1.94E-03	1.84E-02	1.68E-05	1.49E+00	1.75E-04	0.00E+00	4.15E-05	3.02E-04	1.08E-04	1.02E-03	9.34E-07	8.30E-02	9.70E-06	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	500	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	4.27E+00	1.23E+01	1.46E+02	7.14E-04	7.98E-03	1.87E-03	1.77E-02	1.57E-05	1.60E+00	1.69E-04	0.00E+00	5.79E-05	6.47E-04	1.52E-04	1.44E-03	1.27E-06	1.29E-01	1.37E-05	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	750	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	1.06E+00	3.07E+00	6.51E+01	3.22E-04	3.57E-03	8.41E-04	8.07E-03	7.17E-06	7.13E-01	7.59E-05	0.00E+00	1.05E-04	1.16E-03	2.74E-04	2.62E-03	2.33E-06	2.32E-01	2.47E-05	0.00E+00
2009	Annual	Mon-Sun	2270002069	Crawler Tractors	D	1000	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	1.06E+00	3.07E+00	9.22E+01	4.53E-04	5.64E-03	1.29E-03	1.37E-02	1.01E-05	1.01E+00	1.16E-04	0.00E+00	1.47E-04	1.84E-03	4.20E-04	4.46E-03	3.31E-06	3.29E-01	3.79E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	50	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	4.31E-01	1.13E+00	2.33E+00	3.07E-05	3.23E-04	1.36E-04	2.69E-04	3.21E-07	2.48E-02	1.22E-05	0.00E+00	2.71E-05	2.86E-04	1.20E-04	2.38E-04	2.84E-07	2.20E-02	1.08E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	120	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	1.22E+00	3.18E+00	1.22E+01	1.59E-04	9.55E-04	2.96E-04	1.74E-03	1.55E-06	1.32E-01	2.67E-05	0.00E+00	4.98E-05	3.00E-04	9.30E-05	5.45E-04	4.87E-07	4.15E-02	8.39E-06	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	175	Construction and Mining Equipmer	U	P	NHI	P	Imperial	SS	IMP	5.15E-01	1.35E+00	1.03E+01	7.46E-05	6.58E-04	1.67E-04	1.32E-03	1.27E-06	1.13E-01	1.51E-05	0.00E+00	5.53E-05	4.88E-04	1.24E-04	9.79E-04	9.40E-07	8.36E-02	1.12E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	250	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	5.12E-02	1.34E-01	1.49E+00	6.04E-06	4.43E-05	1.60E-05	1.80E-04	1.84E-07	1.64E-02	1.44E-06	0.00E+00	4.50E-05	3.30E-04	1.19E-04	1.34E-03	1.37E-06	1.22E-01	1.08E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	500	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	2.88E-01	7.55E-01	1.28E+01	4.77E-05	4.35E-04	1.23E-04	1.38E-03	1.38E-06	1.41E-01	1.11E-05	0.00E+00	6.31E-05	5.76E-04	1.63E-04	1.82E-03	1.83E-06	1.87E-01	1.47E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	750	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	6.65E-02	1.74E-01	4.65E+00	1.75E-05	1.54E-04	4.55E-05	5.17E-04	5.15E-07	5.12E-02	4.11E-06	0.00E+00	1.01E-04	8.85E-04	2.61E-04	2.97E-03	2.96E-06	2.94E-01	2.36E-05	0.00E+00
2009	Annual	Mon-Sun	2270002054	Crushing/Proc. Equipment	D	9999	Construction and Mining Equipmer	U	N	NHI	P	Imperial	SS	IMP	6.65E-02	1.74E-01	1.04E+01	4.37E-05	4.52E-04	1.27E-04	1.45E-03	1.14E-06	1.14E-01	1.15E-05	0.00E+00	2.51E-04	2.60E-03	7.30E-04	8.30E-03	6.57E-06	6.53E-01	6.58E-05	0.00E+00
2009	Annual	Mon-Sun	2270002078	Dumpers/Tenders	D	25	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	6.47E-02	1.17E-01	4.08E-02	2.32E-07	2.02E-06	6.67E-07	3.88E-06	5.68E-09	4.47E-04	6.02E-08	0.00E+00	1.97E-06	1.72E-05	5.68E-06	3.31E-05	4.83E-08	3.81E-03	5.12E-07	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	25	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	9.98E-02	3.82E-01	2.86E-01	1.27E-06	1.29E-05	3.81E-06	2.43E-05	3.98E-08	3.14E-03	3.44E-07	0.00E+00	3.32E-06	3.38E-05	9.98E-06	6.36E-05	1.04E-07	8.21E-03	9.00E-07	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	50	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	3.76E+00	1.47E+01	1.72E+01	2.18E-04	2.39E-03	9.18E-04	1.96E-03	2.37E-06	1.83E-01	8.29E-05	0.00E+00	1.48E-05	1.63E-04	6.26E-05	1.34E-04	1.62E-07	1.25E-02	5.65E-06	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	120	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.02E+01	3.99E+01	1.35E+02	1.67E-03	1.07E-02	3.02E-03	1.79E-02	1.72E-05	1.47E+00	2.73E-04	0.00E+00	4.20E-05	2.68E-04	7.58E-05	4.49E-04	4.31E-07	3.68E-02	6.84E-06	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.97E+01	7.69E+01	3.94E+02	2.70E-03	2.58E-02	6.00E-03	4.60E-02	4.85E-05	4.31E+00	5.42E-04	0.00E+00	3.51E-05	3.35E-04	7.81E-05	5.99E-04	6.31E-07	5.61E-02	7.05E-06	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	250	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	8.00E+00	3.13E+01	2.25E+02	8.67E-04	6.47E-03	2.39E-03	2.51E-02	2.79E-05	2.48E+00	2.16E-04	0.00E+00	2.77E-05	2.07E-04	7.64E-05	8.01E-04	8.92E-07	7.93E-02	6.89E-06	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	500	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	5.77E+00	2.26E+01	2.39E+02	8.50E-04	7.44E-03	2.33E-03	2.33E-02	2.59E-05	2.63E+00	2.11E-04	0.00E+00	3.77E-05	3.30E-04	1.04E-04	1.03E-03	1.15E-06	1.17E-01	9.34E-06	0.00E+00
2009	Annual	Mon-Sun	2270002036	Excavators	D	750	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	6.25E-01	2.44E+00	4.29E+01	1.55E-04	1.33E-03	4.22E-04	4.31E-03	4.75E-06	4.73E-01	3.81E-05	0.00E+00	6.35E-05	5.46E-04	1.73E-04	1.76E-03	1.95E-06	1.94E-01	1.56E-05	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	50	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	3.77E-02	9.88E-02	1.28E-01	1.69E-06	1.82E-05	7.45E-06	1.48E-05	1.76E-08	1.36E-03	6.72E-07	0.00E+00	1.71E-05	1.85E-04	7.54E-05	1.50E-04	1.78E-07	1.38E-02	6.80E-06	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	120	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	2.52E+00	6.59E+00	2.27E+01	2.96E-04	1.82E-03	5.47E-04	3.23E-03	2.90E-06	2.47E-01	4.94E-05	0.00E+00	4.48E-05	2.76E-04	8.30E-05	4.90E-04	4.39E-07	3.74E-02	7.49E-06	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	8.60E+00	2.25E+01	1.28E+02	9.25E-04	8.37E-03	2.07E-03	1.62E-02	1.57E-05	1.39E+00	1.87E-04	0.00E+00	4.11E-05	3.72E-04	9.21E-05	7.19E-04	6.97E-07	6.19E-02	8.31E-06	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	250	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	5.34E+00	1.40E+01	1.09E+02	4.92E-04	3.63E-03	1.30E-03	1.33E-02	1.35E-05	1.20E+00	1.17E-04	0.00E+00	3.52E-05	2.60E-04	9.28E-05	9.50E-04	9.67E-07	8.60E-02	8.37E-06	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	500	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	1.51E-01	3.95E-01	4.12E+00	1.69E-05	1.60E-04	4.44E-05	4.44E-04	4.45E-07	4.53E-02	4.01E-06	0.00E+00	4.26E-05	4.06E-04	1.12E-04	1.12E-03	1.13E-06	1.15E-01	1.01E-05	0.00E+00
2009	Annual	Mon-Sun	2270002048	Graders	D	750	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	3.99E-02	1.04E-01	2.30E+00	9.55E-06	8.97E-05	2.50E-05	2.55E-04	2.55E-07	2.53E-02	2.26E-06	0.00E+00	9.14E-05	8.59E-04	2.40E-04	2.44E-03	2.44E-06	2.43E-01	2.16E-05	0.00E+00
2009	Annual	Mon-Sun	2270002075	Off-Highway Tractors	D	120	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	2.70E-03	8.29E-03	3.58E-02	5.41E-07	3.12E-06	1.07E-06	6.14E-06	4.55E-09	3.88E-04	9.63E-08	0.00E+00	6.52E-05	3.76E-04	1.29E-04	7.41E-04	5.49E-07	4.68E-02	1.16E-05	0.00E+00
2009	Annual	Mon-Sun	2270002075	Off-Highway Tractors	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	3.30E+00	1.01E+01	6.06E+01	5.34E-04	4.38E-03	1.23E-03	9.37E-03	7.43E-06	6.61E-01	1.11E-04	0.00E+00	5.26E-05	4.32E-04	1.21E-04	9.24E-04	7.33E-07	6.52E-02	1.09E-05	0.00E+00
2009	Annual	Mon-Sun	2270002075	Off-Highway Tractors	D	250	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	3.12E+00	9.58E+00	5.70E+01	3.70E-04	2.68E-03	9.41E-04	8.55E-03	7.03E-06	6.24E-01	8.49E-05	0.00E+00	3.86E-05	2.80E-04	9.82E-05	8.92E-04	7.33E-07	6.52E-02	8.86E-06	0.00E+00
2009	Annual	Mon-Sun	2270002075	Off-Highway Tractors	D	750	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	6.68E+00	2.05E+01	5.33E+02	3.07E-03	3.93E-02	7.91E-03	7.34E-02	5.86E-05	5.83E+00	7.14E-04	0.00E+00	1.50E-04	1.91E-03	3.85E-04	3.58E-03	2.85E-06	2.84E-01	3.48E-05	0.00E+00
2009	Annual	Mon-Sun	2270002075	Off-Highway Tractors	D	1000	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	7.05E-01	2.17E+00	8.07E+01	4.54E-04	6.43E-03	1.27E-03	1.28E-02	8.86E-06	8.81E-01	1.15E-04	0.00E+00	2.10E-04	2.97E-03	5.86E-04	5.92E-03	4.09E-06	4.07E-01	5.29E-05	0.00E+00
2009	Annual	Mon-Sun	2270002051	Off-Highway Trucks	D	175	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.75E-01	9.57E-01	5.47E+00	3.91E-05	3.66E-04	8.80E-05	6.57E-04	6.73E-07	5.98E-02	7.94E-06	0.00E+00	4.08E-05	3.82E-04	9.19E-05	6.87E-04	7.03E-07	6.25E-02	8.30E-06	0.00E+00
2009	Annual	Mon-Sun	2270002051	Off-Highway Trucks	D	250	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	1.29E+00	7.07E+00	5.34E+01	2.17E-04	1.60E-03	6.09E-04	6.12E-03	6.62E-06	5.88E-01	5.50E-05	0.00E+00	3.07E-05	2.27E-04	8.62E-05	8.66E-04	9.36E-07	8.32E-02	7.78E-06	0.00E+00
2009	Annual	Mon-Sun	2270002051	Off-Highway Trucks	D	500	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	1.82E+00	9.96E+00	1.23E+02	4.60E-04	4.03E-03	1.29E-03	1.23E-02	1.33E-05	1.35E+00	1.17E-04	0.00E+00	4.62E-05	4.05E-04	1.30E-04	1.24E-03	1.34E-06	1.36E-01	1.17E-05	0.00E+00
2009	Annual	Mon-Sun	2270002051	Off-Highway Trucks	D	750	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	8.37E+00	4.57E+01	9.16E+02	3.48E-03	3.00E-02	9.70E-03	9.46E-02	1.01E-04	1.01E+01	8.75E-04	0.00E+00	7.61E-05	6.57E-04	2.12E-04	2.07E-03	2.22E-06	2.21E-01	1.92E-05	0.00E+00
2009	Annual	Mon-Sun	2270002051	Off-Highway Trucks	D	1000	Construction and Mining Equipmer	U	N	NHI	NP	Imperial	SS	IMP	3.92E+00	2.14E+01	6.08E+02	2.49E-03	2.39E-02	7.23E-03	8.19E-02	6.72E-05	6.68E+00	6.53E-04	0.00E+00	1.16E-04	1.12E-03	3.38E-04	3.82E-03	3.14E-06	3.12E-01	3.05E-05	0.00E+00
2009	Annual	Mon-Sun	2270002081	Other Construction Equipm	D	15	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	8.92E-01	1.69E+00	7.79E-01	3.14E-06	5.21E-05	9.95E-06	6.24E-05	1.33E-07	8.53E-03	8.97E-07	0.00E+00	1.86E-06	3.08E-05	5.89E-06	3.69E-05	7.86E-08	5.05E-03	5.31E-07	0.00E+00
2009	Annual	Mon-Sun	2270002081	Other Construction Equipm	D	25	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	1.51E-01	2.86E-01	1.72E-01	8.47E-07	7.84E-06	2.38E-06	1.53E-05	2.39E-08	1.89E-03	2.15E-07	0.00E+00	2.96E-06	2.74E-05	8.33E-06	5.35E-05	8.38E-08	6.60E-03	7.51E-07	0.00E+00
2009	Annual	Mon-Sun	2270002081	Other Construction Equipm	D	50	Construction and Mining Equipmer	U	P	NHI	NP	Imperial	SS	IMP	2.32E-01	4.48E-01	5.83E-01	6.32E-06	6.79E-05	2.54E-05	6.34E-05	8.10E-

2009	Annual	Mon-Sun	2270002015	Rollers	D	15	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.63E+00	3.11E+00	8.97E-01	3.61E-06	5.99E-05	1.15E-05	7.18E-05	1.53E-07	9.82E-03	1.03E-06	0.00E+00	1.16E-06	1.93E-05	3.68E-06	2.31E-05	4.91E-08	3.16E-03	3.32E-07	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	25	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	6.82E-01	1.30E+00	7.89E-01	3.89E-06	3.60E-05	1.09E-05	7.03E-05	1.10E-07	8.67E-03	9.86E-07	0.00E+00	2.99E-06	2.77E-05	8.41E-06	5.40E-05	8.46E-08	6.67E-03	7.58E-07	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.12E+00	4.08E+00	4.97E+00	6.27E-05	6.64E-04	2.76E-04	5.70E-04	6.85E-07	5.30E-02	2.49E-05	0.00E+00	1.54E-05	1.63E-04	6.76E-05	1.40E-04	1.68E-07	1.30E-02	6.10E-06	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.14E+01	2.19E+01	5.93E+01	7.35E-04	4.62E-03	1.40E-03	8.52E-03	7.57E-06	6.46E-01	1.26E-04	0.00E+00	3.36E-05	2.11E-04	6.39E-05	3.89E-04	3.46E-07	2.95E-02	5.77E-06	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	4.58E+00	8.81E+00	4.35E+01	3.02E-04	2.77E-03	6.88E-04	5.59E-03	5.36E-06	4.76E-01	6.20E-05	0.00E+00	3.43E-05	3.15E-04	7.80E-05	6.35E-04	6.08E-07	5.40E-02	7.04E-06	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	6.50E-01	1.25E+00	8.69E+00	4.01E-05	3.00E-04	1.03E-04	1.07E-03	1.08E-06	9.56E-02	9.25E-06	0.00E+00	3.21E-05	2.40E-04	8.20E-05	8.58E-04	8.60E-07	7.65E-02	7.40E-06	0.00E+00
2009	Annual	Mon-Sun	2270002015	Rollers	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	4.56E-01	8.76E-01	8.73E+00	3.64E-05	3.69E-04	9.22E-05	9.68E-04	9.42E-07	9.59E-02	8.32E-06	0.00E+00	4.15E-05	4.20E-04	1.05E-04	1.10E-03	1.07E-06	1.09E-01	9.50E-06	0.00E+00
2009	Annual	Mon-Sun	2270002057	Rough Terrain Forklifts	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.99E-01	9.31E-01	1.48E+00	1.87E-05	2.01E-04	8.05E-05	1.68E-04	2.04E-07	1.58E-02	7.26E-06	0.00E+00	2.01E-05	2.16E-04	8.64E-05	1.81E-04	2.19E-07	1.69E-02	7.80E-06	0.00E+00
2009	Annual	Mon-Sun	2270002057	Rough Terrain Forklifts	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.43E+01	4.46E+01	1.28E+02	1.59E-03	1.00E-02	2.91E-03	1.74E-02	1.63E-05	1.39E+00	2.62E-04	0.00E+00	3.58E-05	2.24E-04	6.52E-05	3.89E-04	3.66E-07	3.12E-02	5.88E-06	0.00E+00
2009	Annual	Mon-Sun	2270002057	Rough Terrain Forklifts	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.84E+00	5.71E+00	3.26E+01	2.25E-04	2.09E-03	4.98E-04	3.93E-03	4.01E-06	3.56E-01	4.49E-05	0.00E+00	3.93E-05	3.66E-04	8.71E-05	6.87E-04	7.02E-07	6.24E-02	7.86E-06	0.00E+00
2009	Annual	Mon-Sun	2270002057	Rough Terrain Forklifts	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.02E-01	3.19E-01	2.47E+00	9.74E-06	7.24E-05	2.59E-05	2.83E-04	3.06E-07	2.72E-02	2.34E-06	0.00E+00	3.05E-05	2.27E-04	8.12E-05	8.88E-04	9.60E-07	8.53E-02	7.33E-06	0.00E+00
2009	Annual	Mon-Sun	2270002057	Rough Terrain Forklifts	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	6.74E-02	2.10E-01	2.44E+00	8.84E-06	7.85E-05	2.32E-05	2.46E-04	2.64E-07	2.69E-02	2.10E-06	0.00E+00	4.22E-05	3.74E-04	1.11E-04	1.17E-03	1.26E-06	1.28E-01	9.99E-06	0.00E+00
2009	Annual	Mon-Sun	2270002063	Rubber Tired Dozers	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.70E-02	1.21E-01	7.18E-01	6.51E-06	5.30E-05	1.51E-05	1.13E-04	8.80E-08	7.82E-03	1.36E-06	0.00E+00	5.38E-05	4.38E-04	1.25E-04	9.35E-04	7.28E-07	6.47E-02	1.13E-05	0.00E+00
2009	Annual	Mon-Sun	2270002063	Rubber Tired Dozers	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	6.61E-01	2.96E+00	2.48E+01	1.67E-04	1.20E-03	4.28E-04	3.79E-03	3.06E-06	2.72E-01	3.86E-05	0.00E+00	5.62E-05	4.05E-04	1.44E-04	1.28E-03	1.03E-06	9.17E-02	1.30E-05	0.00E+00
2009	Annual	Mon-Sun	2270002063	Rubber Tired Dozers	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.02E+00	4.56E+00	5.53E+01	3.26E-04	4.25E-03	8.56E-04	7.64E-03	5.92E-06	6.03E-01	7.72E-05	0.00E+00	7.16E-05	9.31E-04	1.88E-04	1.68E-03	1.30E-06	1.32E-01	1.69E-05	0.00E+00
2009	Annual	Mon-Sun	2270002063	Rubber Tired Dozers	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.77E+00	7.94E+00	1.45E+02	8.61E-04	1.11E-02	2.25E-03	2.03E-02	1.59E-05	1.58E+00	2.03E-04	0.00E+00	1.08E-04	1.40E-03	2.84E-04	2.56E-03	2.00E-06	1.99E-01	2.56E-05	0.00E+00
2009	Annual	Mon-Sun	2270002063	Rubber Tired Dozers	D	1000	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.20E-01	5.36E-01	1.45E+01	8.46E-05	1.20E-03	2.37E-04	2.35E-03	1.59E-06	1.59E-01	2.14E-05	0.00E+00	1.58E-04	2.24E-03	4.41E-04	4.38E-03	2.97E-06	2.96E-01	3.98E-05	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	25	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	3.77E-02	9.91E-02	7.63E-02	3.59E-07	3.45E-06	1.03E-06	6.58E-06	1.06E-08	8.38E-04	9.25E-08	0.00E+00	3.62E-06	3.48E-05	1.03E-05	6.65E-05	1.07E-07	8.46E-03	9.34E-07	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	7.33E-01	1.96E+00	2.87E+00	3.76E-05	4.05E-04	1.65E-04	3.32E-04	3.95E-07	3.05E-02	1.49E-05	0.00E+00	1.92E-05	2.07E-04	8.42E-05	1.69E-04	2.01E-07	1.56E-02	7.59E-06	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.99E+01	5.33E+01	1.44E+02	1.86E-03	1.15E-02	3.44E-03	2.04E-02	1.84E-05	1.57E+00	3.11E-04	0.00E+00	3.49E-05	2.15E-04	6.45E-05	3.83E-04	3.45E-07	2.94E-02	5.82E-06	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.12E+01	3.01E+01	1.46E+02	1.05E-03	9.54E-03	2.35E-03	1.84E-02	1.80E-05	1.60E+00	2.12E-04	0.00E+00	3.49E-05	3.17E-04	7.81E-05	6.12E-04	5.98E-07	5.31E-02	7.05E-06	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.12E+01	2.99E+01	2.02E+02	8.96E-04	6.62E-03	2.36E-03	2.44E-02	2.50E-05	2.22E+00	2.13E-04	0.00E+00	3.00E-05	2.22E-04	7.89E-05	8.16E-04	8.37E-07	7.44E-02	7.11E-06	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	4.65E+00	1.24E+01	1.34E+02	5.39E-04	5.11E-03	1.42E-03	1.43E-02	1.45E-05	1.47E+00	1.28E-04	0.00E+00	4.33E-05	4.11E-04	1.14E-04	1.15E-03	1.16E-06	1.18E-01	1.03E-05	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.61E+00	4.30E+00	9.49E+01	3.87E-04	3.62E-03	1.01E-03	1.04E-02	1.05E-05	1.04E+00	9.13E-05	0.00E+00	8.99E-05	8.42E-04	2.35E-04	2.42E-03	2.44E-06	2.43E-01	2.12E-05	0.00E+00
2009	Annual	Mon-Sun	2270002060	Rubber Tired Loaders	D	1000	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.73E-01	4.62E-01	1.25E+01	5.21E-05	5.57E-04	1.50E-04	1.71E-03	1.38E-06	1.37E-01	1.36E-05	0.00E+00	1.13E-04	1.21E-03	3.26E-04	3.71E-03	2.98E-06	2.97E-01	2.94E-05	0.00E+00
2009	Annual	Mon-Sun	2270002018	Scrapers	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.05E-01	3.22E-01	1.39E+00	1.98E-05	1.17E-04	3.81E-05	2.21E-04	1.77E-07	1.51E-02	3.43E-06	0.00E+00	6.16E-05	3.62E-04	1.18E-04	6.85E-04	5.50E-07	4.69E-02	1.07E-05	0.00E+00
2009	Annual	Mon-Sun	2270002018	Scrapers	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	9.63E-01	2.95E+00	2.00E+01	1.62E-04	1.38E-03	3.70E-04	2.84E-03	2.45E-06	2.18E-01	3.33E-05	0.00E+00	5.50E-05	4.68E-04	1.25E-04	9.62E-04	8.32E-07	7.40E-02	1.13E-05	0.00E+00
2009	Annual	Mon-Sun	2270002018	Scrapers	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	9.38E-01	2.87E+00	2.74E+01	1.53E-04	1.11E-03	3.95E-04	3.76E-03	3.38E-06	3.01E-01	3.56E-05	0.00E+00	5.32E-05	3.87E-04	1.37E-04	1.31E-03	1.18E-06	1.05E-01	1.24E-05	0.00E+00
2009	Annual	Mon-Sun	2270002018	Scrapers	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	2.58E+00	7.91E+00	1.16E+02	5.77E-04	6.52E-03	1.51E-03	1.43E-02	1.25E-05	1.27E+00	1.36E-04	0.00E+00	7.30E-05	8.24E-04	1.90E-04	1.80E-03	1.58E-06	1.61E-01	1.72E-05	0.00E+00
2009	Annual	Mon-Sun	2270002018	Scrapers	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	2.09E+00	6.40E+00	1.62E+02	8.14E-04	9.11E-03	2.11E-03	2.03E-02	1.78E-05	1.77E+00	1.91E-04	0.00E+00	1.27E-04	1.42E-03	3.30E-04	3.17E-03	2.79E-06	2.77E-01	2.98E-05	0.00E+00
2009	Annual	Mon-Sun	2270002027	Signal Boards	D	15	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	7.59E+00	1.56E+01	4.39E+00	1.43E-05	2.94E-04	5.60E-05	3.51E-04	7.49E-07	4.81E-02	5.05E-06	0.00E+00	9.18E-07	1.88E-05	3.59E-06	2.25E-05	4.80E-08	3.08E-03	3.24E-07	0.00E+00
2009	Annual	Mon-Sun	2270002027	Signal Boards	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	3.77E-02	5.54E-02	9.33E-02	1.05E-06	1.08E-05	4.38E-06	1.04E-05	1.29E-08	1.00E-03	3.95E-07	0.00E+00	1.90E-05	1.96E-04	7.90E-05	1.87E-04	2.34E-07	1.81E-02	7.13E-06	0.00E+00
2009	Annual	Mon-Sun	2270002027	Signal Boards	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	6.17E-01	9.06E-01	3.33E+00	3.73E-05	2.46E-04	7.19E-05	4.49E-04	4.26E-07	3.63E-02	6.49E-06	0.00E+00	4.12E-05	2.71E-04	7.93E-05	4.96E-04	4.70E-07	4.01E-02	7.16E-06	0.00E+00
2009	Annual	Mon-Sun	2270002027	Signal Boards	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	3.83E-01	5.62E-01	3.96E+00	2.46E-05	2.38E-04	5.65E-05	4.79E-04	4.88E-07	4.34E-02	5.10E-06	0.00E+00	4.38E-05	4.23E-04	1.01E-04	8.53E-04	8.69E-07	7.72E-02	9.08E-06	0.00E+00
2009	Annual	Mon-Sun	2270002027	Signal Boards	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	8.09E-02	1.19E-01	1.37E+00	5.00E-06	3.87E-05	1.30E-05	1.57E-04	1.70E-07	1.51E-02	1.18E-06	0.00E+00	4.21E-05	3.26E-04	1.10E-04	1.32E-03	1.43E-06	1.28E-01	9.91E-06	0.00E+00
2009	Annual	Mon-Sun	2270002072	Skid Steer Loaders	D	25	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	5.18E+00	1.18E+01	7.47E+00	5.08E-05	4.35E-04	1.60E-04	7.60E-04	1.04E-06	8.16E-02	1.44E-05	0.00E+00	4.29E-06	3.68E-05	1.35E-05	6.42E-05	8.74E-08	6.89E-03	1.22E-06	0.00E+00
2009	Annual	Mon-Sun	2270002072	Skid Steer Loaders	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	4.70E+01	1.10E+02	1.30E+02	1.31E-03	1.43E-02	4.90E-03	1.38E-02	1.81E-05	1.40E+00	4.42E-04	0.00E+00	1.19E-05	1.30E-04	4.46E-05	1.25E-04	1.65E-07	1.27E-02	4.02E-06	0.00E+00
2009	Annual	Mon-Sun	2270002072	Skid Steer Loaders	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.46E+01	5.76E+01	1.13E+02	1.12E-03	8.21E-03	1.95E-03	1.29E-02	1.44E-05	1.23E+00	1.76E-04	0.00E+00	1.93E-05	1.42E-04	3.38E-05	2.23E-04	2.51E-07	2.14E-02	3.05E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	5.39E-02	6.70E-02	4.41E-02	5.00E-07	5.23E-06	2.10E-06	4.93E-06	6.11E-09	4.72E-04	1.90E-07	0.00E+00	7.47E-06	7.80E-05	3.14E-05	7.35E-05	9.11E-08	7.05E-03	2.83E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.08E-02	1.34E-02	3.92E-02	4.38E-07	2.93E-06	8.53E-07	5.42E-06	5.01E-09	4.27E-04	7.70E-08	0.00E+00	3.27E-05	2.19E-04	6.36E-05	4.05E-04	3.74E-07	3.19E-02	5.74E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	8.09E-03	1.01E-02	3.94E-02	2.48E-07	2.42E-06	5.71E-07	4.87E-06	4.85E-09	4.31E-04	5.15E-08	0.00E+00	2.46E-05	2.41E-04	5.67E-05	4.84E-04	4.82E-07	4.28E-02	5.12E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.62E-02	2.01E-02	1.23E-01	5.26E-07	4.11E-06	1.34E-06	1.46E-05	1.52E-08	1.35E-03	1.21E-07	0.00E+00	2.62E-05	2.04E-04	6.68E-05	7.28E-04	7.58E-07	6.74E-02	6.02E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.35E-01	1.68E-01	1.68E+00	6.55E-06	7.03E-05	1.65E-05	1.82E-04	1.82E-07	1.85E-02	1.49E-06	0.00E+00	3.91E-05	4.19E-04	9.84E-05	1.08E-03	1.08E-06	1.11E-01	8.87E-06	0.00E+00
2009	Annual	Mon-Sun	2270002024	Surfacing Equipment	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	3.99E-01	4.96E-01	7.82E+00	3.07E-05	3.26E-04	7.80E-05	8.61E-04	8.65E-07	8.60E-02	7.04E-06	0.00E+00	6.19E-05	6.58E-04	1.57E-04	1.74E-03	1.74E-06	1.73E-01	1.42E-05	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	25	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	7.60E-01	1.96E+00	1.42E+00	7.76E-06	6.84E-05	2.20E-05	1.33E-04	1.97E-07	1.56E-02	1.99E-06	0.00E+00	3.95E-06	3.48E-05	1.12E-05	6.77E-05	1.01E-07	7.92E-03	1.01E-06	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	4.54E+00	1.20E+01	1.71E+01	2.03E-04	2.22E-03	8.38E-04	1.90E-03	2.36E-06	1.83E-01	7.56E-05	0.00E+00	1.68E-05	1.84E-04	6.96E-05	1.58E-04	1.96E-07	1.52E-02	6.28E-06	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	6.08E+01	1.61E+02	3.82E+02	4.46E-03	2.95E-02	7.99E-03	4.89E-02	4.89E-05	4.16E+00	7.21E-04	0.00E+00	2.77E-05	1.83E-04	4.96E-05	3.03E-04	3.03E-07	2.58E-02	4.47E-06	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	4.54E+00	1.20E+01	5.57E+01	3.58E-04	3.54E-03	7.84E-04	6.24E-03	6.85E-06	6.09E-01	7.08E-05	0.00E+00	2.98E-05	2.94E-04	6.52E-05	5.19E-04	5.70E-07	5.06E-02	5.88E-06	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.47E+00	3.89E+00	3.03E+01	1.08E-04	8.22E-04	2.91E-04	3.24E-03	3.76E-06	3.34E-01	2.63E-05	0.00E+00	2.79E-05	2.11E-04	7.49E-05	8.32E-04	9.65E-07	8.58E-02	6.76E-06	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	2.37E+00	6.28E+00	9.81E+01	3.25E-04	2.82E-03	8.63E-04	9.16E-03	1.22E-05	1.08E+00	7.78E-05	0.00E+00	5.18E-05	4.50E-04	1.37E-04	1.46E-03	1.94E-06	1.72E-01	1.24E-05	0.00E+00
2009	Annual	Mon-Sun	2270002066	Tractors/Loaders/Backhoes	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	8.05E+00	2.13E+01	5.00E+02	1.69E-03	1.44E-02	4.45E-03	4.82E-02	6.21E-05	5.51E+00	4.01E-04	0.00E+00	7.90E-05	6.75E-04	2.08E-04	2.26E-03	2.91E-06	2.58E-01	1.88E-05	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	15	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.02E-01	3.43E-01	1.32E-01	4.32E-07	8.85E-06	1.69E-06	1.06E-05	2.25E-08	1.45E-03	1.52E-07	0.00E+00	1.26E-06	2.58E-05	4.92E-06	3.08E-05	6.58E-08	4.23E-03	4.44E-07	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	25	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	2.13E-01	3.61E-01	5.41E-01	2.54E-06	2.44E-05	7.26E-06	4.67E-05	7.53E-08	5.94E-03	6.55E-07	0.00E+00	7.05E-06	6.77E-05	2.01E-05	1.29E-04	2.09E-07	1.64E-02	1.82E-06	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	50	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	8.11E+00	1.41E+01	2.18E+01	2.97E-04	3.14E-03	1.36E-03	2.58E-03	2.99E-06	2.32E-01	1.22E-04	0.00E+00	2.10E-05	2.23E-04	9.63E-05	1.83E-04	2.13E-07	1.64E-02	8.69E-06	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	120	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.10E+01	1.91E+01	5.70E+01	7.69E-04	4.67E-03	1.52E-03	9.07E-03	7.26E-06	6.19E-01	1.37E-04	0.00E+00	4.03E-05	2.45E-04	7.95E-05	4.75E-04	3.80E-07	3.24E-02	7.17E-06	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	175	Construction and Mining Equipmer	U	P	NHI-	NP	Imperial	SS	IMP	1.20E+00	2.09E+00	1.37E+01	1.07E-04	9.32E-04	2.47E-04	1.97E-03	1.69E-06	1.50E-01	2.23E-05	0.00E+00	5.14E-05	4.46E-04	1.18E-04	9.42E-04	8.09E-07	7.19E-02	1.07E-05	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	250	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.08E-01	1.87E-01	1.90E+00	1.09E-05	8.03E-05	2.73E-05	2.63E-04	2.35E-07	2.09E-02	2.47E-06	0.00E+00	5.82E-05	4.29E-04	1.46E-04	1.40E-03	1.25E-06	1.11E-01	1.32E-05	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	500	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	1.38E-01	2.39E-01	3.39E+00	1.72E-05	2.11E-04	4.35E-05	4.26E-04	3.65E-07	3.72E-02	3.92E-06	0.00E+00	7.21E-05	8.85E-04	1.82E-04	1.78E-03	1.53E-06	1.56E-01	1.64E-05	0.00E+00
2009	Annual	Mon-Sun	2270002030	Trenchers	D	750	Construction and Mining Equipmer	U	N	NHI-	NP	Imperial	SS	IMP	7.98E-02	1.39E-01	3.71E+00	1.90E-05	2.31E-04	4.80E-05	4.74E-04	4.09E-07	4.06E-02	4.33E-06	0.00E+00	1.37E-04	1.67E-03	3.46E-04	3.42E-03	2.95E-06	2.93E-01	3.12E-05	0.00E+00
2009	Annual	Mon-Sun	2266003010	Aerial Lifts	C4	15	Industrial Equipment	U	P	NHI-	NP	Imperial	SS	IMP	1.65E-02	1.70E-02	1.36E-02	3.47E-08	1.22E-05	3.15E-08	3.34E-07	0.00E+00	7.57E-05	2.64E-07	0.00E+00	2.04E-06	7.18E-04	1.85E-06	1.96E-05	0.00E+00	4.45E-03	1.55E-05	0.00E+00
2009	Annual	Mon-Sun	2266003010	Aerial Lifts	C4	25	Industrial Equipment	U	P	NHI-	NP	Imperial	SS	IMP	7.10E-01	7.30E-01	8.69E-01	2.44E-06	8.07E-04	3.04E-06	2.22E-05	0.00E+00	4.74E-03	2.55E-05	0.00E+00	3.35E-06	1.11E-03	4.16E-06	3.04E-05	0.00E+00	6.50E-03	3.49E-05	0.00E+00
2009	Annual	Mon-Sun	2266003020	Forklifts	C4	25	Industrial Equipment	U	N	NHI-	NP	Imperial	SS	IMP	6.97E-03	2.39E-02	2.34E-02	8.06E-08	2.35E-05	1.48E-07	6.56E-07	0.00E+00	1.23E-04	1.24E-06	0.00E+00	3.38E-06	9.84E-04	6.22E-06	2.75E-05	0.00E+00	5.13E-03	5.21E-05	0.00E+00
2009	Annual	Mon-Sun	2266003020	Forklifts	C4	50	Industrial Equipment	U	N	NHI-	NP	Imperial	SS	IMP	4.72E+00	2.33E+01	3.12E+01	1.89E-05	3.42E-03	3.73E-05	1.59E-03	0.00E+00	2.13E-01	3.13E-04	0.00E+00	8.14E-07	1.47E-04	1.60E-06	6.85E-05	0.00E+00	9.15E-03	1.34E-05	0.00E+00
2009	Annual	Mon-Sun	2266003020	Forklifts	C4	120	Industrial Equipment	U	N	NHI-	NP	Imperial	SS	IMP	1.66E+01	8.17E+01	1.95E+02	1.14E-04	5.76E-02	2.33E-04	9.08E-03

2009	Annual	Mon-Sun	2270003040	Other General Industrial Eq	D	500	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	8.42E-01	3.29E+00	3.96E+01	1.58E-04	1.42E-03	4.25E-04	4.45E-03	4.28E-06	4.36E-01	3.83E-05	0.00E+00	4.81E-05	4.33E-04	1.29E-04	1.35E-03	1.30E-06	1.33E-01	1.16E-05	0.00E+00
2009	Annual	Mon-Sun	2270003040	Other General Industrial Eq	D	750	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	2.10E-01	8.22E-01	1.63E+01	6.62E-05	5.87E-04	1.76E-04	1.88E-03	1.81E-06	1.80E-01	1.59E-05	0.00E+00	8.06E-05	7.14E-04	2.15E-04	2.29E-03	2.20E-06	2.19E-01	1.94E-05	0.00E+00
2009	Annual	Mon-Sun	2270003040	Other General Industrial Eq	D	1000	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	1.28E-01	5.00E-01	1.27E+01	5.67E-05	5.86E-04	1.64E-04	1.83E-03	1.41E-06	1.40E-01	1.48E-05	0.00E+00	1.13E-04	1.17E-03	3.29E-04	3.66E-03	2.81E-06	2.80E-01	2.97E-05	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	50	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	6.06E-03	2.19E-02	3.13E-02	4.44E-07	4.70E-06	2.01E-06	3.70E-06	4.29E-09	3.32E-04	1.81E-07	0.00E+00	2.03E-05	2.15E-04	9.18E-05	1.69E-04	1.96E-07	1.52E-02	8.28E-06	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	120	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	3.63E-02	1.31E-01	3.66E-01	5.18E-06	2.98E-05	9.61E-06	5.45E-05	4.67E-08	3.98E-03	8.67E-07	0.00E+00	3.94E-05	2.27E-04	7.32E-05	4.15E-04	3.56E-07	3.03E-02	6.60E-06	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	175	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	3.89E-02	1.41E-01	7.85E-01	6.15E-06	5.18E-05	1.38E-05	1.05E-04	9.66E-08	8.58E-03	1.25E-06	0.00E+00	4.37E-05	3.68E-04	9.82E-05	7.47E-04	6.86E-07	6.10E-02	8.86E-06	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	250	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	9.26E-02	3.35E-01	2.20E+00	9.56E-06	6.89E-05	2.58E-05	2.78E-04	2.73E-07	2.42E-02	2.32E-06	0.00E+00	2.86E-05	2.06E-04	7.70E-05	8.31E-04	8.15E-07	7.24E-02	6.95E-06	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	500	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	1.73E-02	6.25E-02	5.44E-01	2.16E-06	1.95E-05	5.76E-06	6.09E-05	5.88E-08	5.99E-03	5.19E-07	0.00E+00	3.46E-05	3.12E-04	9.20E-05	9.74E-04	9.40E-07	9.57E-02	8.31E-06	0.00E+00
2009	Annual	Mon-Sun	2270003050	Other Material Handling Eq	D	9999	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	5.19E-03	1.88E-02	6.33E-01	2.80E-06	2.91E-05	8.13E-06	9.06E-05	6.82E-08	6.95E-03	7.34E-07	0.00E+00	1.49E-04	1.55E-03	4.33E-04	4.83E-03	3.64E-06	3.70E-01	3.91E-05	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	15	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	4.85E-02	8.64E-02	4.70E-02	1.54E-07	3.14E-06	5.34E-07	3.75E-06	8.01E-09	5.15E-04	4.82E-08	0.00E+00	1.78E-06	3.64E-05	6.18E-06	4.35E-05	9.28E-08	5.96E-03	5.58E-07	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	25	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	4.85E-02	8.64E-02	7.71E-02	3.64E-07	3.48E-06	1.04E-06	6.66E-06	1.07E-08	8.46E-04	9.35E-08	0.00E+00	4.21E-06	4.03E-05	1.20E-05	7.71E-05	1.24E-07	9.80E-03	1.08E-06	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	50	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	9.44E-01	3.16E+00	4.67E+00	5.96E-05	6.36E-04	2.58E-04	5.29E-04	6.43E-07	4.98E-02	2.33E-05	0.00E+00	1.89E-05	2.01E-04	8.18E-05	1.68E-04	2.04E-07	1.58E-02	7.38E-06	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	120	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	1.56E+00	5.22E+00	1.80E+01	2.32E-04	1.40E-03	4.16E-04	2.40E-03	2.30E-06	1.96E-01	3.76E-05	0.00E+00	4.43E-05	2.69E-04	7.97E-05	4.59E-04	4.40E-07	3.75E-02	7.19E-06	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	175	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	7.19E-01	2.41E+00	1.53E+01	1.08E-04	9.68E-04	2.37E-04	1.82E-03	1.88E-06	1.67E-01	2.14E-05	0.00E+00	4.49E-05	4.03E-04	9.84E-05	7.57E-04	7.81E-07	6.94E-02	8.88E-06	0.00E+00
2009	Annual	Mon-Sun	2270003030	Sweepers/Scrubbers	D	250	Industrial Equipment	U	N	NHI-NP	Imperial	SS	IMP	1.15E-01	3.85E-01	2.83E+00	9.81E-06	7.20E-05	2.69E-05	3.17E-04	3.51E-07	3.12E-02	2.42E-06	0.00E+00	2.55E-05	1.87E-04	6.98E-05	8.24E-04	9.11E-07	8.09E-02	6.30E-06	0.00E+00
2009	Annual	Mon-Sun	2266006020	Gas Compressors	C4	50	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.35E-01	3.14E+00	1.08E+01	5.66E-06	1.08E-03	6.12E-06	2.22E-04	0.00E+00	7.39E-02	5.13E-05	0.00E+00	1.80E-06	3.45E-04	1.95E-06	7.06E-05	0.00E+00	2.35E-02	1.63E-05	0.00E+00
2009	Annual	Mon-Sun	2266006020	Gas Compressors	C4	120	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	2.79E-01	6.50E+00	6.29E+01	3.22E-05	1.73E-02	3.34E-05	1.31E-03	0.00E+00	4.15E-01	2.80E-04	0.00E+00	4.95E-06	2.67E-03	5.13E-06	2.02E-04	0.00E+00	6.39E-02	4.30E-05	0.00E+00
2009	Annual	Mon-Sun	2266006020	Gas Compressors	C4	175	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	4.50E-02	1.05E+00	1.62E+01	8.60E-06	3.53E-03	9.30E-06	3.52E-04	0.00E+00	1.08E-01	7.80E-05	0.00E+00	8.21E-06	3.36E-03	8.88E-06	3.36E-04	0.00E+00	1.03E-01	7.44E-05	0.00E+00
2009	Annual	Mon-Sun	2266006020	Gas Compressors	C4	250	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	3.60E-02	8.39E-01	1.67E+01	9.90E-06	4.06E-03	7.16E-06	3.41E-04	0.00E+00	1.11E-01	6.00E-05	0.00E+00	1.18E-05	4.84E-03	8.54E-06	4.06E-04	0.00E+00	1.33E-01	7.16E-05	0.00E+00
2009	Annual	Mon-Sun	2266006020	Gas Compressors	C4	500	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	3.15E-02	7.34E-01	2.36E+01	1.39E-05	5.72E-03	1.01E-05	4.80E-04	0.00E+00	1.57E-01	8.45E-05	0.00E+00	1.90E-05	7.79E-03	1.37E-05	6.54E-04	0.00E+00	2.14E-01	1.15E-04	0.00E+00
2009	Annual	Mon-Sun	2266006005	Generator Sets	C4	120	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	8.69E-01	2.73E-01	1.72E+00	1.02E-06	3.60E-04	1.75E-06	1.15E-04	0.00E+00	1.15E-02	1.47E-05	0.00E+00	3.73E-06	1.32E-03	6.40E-06	4.22E-04	0.00E+00	4.20E-02	5.37E-05	0.00E+00
2009	Annual	Mon-Sun	2266006005	Generator Sets	C4	175	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	7.20E-01	2.27E-01	2.48E+00	1.49E-06	4.32E-04	2.04E-06	1.68E-04	0.00E+00	1.67E-02	1.71E-05	0.00E+00	6.57E-06	1.90E-03	8.99E-06	7.41E-04	0.00E+00	7.38E-02	7.54E-05	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	15	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	2.33E-01	5.19E-01	1.72E-01	1.65E-06	1.35E-05	3.87E-06	2.24E-05	2.91E-08	1.87E-03	3.49E-07	0.00E+00	3.18E-06	2.60E-05	7.46E-06	4.31E-05	5.61E-08	3.61E-03	6.73E-07	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	25	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	4.61E-01	1.03E+00	6.81E-01	5.27E-06	4.47E-05	1.74E-05	7.27E-05	9.41E-08	7.42E-03	1.57E-06	0.00E+00	5.12E-06	4.35E-05	1.70E-05	7.08E-05	9.16E-08	7.22E-03	1.53E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	50	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	4.19E+00	9.34E+00	9.75E+00	1.26E-04	1.32E-03	5.59E-04	1.12E-03	1.34E-06	1.04E-01	5.05E-05	0.00E+00	1.35E-05	1.42E-04	5.99E-05	1.20E-04	1.44E-07	1.11E-02	5.40E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	120	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	2.79E+01	6.22E+01	1.34E+02	1.73E-03	1.04E-02	3.26E-03	1.92E-02	1.71E-05	1.46E+00	2.94E-04	0.00E+00	2.77E-05	1.68E-04	5.24E-05	3.09E-04	2.75E-07	2.35E-02	4.73E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	175	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.06E+00	2.35E+00	9.52E+00	6.80E-05	6.01E-04	1.54E-04	1.23E-03	1.17E-06	1.04E-01	1.39E-05	0.00E+00	2.89E-05	2.55E-04	6.55E-05	5.22E-04	4.97E-07	4.42E-02	5.91E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	250	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.49E+00	3.31E+00	1.97E+01	8.10E-05	5.96E-04	2.13E-04	2.40E-03	2.44E-06	2.17E-01	1.92E-05	0.00E+00	2.44E-05	1.80E-04	6.43E-05	7.26E-04	7.38E-07	6.56E-02	5.80E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	500	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.94E+00	4.32E+00	4.54E+01	1.71E-04	1.59E-03	4.39E-04	4.96E-03	4.91E-06	5.00E-01	3.96E-05	0.00E+00	3.95E-05	3.67E-04	1.02E-04	1.15E-03	1.14E-06	1.16E-01	9.17E-06	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	750	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	7.25E-01	1.62E+00	2.63E+01	1.00E-04	9.18E-04	2.58E-04	2.94E-03	2.91E-06	2.89E-01	2.33E-05	0.00E+00	6.19E-05	5.68E-04	1.60E-04	1.82E-03	1.80E-06	1.79E-01	1.44E-05	0.00E+00
2009	Annual	Mon-Sun	2270006015	Air Compressors	D	1000	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.79E-02	3.99E-02	8.83E-01	3.73E-06	3.96E-05	1.08E-05	1.23E-04	9.75E-08	9.70E-03	9.74E-07	0.00E+00	9.34E-05	9.91E-04	2.71E-04	3.08E-03	2.44E-06	2.43E-01	2.44E-05	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	15	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	2.28E+01	2.10E+01	9.84E+00	7.61E-05	7.73E-04	1.89E-04	1.25E-03	1.67E-06	1.07E-01	1.70E-05	0.00E+00	3.62E-06	3.67E-05	8.97E-06	5.93E-05	7.93E-08	5.10E-03	8.09E-07	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	25	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.66E+01	1.54E+01	1.24E+01	8.59E-05	8.18E-04	2.41E-04	1.33E-03	1.72E-06	1.36E-01	2.18E-05	0.00E+00	5.58E-06	5.31E-05	1.57E-05	8.64E-05	1.12E-07	8.81E-03	1.42E-06	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	50	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	2.03E+01	1.88E+01	2.67E+01	2.75E-04	2.76E-03	1.09E-03	2.91E-03	3.72E-06	2.88E-01	9.84E-05	0.00E+00	1.46E-05	1.47E-04	5.80E-05	1.55E-04	1.98E-07	1.53E-02	5.23E-06	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	120	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	3.09E+01	2.86E+01	1.02E+02	1.05E-03	7.25E-03	2.08E-03	1.34E-02	1.30E-05	1.11E+00	1.87E-04	0.00E+00	3.66E-05	2.54E-04	7.27E-05	4.71E-04	4.57E-07	3.89E-02	6.56E-06	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	175	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.83E+00	1.69E+00	1.09E+01	6.23E-05	6.32E-04	1.47E-04	1.29E-03	1.35E-06	1.20E-01	1.32E-05	0.00E+00	3.69E-05	3.74E-04	8.69E-05	7.67E-04	7.98E-07	7.09E-02	7.84E-06	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	250	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.02E+00	9.44E-01	9.09E+00	3.07E-05	2.50E-04	8.09E-05	1.02E-03	1.13E-06	1.00E-01	7.30E-06	0.00E+00	3.26E-05	2.65E-04	8.58E-05	1.08E-03	1.19E-06	1.06E-01	7.74E-06	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	500	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	2.27E+00	2.10E+00	3.20E+01	1.01E-04	9.98E-04	2.56E-04	3.27E-03	3.47E-06	3.53E-01	2.31E-05	0.00E+00	4.82E-05	4.76E-04	1.22E-04	1.56E-03	1.65E-06	1.68E-01	1.10E-05	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	750	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.41E+00	1.30E+00	3.21E+01	1.03E-04	1.00E-03	2.65E-04	3.37E-03	3.56E-06	3.54E-01	2.39E-05	0.00E+00	7.88E-05	7.68E-04	2.03E-04	2.58E-03	2.73E-06	2.72E-01	1.83E-05	0.00E+00
2009	Annual	Mon-Sun	2270006005	Generator Sets	D	9999	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	3.67E-01	3.39E-01	1.62E+01	6.35E-05	6.48E-04	1.79E-04	2.11E-03	1.79E-06	1.78E-01	1.62E-05	0.00E+00	1.87E-04	1.91E-03	5.29E-04	6.22E-03	5.27E-06	5.24E-01	4.77E-05	0.00E+00
2009	Annual	Mon-Sun	2270006030	Pressure Washers	D	15	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.06E+00	4.19E-01	9.39E-02	7.26E-07	7.38E-06	1.80E-06	1.19E-05	1.59E-08	1.02E-03	1.62E-07	0.00E+00	1.73E-06	1.76E-05	4.30E-06	2.84E-05	3.80E-08	2.44E-03	3.88E-07	0.00E+00
2009	Annual	Mon-Sun	2270006030	Pressure Washers	D	25	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	2.46E-01	9.76E-02	3.19E-02	2.21E-07	2.10E-06	6.21E-07	3.42E-06	4.42E-09	3.49E-04	5.60E-08	0.00E+00	2.26E-06	2.15E-05	6.36E-06	3.50E-05	4.53E-08	3.57E-03	5.74E-07	0.00E+00
2009	Annual	Mon-Sun	2270006030	Pressure Washers	D	50	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	4.88E-01	1.94E-01	1.28E-01	1.15E-06	1.12E-05	4.19E-06	1.36E-05	1.79E-08	1.38E-03	3.78E-07	0.00E+00	5.95E-06	5.81E-05	2.16E-05	7.01E-05	9.23E-08	7.14E-03	1.95E-06	0.00E+00
2009	Annual	Mon-Sun	2270006030	Pressure Washers	D	120	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	2.01E-01	7.99E-02	8.80E-02	7.92E-07	5.97E-06	1.62E-06	1.11E-05	1.13E-08	9.61E-04	1.47E-07	0.00E+00	9.92E-06	7.48E-05	2.03E-05	1.39E-04	1.41E-07	1.20E-02	1.83E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	15	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.71E+01	1.88E+01	6.42E+00	6.17E-05	5.04E-04	1.45E-04	8.35E-04	1.09E-06	6.99E-02	1.30E-05	0.00E+00	3.27E-06	2.67E-05	7.67E-06	4.43E-05	5.77E-08	3.71E-03	6.92E-07	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	25	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	5.11E+00	5.63E+00	5.03E+00	3.89E-05	3.30E-04	1.29E-04	5.38E-04	6.95E-07	5.48E-02	1.16E-05	0.00E+00	6.91E-06	5.87E-05	2.29E-05	9.55E-05	1.24E-07	9.73E-03	2.06E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	50	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	8.90E+00	9.81E+00	1.57E+01	1.68E-04	1.70E-03	6.81E-04	1.72E-03	2.18E-06	1.68E-01	6.15E-05	0.00E+00	1.71E-05	1.73E-04	6.94E-05	1.76E-04	2.22E-07	1.72E-02	6.26E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	120	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.74E+01	1.92E+01	6.87E+01	7.33E-04	4.96E-03	1.44E-03	9.19E-03	8.79E-06	7.49E-01	1.30E-04	0.00E+00	3.81E-05	2.58E-04	7.50E-05	4.78E-04	4.57E-07	3.89E-02	6.77E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	175	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.89E+00	2.08E+00	1.33E+01	7.90E-05	7.81E-04	1.85E-04	1.60E-03	1.64E-06	1.46E-01	1.67E-05	0.00E+00	3.79E-05	3.75E-04	8.86E-05	7.68E-04	7.88E-07	7.00E-02	8.00E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	250	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.36E+00	1.50E+00	1.37E+01	4.82E-05	3.83E-04	1.26E-04	1.55E-03	1.70E-06	1.51E-01	1.14E-05	0.00E+00	3.21E-05	2.55E-04	8.43E-05	1.04E-03	1.13E-06	1.01E-01	7.60E-06	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	500	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	2.68E-02	2.96E-02	4.63E-01	1.51E-06	1.50E-05	3.84E-06	4.79E-05	5.01E-08	5.11E-03	3.46E-07	0.00E+00	5.11E-05	5.07E-04	1.30E-04	1.62E-03	1.69E-06	1.72E-01	1.17E-05	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	750	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	4.47E-03	4.93E-03	1.28E-01	4.22E-07	4.13E-06	1.09E-06	1.35E-05	1.41E-08	1.41E-03	9.81E-08	0.00E+00	8.56E-05	8.38E-04	2.20E-04	2.74E-03	2.87E-06	2.85E-01	1.99E-05	0.00E+00
2009	Annual	Mon-Sun	2270006010	Pumps	D	9999	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	9.84E-02	1.09E-01	6.68E+00	2.66E-05	2.77E-04	7.55E-05	8.81E-04	7.39E-07	7.35E-02	6.81E-06	0.00E+00	2.45E-04	2.55E-03	6.95E-04	8.12E-03	6.81E-06	6.77E-01	6.27E-05	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	15	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	7.73E+00	1.36E+01	3.87E+00	3.72E-05	3.04E-04	8.72E-05	5.03E-04	6.56E-07	4.22E-02	7.87E-06	0.00E+00	2.73E-06	2.23E-05	6.41E-06	3.70E-05	4.83E-08	3.10E-03	5.79E-07	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	25	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	6.80E+00	1.20E+01	6.19E+00	4.79E-05	4.07E-04	1.58E-04	6.62E-04	8.56E-07	6.75E-02	1.43E-05	0.00E+00	4.00E-06	3.40E-05	1.32E-05	5.53E-05	7.15E-08	5.64E-03	1.19E-06	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	50	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	2.09E+01	3.68E+01	4.47E+01	5.42E-04	5.61E-03	2.33E-03	5.06E-03	6.17E-06	4.78E-01	2.11E-04	0.00E+00	1.47E-05	1.52E-04	6.34E-05	1.37E-04	1.68E-07	1.30E-02	5.72E-06	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	120	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	1.63E+01	2.86E+01	5.18E+01	6.24E-04	3.93E-03	1.20E-03	7.25E-03	6.62E-06	5.64E-01	1.08E-04	0.00E+00	2.18E-05	1.37E-04	4.18E-05	2.54E-04	2.31E-07	1.97E-02	3.77E-06	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	175	Light Commercial Equipment	U	P	NHI-P	Imperial	SS	IMP	8.05E-02	1.42E-01	6.35E-01	4.25E-06	3.91E-05	9.74E-06	8.00E-05	7.82E-08	6.95E-03	8.79E-07	0.00E+00	3.00E-05	2.76E-04	6.87E-05	5.64E-04	5.52E-07	4.91E-02	6.20E-06	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	250	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	1.79E-02	3.15E-02	1.70E-01	6.66E-07	5.02E-06	1.74E-06	2.02E-05	2.11E-08	1.87E-03	1.57E-07	0.00E+00	2.11E-05	1.59E-04	5.54E-05	6.42E-04	6.69E-07	5.95E-02	5.00E-06	0.00E+00
2009	Annual	Mon-Sun	2270006025	Welders	D	500	Light Commercial Equipment	U	N	NHI-P	Imperial	SS	IMP	4.47E-02	7.87E-02	5.98E-01	2.15E-06	2.06E-05	5.48E-06	6.41E-05	6.47E-08	6.59E-03	4.95E-07	0.00E+00	2.73E-05	2.61E-04	6.97E-05	8.14E-04	8.22E-07	8.37E-02	6.29E-06	0.00E+00

Reference source 1: Table C.5, California Climate Action Registry General Reporting Protocol Version 3

Table C.5: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type

Vehicle Types/Model Years	CH_4 (g/mile)	N_2O (g/mile)
Passenger Cars - Gasoline		
Model Year 1966-1972	0.22	0.02
Model Year 1973-1974	0.19	0.02
Model Year 1975-1979	0.11	0.05
Model Year 1980-1983	0.07	0.08
Model Year 1984-1991	0.06	0.08
Model Year 1992	0.06	0.07
Model Year 1993	0.05	0.05
Model Year 1994-1999	0.05	0.04
Model Year 2000– present	0.04	0.04
Passenger Cars - Alternative Fuels and Diesel		
CNG Model Year 2000– present	0.04	0.04
LPG Model Year 2000– present	0.04	0.04
E85 Model Year 2000– present	0.04	0.04
Diesel all model years	0.01	0.02
Light Duty Truck (<5750 GVWR*) - Gasoline		
Model Year 1966-1972	0.22	0.02
Model Year 1973-1974	0.23	0.02
Model Year 1975-1979	0.14	0.07
Model Year 1980-1983	0.12	0.13
Model Year 1984-1991	0.11	0.14
Model Year 1992	0.09	0.11
Model Year 1993	0.07	0.08
Model Year 1994-1999	0.06	0.06
Model Year 2000– present	0.05	0.06

Table C.5: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (continued)

Vehicle Types/Model Years	CH_4 (g/mile)	N_2O (g/mile)
Light Duty Truck - Alternative Fuels and Diesel		
CNG Model Year 2000– present	0.05	0.06
LPG Model Year 2000– present	0.05	0.06
E85 Model Year 2000– present	0.05	0.06
Diesel all model years	0.01	0.03
Heavy-Duty Vehicle (>5751 GVWR) - Gasoline		
Model Year 1981 and older	0.43	0.04
Model Year 1982-1984	0.42	0.05
Model Year 1985-1986	0.20	0.05
Model Year 1987	0.18	0.09
Model Year 1988-1989	0.17	0.09
Model Year 1990-present	0.12	0.20
Heavy Duty Trucks - Diesel and Alternative Fuels		
Model Year 1966-1982	0.10	0.05
Model Year 1983-1995	0.08	0.05
Model Year 1996 to present	0.06	0.05
CNG, LNG	3.48	0.05
FTD, Biodiesel	0.06	0.05
Motorcycles		
Model Year 1966-1995	0.42	0.01
Model Year 1996-present	0.09	0.01
Off-Road Vehicles/Construction Equipment by Fuel Type		
	CH_4 (kg/gallon)	N_2O (kg/gallon)
Butane	9.1×10^{-5}	4.1×10^{-4}
Distillate Fuel	.0014	.0001
Liquefied Petroleum Gas (LPG)	.0010	.0001
Motor Gasoline	.0013	.0001
Propane	9.1×10^{-5}	4.1×10^{-4}

Title : solar two 2010
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/04/29 13:46:11
Scen Year: 2010 -- All model years in the range 1970 to 2010 selected
Season : Annual
Area : Imperial County APCD

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Year: 2010 -- Model Years 1970 to 2010 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

District Average District Average Imperial County APCD

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Reactive Org Gases Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.704	26.243	3.173	19.298	25.704	26.011	3.173	15.866	25.704	25.876	3.173	7.593	0	0	13.188	13.06	25.704	25.791	3.173	10.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.968	0.549	11.455	2.423
5	20.47	1.396	0.495	1.483	18.501	1.192	0.232	1.368	18.566	0.76	0.459	0.862	25.673	0.516	0.204	0.573	21.391	0.628	0.403	0.603	21.391	2.266	0.531	1.575	32.137	4.601	0.609	1.634	89.342	13.385	10.319	10.365	32.137	5.477	0.63	2.563	33.927	10.829	0.091	9.941	0	0	0	0	0	0	0	0	0	0	0	0	20.352	1.149	8.759	2.553
10	14.549	0.911	0.393	0.973	13.146	0.804	0.182	0.933	13.193	0.503	0.36	0.576	18.254	0.334	0.16	0.375	13.982	0.409	0.317	0.409	13.982	1.475	0.417	1.057	21.023	2.994	0.478	1.13	58.506	8.738	5.78	5.819	21.023	3.565	0.494	1.725	22.196	7.085	0.066	6.504	0	0	0	0	0	0	0	0	0	0	0	0	14.371	0.755	4.922	1.54
15	10.817	0.626	0.312	0.672	9.772	0.569	0.146	0.667	9.807	0.35	0.289	0.405	13.578	0.227	0.128	0.258	9.519	0.278	0.254	0.289	9.519	1	0.335	0.74	14.327	2.027	0.383	0.814	39.929	5.94	2.79	2.828	14.327	2.414	0.397	1.21	15.129	4.83	0.05	4.435	0	0	0	0	0	0	0	0	0	0	0	0	10.617	0.521	2.395	0.895
20	8.414	0.452	0.256	0.488	7.599	0.421	0.12	0.499	7.626	0.256	0.237	0.299	10.567	0.163	0.105	0.187	6.749	0.196	0.209	0.213	6.749	0.706	0.274	0.539	10.172	1.428	0.315	0.61	28.398	4.205	1.483	1.515	10.172	1.7	0.325	0.883	10.742	3.434	0.039	3.153	0	0	0	0	0	0	0	0	0	0	0	0	8.207	0.378	1.287	0.575
25	6.848	0.343	0.214	0.373	6.183	0.327	0.101	0.391	6.205	0.197	0.199	0.232	8.605	0.124	0.088	0.143	4.983	0.144	0.175	0.163	4.983	0.518	0.23	0.409	7.524	1.046	0.264	0.474	21.049	3.1	1.201	1.224	7.524	1.246	0.273	0.67	7.947	2.546	0.031	2.338	0	0	0	0	0	0	0	0	0	0	0	0	6.641	0.289	1.043	0.451
30	5.833	0.275	0.184	0.301	5.266	0.266	0.086	0.322	5.285	0.158	0.17	0.188	7.334	0.099	0.076	0.116	3.833	0.111	0.15	0.13	3.833	0.397	0.197	0.322	5.798	0.798	0.226	0.383	16.26	2.381	0.977	0.994	5.798	0.951	0.234	0.529	6.125	1.967	0.026	1.806	0	0	0	0	0	0	0	0	0	0	0	0	5.625	0.232	0.85	0.365
35	5.202	0.232	0.161	0.255	4.696	0.227	0.076	0.277	4.712	0.134	0.149	0.161	6.543	0.083	0.066	0.098	3.073	0.088	0.131	0.107	3.073	0.316	0.173	0.264	4.656	0.634	0.198	0.319	13.092	1.907	0.81	0.824	4.656	0.757	0.205	0.434	4.92	1.584	0.022	1.455	0	0	0	0	0	0	0	0	0	0	0	0	4.99	0.196	0.706	0.308
40	4.859	0.207	0.144	0.228	4.385	0.203	0.068	0.251	4.4	0.119	0.134	0.144	6.112	0.074	0.059	0.088	2.568	0.074	0.118	0.092	2.568	0.263	0.155	0.225	3.899	0.526	0.178	0.276	10.988	1.592	0.702	0.713	3.899	0.628	0.184	0.369	4.12	1.33	0.02	1.221	0	0	0	0	0	0	0	0	0	0	0	0	4.637	0.174	0.612	0.272
45	4.752	0.194	0.132	0.215	4.289	0.191	0.062	0.237	4.304	0.112	0.123	0.136	5.979	0.069	0.054	0.082	2.238	0.064	0.108	0.082	2.238	0.229	0.142	0.198	3.404	0.456	0.163	0.246	9.615	1.388	0.651	0.66	3.404	0.544	0.168	0.326	3.598	1.164	0.019	1.069	0	0	0	0	0	0	0	0	0	0	0	0	4.515	0.162	0.568	0.254
50	4.869	0.192	0.124	0.214	4.394	0.188	0.058	0.236	4.409	0.11	0.115	0.135	6.125	0.068	0.051	0.082	2.036	0.058	0.101	0.075	2.036	0.207	0.133	0.182	3.1	0.413	0.152	0.227	8.772	1.262	0.658	0.666	3.1	0.493	0.157	0.299	3.278	1.062	0.018	0.975	0	0	0	0	0	0	0	0	0	0	0	0	4.605	0.16	0.573	0.254

Pollutant Name: Carbon Monoxide Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150.122	152.045	26.3	114.193	150.122	151.217	26.3	95.729	150.122	150.736	26.3	50.527	0	0	49.119	48.644	150.122	150.435	26.3	68.982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.655	3.186	44.288	10.254
5	238.175	11.019	2.993	12.056	195.213	16.499	2.282	18.115	196.165	9.798	2.824	10.861	381.174	5.96	2.163	6.818	413.934	6.031	2.932	5.926	413.934	21.652	3.168	15.078	620.902	52.025	7.663	21.425	2379.877	158.347	16.757	18.617	620.902	62.975	8.103	32.555	642.028	33.004	4.156	30.67	0	0	0	0	0	0	0	0	0	0	0	0	245.873	11.418	14.868	13.214
10	173.598	9.622	2.064	10.368	142.284	13.802	1.574	14.87	142.978	8.428	1.947	9.191	277.825	5.231	1.491	5.851	275.395	4.012	2.022	3.964	275.395	14.405	2.185	10.065	413.093	34.613	5.284	14.404	1583.359	105.35	12.353	13.579	413.093	41.898	5.587	21.788	427.149	21.958	2.616	20.393	0	0	0	0	0	0	0	0	0	0	0	0	176.925	9.716	10.924	10.782
15	133.25	8.536	1.489	9.101	109.214	11.847	1.135	12.588	109.747	7.388	1.405	7.966	213.252	4.656	1.076	5.129	193.583	2.82	1.459	2.798	193.583	10.126	1.576	7.093	290.375	24.33	3.813	10.204	1112.989	74.053	9.011	9.87	290.375	29.451	4.032	15.384	300.255	15.435	1.748	14.327	0	0	0	0	0	0	0	0	0	0	0	0	134.259	8.461	7.965	9.021
20	107.712	7.669	1.125	8.121	88.283	10.39	0.858	10.937	88.713	6.579	1.061	7.04	172.382	4.192	0.813	4.572	143.769	2.095	1.102	2.083	143.769	7.52	1.191	5.277	215.653	18.07	2.88	7.617	826.586	54.997	6.858	7.494	215.653	21.873	3.045	11.458	222.991	11.463	1.24	10.636	0	0	0	0	0	0	0	0	0	0	0	0	107.424	7.503	6.059	7.768
25	91.693	6.964	0.889	7.346	75.153	9.286	0.678	9.723	75.52	5.937	0.839	6.327	146.745	3.81	0.642	4.132	112.81	1.644	0.871	1.637	112.81	5.901	0.941	4.144	169.215	14.179	2.276	5.99	648.592	43.154	5.819	6.314	169.215	17.163	2.407	9.002	174.973	8.995	0.935	8.342	0	0	0	0	0	0	0	0	0	0	0	0	90.617	6.754	5.125	6.905
30	82.202	6.384	0.735	6.725	67.374	8.444	0.561	8.826	67.703	5.423	0.694	5.772	131.556	3.494	0.531	3.782	93.523	1.363	0.72	1.356	93.523	4.892	0.778	3.434	140.285	11.754	1.883	4.962	537.702	35.776	4.941	5.35	140.285	14.228	1.991	7.46	145.058	7.457	0.748	6.914	0	0	0	0	0	0	0	0	0	0	0	0	80.577	6.161	4.346	6.231
35	77.608	5.905	0.637	6.228	63.609	7.808	0.485	8.176	63.919	5.012	0.601	5.342	124.203	3.23	0.46	3.503	81.917	1.193	0.624	1.186	81.917	4.285	0.674	3.005	122.876	10.296	1.63	4.331	470.975	31.337	4.223	4.582	122.876	12.463	1.723	6.521	127.057	6.531	0.635	6.054	0	0	0	0	0	0	0	0	0	0	0	0	75.52	5.69	3.717	5.71
40	77.162	5.514	0.577	5.837	63.243	7.345	0.44	7.735	63.551	4.688	0.544	5.018	123.489	3.012	0.417	3.284	75.808	1.104	0.565	1.094	75.808	3.965	0.61	2.775	113.712	9.528	1.476	3.983	435.853	29	3.666	4.001	113.712	11.533	1.561	6.013	117.582	6.044	0.573	5.601	0	0	0	0	0	0	0	0	0	0	0	0	74.596	5.322	3.233	5.319
45	80.793	5.201	0.547	5.543	66.219	7.041	0.417	7.486	66.542	4.443	0.516	4.792	129.3	2.835	0.395	3.121	74.122	1.08	0.536	1.064	74.122	3.877	0.579	2.705	111.183	9.316	1.4	3.859	426.156	28.355	3.27	3.6	111.183	11.277	1.48	5.849	114.966	5.91	0.549	5.476	0	0	0	0	0	0	0	0	0	0	0	0	77.651	5.046	2.892	5.049
50	89.088	4.967	0.543	5.348	73.018	6.896	0.414	7.437	73.374	4.274	0.512	4.665	142.575	2.698	0.392	3.015	76.57	1.116	0.532	1.093	76.57	4.005	0.574	2.784	114.855	9.624	1.389	3.94	440.233	29.291	3.034	3.379	114.855	11.649	1.469	6.002	118.763	6.105	0.558	5.656	0	0	0	0	0	0	0	0	0	0	0	0	85.175	4.86	2.692	4.9

Pollutant Name: Oxides of Nitrogen Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.694	1.73	75.051	23.799	1.694	1.714	75.051	34.288	1.694	1.705	75.051	60.768	0	0	108.534	107.484	1.694	1.699	75.051	49.829	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.064	0.036	99.759	17.153
5	3.623	1.1	2.176	1.113	3.44	1.306	2.21	1.376	3.491	1.156	2.215	1.173	6.227	0.795	2.232	0.811	2.065	0.333	6.764	2.272	2.065	0.95	7.722	3.962	3.097	2.895	13.746	11.635	18.462	7.541	39.895	39.584	3.097	3.018	14.124	10.306	3.273	1.741	1.573	1.727	0	0	0	0	0	0	0	0	0	0	0	0	3.702	1.118	34.928	6.935
10	3.81	0.956	1.806	0.971	3.618	1.113	1.833	1.179	3.67	0.991	1.838	1.009	6.548	0.683	1.852	0.7	2.169	0.35	5.612	1.937	2.169	0.998	6.406	3.405	3.254	3.041	11.404	9.778	19.398	7.924	27.548	27.361	3.254	3.171	11.718	8.78	3.439	1.829	1.203	1.777	0	0	0	0	0	0	0	0	0	0	0	0	3.892	0.97	24.307	4.991
15	4.001	0.848	1.552	0.863	3.799	0.973	1.576	1.038	3.854	0.869	1.58	0.888	6.876	0.6	1.592	0.618	2.274	0.367	4.824	1.712	2.274	1.046	5.507	3.033	3.411	3.188	9.803	8.517	20.334	8.306	19.946	19.836	3.411	3.324	10.073	7.753	3.605	1.917	0.968	1.839	0	0	0	0	0	0	0	0	0	0	0	0	4.086	0.861	17.751	3.776
20	4.195	0.766	1.383	0.783	3.984	0.874	1.404	0.938	4.042	0.78	1.407	0.8	7.21	0.539	1.418	0.557	2.379	0.384	4.297	1.566	2.379	1.094	4.905	2.792	3.568	3.335	8.732	7.683	21.27	8.688	17.045	16.967	3.568	3.477	8.972	7.084	3.771	2.006	0.818	1.907	0	0	0	0	0	0	0	0	0	0	0	0	4.285	0.78	15.204	3.274
25	4.393	0.705	1.276	0.723	4.172	0.803	1.296	0.869	4.233	0.715	1.299	0.737	7.551	0.494	1.309	0.513	2.483	0.401	3.966	1.478	2.483	1.142	4.527	2.651	3.725	3.482	8.059	7.169	22.206	9.07	16.28	16.213	3.725	3.63	8.281	6.682	3.937	2.094	0.727	1.981	0	0	0	0	0	0	0	0	0	0	0	0	4.486	0.721	14.494	3.105
30	4.595	0.66	1.22	0.68	4.363	0.755	1.239	0.824	4.427	0.669	1.242	0.692	7.897	0.462	1.251	0.481	2.588	0.418	3.792	1.438	2.588	1.19	4.329	2.59	3.882	3.628	7.706	6.914	23.142	9.453	15.672	15.614	3.882	3.782	7.918	6.497	4.103	2.182	0.679	2.058	0	0	0	0	0	0	0	0	0	0	0	0	4.691	0.68	13.947	2.978
35	4.799	0.63	1.209	0.65	4.557	0.726	1.227	0.799	4.623	0.639	1.23	0.664	8.248	0.44	1.24	0.461	2.693	0.434	3.757	1.439	2.693	1.239	4.289	2.599	4.039	3.775	7.635	6.886	24.078	9.835	15.221	15.172	4.039	3.935	7.845	6.502	4.269	2.27	0.667	2.138	0	0	0	0	0	0	0	0	0	0	0	0	4.898	0.653	13.561	2.891
40	5.005	0.611	1.241	0.633	4.753	0.713	1.26	0.791	4.822	0.623	1.263	0.649	8.602	0.428	1.273	0.449	2.797	0.451	3.857	1.481	2.797	1.287	4.403	2.677	4.196	3.922	7.838	7.078	25.013	10.217	14.929	14.887	4.196	4.088	8.054	6.691	4.435	2.359	0.689	2.22	0	0	0	0	0	0	0	0	0	0	0	0	5.108	0.639	13.335	2.841
45	5.213	0.604	1.32	0.626	4.95	0.715	1.34	0.799	5.023	0.619	1.344	0.647	8.96	0.424	1.354	0.447	2.902	0.468	4.103	1.567	2.902	1.335	4.683	2.829	4.353	4.069	8.337	7.509	25.949	10.6	14.794	14.757	4.353	4.241	8.567	7.081	4.601	2.447	0.748	2.306	0	0	0	0	0	0	0	0	0	0	0	0	5.319	0.636	13.271	2.829
50	5.423	0.607	1.455	0.631	5.149	0.732	1.477	0.824	5.225	0.629	1.481	0.658	9.32	0.429	1.492	0.453	3.007	0.485	4.522	1.705	3.007	1.383	5.162	3.068	4.51	4.215	9.189	8.223	26.885	10.982	14.818	14.784	4.51	4.394	9.442	7.707	4.767	2.535	0.853	2.396	0	0	0	0	0	0	0	0	0	0	0	0	5.531	0.645	13.374	2.855

Pollutant Name: Carbon Dioxide Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.049	0.049	0.039	0.046	0.049	0.049	0.039	0.045	0.049	0.049	0.039	0.041	0	0	0.063	0.063	0.049	0.049	0.039	0.042	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.002	0.001	0.058	0.011
5	0.018	0.011	0.003	0.011	0.017	0.014	0.003	0.013	0.017	0.014	0.003	0.014	0.023	0.019	0.003	0.019	0.031	0.024	0.005	0.018	0.031	0.025	0.005	0.016	0.034	0.025	0.014	0.017	0.063	0.027	0.037	0.037	0.034	0.025	0.014	0.018	0.035	0.025	0.021	0.025	0	0	0	0	0	0	0	0	0	0	0	0	0.018	0.013	0.032	0.017
10	0.013	0.008	0.003	0.008	0.012	0.01	0.003	0.01	0.012	0.01	0.003	0.01	0.017	0.014	0.003	0.014	0.021	0.016	0.005	0.013	0.021	0.016	0.005	0.011	0.023	0.017	0.014	0.015	0.042	0.018	0.03	0.03	0.023	0.017	0.014	0.015	0.023	0.017	0.021	0.017	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.01	0.027	0.013
15	0.01	0.007	0.003	0.007	0.01	0.008	0.003	0.008	0.01	0.008	0.003	0.008	0.013	0.011	0.003	0.011	0.018	0.014	0.005	0.009	0.018	0.013	0.005	0.009	0.016	0.012	0.014	0.014	0.029	0.013	0.025	0.025	0.016	0.012	0.014	0.01	0.018	0.012	0.021	0.012	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.008	0.022	0.01
20	0.008	0.005	0.003	0.005	0.008	0.006	0.003	0.006	0.008	0.006	0.003	0.006	0.011	0.009	0.003	0.009	0.011	0.008	0.005	0.007	0.011	0.009	0.005	0.007	0.012	0.009	0.014	0.013	0.022	0.009	0.021	0.021	0.012	0.009	0.014	0.012	0.012	0.009	0.021	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.006	0.019	0.008
25	0.007	0.005	0.003	0.005	0.007	0.005	0.003	0.005	0.007	0.005	0.003	0.005	0.009	0.007	0.003	0.007	0.008	0.007	0.005	0.006	0.008	0.007	0.005	0.006	0.009	0.007	0.014	0.013	0.017	0.007	0.02	0.019	0.009	0.007	0.014	0.012	0.009	0.007	0.021	0.008	0	0	0	0	0	0	0	0	0	0	0	0	0.007	0.005	0.018	0.007
30	0.006	0.004	0.003	0.004	0.006	0.005	0.003	0.005	0.006	0.005	0.003	0.005	0.008	0.007	0.003	0.007	0.007	0.005	0.005	0.005	0.007	0.006	0.005	0.005	0.008	0.006	0.014	0.013	0.014	0.006	0.018	0.018	0.008	0.006	0.014	0.011	0.008	0.006	0.021	0.007	0	0	0	0	0	0	0	0	0	0	0	0	0.006	0.005	0.017	0.007
35	0.006	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.006	0.003	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.007	0.005	0.014	0.013	0.012	0.005	0.017	0.017	0.007	0.005	0.014	0.011	0.007	0.005	0.021	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0.006	0.004	0.016	0.006
40	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.006	0.003	0.006	0.006	0.004	0.005	0.005	0.006	0.004	0.005	0.005	0.006	0.005	0.014	0.012	0.011	0.005	0.017	0.017	0.006	0.005	0.014	0.011	0.006	0.005	0.021	0.006	0	0	0	0	0	0	0	0	0	0	0	0	0.005	0.004	0.015	0.006
45	0.005	0.003	0.003	0.003	0.005	0.004	0.003	0.004	0.005	0.004	0.003	0.004	0.007	0.006	0.003	0.006	0.006	0.004	0.005	0.005	0.006	0.004	0.005	0.005	0.006	0.004	0.014	0.012

Pollutant Name: PM10 - Break Wear Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
10	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
15	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
20	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
25	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
30	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
35	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
40	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
45	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015
50	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0	0	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.026	0.015

Pollutant Name: Gasoline - mi/gal Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4.803	7.54	0	7.527	5.119	6.203	0	6.188	5.114	6.174	0	6.167	3.736	4.522	0	4.52	2.742	3.509	0	3.507	2.742	3.468	0	3.463	2.468	3.395	0	3.352	1.356	3.159	0	3.118	2.468	3.369	0	3.343	2.441	3.409	0	3.408	0	0	0	0	0	0	0	0	0	0	0	0	0	4.827	6.589	0	6.578
10	6.47	10.126	0	10.109	6.861	8.32	0	8.3	6.855	8.292	0	8.284	5.021	6.082	0	6.079	4.123	5.275	0	5.271	4.123	5.213	0	5.205	3.711	5.104	0	5.039	2.039	4.75	0	4.688	3.711	5.065	0	5.025	3.671	5.124	0	5.124	0	0	0	0	0	0	0	0	0	0	0	0	0	6.499	8.862	0	8.847
15	8.299	12.994	0	12.972	8.795	10.671	0	10.645	8.787	10.645	0	10.635	6.447	7.815	0	7.812	5.868	7.504	0	7.499	5.868	7.417	0	7.406	5.283	7.262	0	7.17	2.905	6.76	0	6.672	5.283	7.207	0	7.151	5.227	7.293	0	7.292	0	0	0	0	0	0	0	0	0	0	0	0	0	8.356	11.389	0	11.371
20	10.201	15.98	0	15.954	10.819	13.122	0	13.092	10.809	13.099	0	13.085	7.935	9.622	0	9.618	7.908	10.105	0	10.098	7.908	9.989	0	9.973	7.122	9.78	0	9.657	3.918	9.108	0	8.989	7.122	9.706	0	9.631	7.046	9.825	0	9.824	0	0	0	0	0	0	0	0	0	0	0	0	0	10.302	14.03	0	14.006
25	12.032	18.87	0	18.838	12.781	15.499	0	15.462	12.769	15.474	0	15.459	9.369	11.372	0	11.368	10.089	12.878	0	12.87	10.089	12.732	0	12.712	9.089	12.467	0	12.311	5.004	11.616	0	11.465	9.089	12.374	0	12.278	8.993	12.529	0	12.529	0	0	0	0	0	0	0	0	0	0	0	0	0	12.192	16.591	0	16.564
30	13.627	21.421	0	21.384	14.506	17.6	0	17.558	14.492	17.572	0	17.554	10.616	12.916	0	12.91	12.185	15.535	0	15.525	12.185	15.36	0	15.336	10.982	15.043	0	14.855	6.051	14.024	0	13.842	10.982	14.932	0	14.817	10.867	15.124	0	15.124	0	0	0	0	0	0	0	0	0	0	0	0	0	13.855	18.857	0	18.826
35	14.823	23.399	0	23.359	15.818	19.232	0	19.186	15.802	19.198	0	19.178	11.544	14.109	0	14.103	13.93	17.737	0	17.726	13.93	17.539	0	17.512	12.56	17.181	0	16.967	6.928	16.026	0	15.818	12.56	17.054	0	16.924	12.43	17.282	0	17.282	0	0	0	0	0	0	0	0	0	0	0	0	0	15.118	20.618	0	20.584
40	15.487	24.623	0	24.58	16.57	20.244	0	20.195	16.554	20.201	0	20.18	12.046	14.841	0	14.834	15.074	19.167	0	19.155	15.074	18.956	0	18.927	13.599	18.572	0	18.342	7.508	17.336	0	17.111	13.599	18.437	0	18.296	13.459	18.692	0	18.691	0	0	0	0	0	0	0	0	0	0	0	0	0	15.839	21.708	0	21.672
45	15.541	24.99	0	24.946	16.673	20.549	0	20.496	16.655	20.497	0	20.474	12.058	15.051	0	15.044	15.44	19.604	0	19.592	15.44	19.391	0	19.362	13.936	19.002	0	18.768	7.703	17.749	0	17.52	13.936	18.866	0	18.722	13.794	19.135	0	19.134	0	0	0	0	0	0	0	0	0	0	0	0	0	15.93	22.033	0	21.995
50	14.973	24.497	0	24.453	16.108	20.14	0	20.085	16.09	20.082	0	20.059	11.573	14.738	0	14.731	14.969	18.979	0	18.967	14.969	18.775	0	18.747	13.518	18.402	0	18.176	7.48	17.2	0	16.978	13.518	18.271	0	18.133	13.381	18.54	0	18.54	0	0	0	0	0	0	0	0	0	0	0	0	0	15.374	21.589	0	21.55

Pollutant Name: Diesel - mi/gal Temperature: 90F Relative Humidity: 10%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	2.621	2.621	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.845	4.845	0	0
10	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	3.184	3.184	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.319	5.319	0	0
15	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	3.883	3.883	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.907	5.907	0	0
20	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	4.617	4.617	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.525	6.525	0	0
25	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	4.935	4.935	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.792	6.792	0	0
30	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	5.238	5.238	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.048	7.048	0	0
35	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	5.515	5.515	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.28	7.28	0	0
40	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	5.749	5.749	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.477	7.477	0	0
45	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	5.926	5.926	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.626	7.626	0	0
50	0	0	27.975	27.975	0	0	29.001	29.001	0	0	28.12	28.12	0	0	29.034	29.034	0	0	19.355	19.355	0	0	18.908	18.908	0	0	6.698	6.698	0	0	6.033	6.033	0	0	6.698	6.698	0	0	4.489	4.489	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.717	7.717	0	0

For on-site activity (mean vehicle speed = 10 mph, Temperature: 90F, Relative Humidity: 10%

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	
LDA-ALL	0.0580	0.0418	10.3680	0.9730	0.9710	0.0080	857.0070	0.05	0.06	Assumptions for CH_4 and N_2O from Reference sources TAB
LHD1-DSL	0.1090	0.0859	2.0220	0.3170	5.6120	0.0050	520.7810	0.01	0.03	Passenger Cars - Gasoline - Model Year 2000 - Present
HHD-DSL	1.6970	1.5234	12.3530	5.7800	27.5480	0.0300	3165.4460	0.06	0.05	Light Duty Truck - Diesel all model years
OBUS-CAT	0.0660	0.0463	41.8980	3.5650	3.1710	0.0170	1672.2670	0.12	0.20	Heavy Duty Trucks - Diesel and Alternative Fuels - Model Year 1996 - Present
										Other Bus - Gasoline (with catalyst) - Model Year 1996 - Present

For off-site activity (mean vehicle speed = 50 mph, Temperature: 90F, Relative Humidity: 10%

	Emission Factors (g/mile)									
	PM_{10}	$PM_{2.5}$	CO	ROG	NO_x	SO_x	CO_2	CH_4	N_2O	
LDA-ALL	0.0290	0.0150	5.3480	0.2140	0.6310	0.0030	353.6330	0.05	0.06	Assumptions for CH_4 and N_2O from Reference sources TAB
LHD1-DSL	0.0520	0.0334	0.5320	0.1010	4.5220	0.0050	520.7810	0.01	0.03	Passenger Cars - Gasoline - Model Year 2000 - Present
HHD-DSL	0.5620	0.4792	3.0340	0.6580	14.8180	0.0160	1670.6790	0.06	0.05	Light Duty Truck - Diesel all model years
OBUS-CAT	0.0310	0.0141	11.6490	0.4930	4.3940	0.0050	464.9530	0.12	0.20	Heavy Duty Trucks - Diesel and Alternative Fuels - Model Year 1996 - Present
										Other Bus - Gasoline (with catalyst) - Model Year 1996 - Present

Note:

$PM_{2.5}$ emission factors determined using guidance from SCAQMD

Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds

10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions

On-road vehicles

- $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
- $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
- $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst: 0.928
- $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250

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3.3 HYDROLOGY AND WATER QUALITY

3.3 HYDROLOGY AND WATER QUALITY

3.3.1 Introduction

This section is formatted in a slightly different manner than the other EIR/EIS evaluations in order to accommodate an analysis of hydrology issues that differ between the Plant and Quarry sites. Rather than one section describing the Affected Environment and one section on Standards, Impacts and Mitigation Measures there are two sections each (one set for the Plant hydrology analysis and one for the Quarry hydrology): because these facilities are in different hydrologic basins with substantially differing conditions. Sections 3.3.2 and 3.3.3 cover hydrology issues at the Plant; Sections 3.3.4 and 3.3.5 cover hydrology issues at the Quarry. Each of these sections addresses the Proposed Action and its various alternatives.

The section is organized as follows:

- 3.3.2 Plant Water Usage
- 3.3.3 Plant Water Usage: Standards of Significance, Environmental Impacts, and Mitigation Measures (starting at page 3.3-34)
- 3.3.4 Quarry Water Usage: Affected Environment (starting at page 3.3-90)
- 3.3-5 Quarry Water Usage: Standards of Significance, Environmental Impacts and Mitigation Measures (Starting at page 3.3-95)

The Proposed Action includes changes in the quantity of water to be used in both the wallboard manufacturing Plant and the Quarry. Water for the Plant is supplied by three wells located in Ocotillo. Water for the Quarry is proposed to be supplied by a new well to be drilled approximately three miles east of the Quarry along the narrow-gauge rail line right-of-way. Evaluation of the proposed increased water usage for the Plant is presented in Section 3.3.2. Evaluation of the proposed new well installation and increased water usage for the Quarry is presented in Section 3.3.4.

3.3.2 Plant Water Usage

The existing Plant operation and Proposed Action rely on three supply wells for water for potable domestic uses and processing and production of wallboard and other gypsum products. The three wells are located in the Ocotillo/Coyote Wells Groundwater Basin in the southwest part of Imperial County. Prior to implementation of the Proposed Action, USG pumped an average of 347 acre-feet per year (AF/yr) from 1994 to 1998. The Proposed Action anticipates increasing groundwater pumping from the existing wells up to a maximum of 767 AF/yr (the amount reported by USG in 1972).

The extracted groundwater is transported by 8 inch diameter pipeline to Plaster City. The location of the Ocotillo/Coyote Wells Groundwater Basin is shown in Figure 3.3-1, Groundwater Basin Location Map.

There are several communities in the Ocotillo/Coyote Wells Groundwater Basin, including Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. These communities, USG and several other commercial/industrial and agricultural users, depend on the Ocotillo/Coyote Wells Groundwater Basin as their source of potable water. Surface water is not present in the Basin and there are no water imports into the Basin. The Ocotillo/Coyote Wells Groundwater Basin was designated as a "sole-source aquifer" by the Environmental Protection Agency (EPA) in 1996 (61 FR 47752, September 10, 1996) and is, thus, part of the Sole Source Aquifer Protection Program, authorized by Section 14245(e) of the Safe Drinking Water Act. The sole-source aquifer designation requires U.S. EPA review of proposed federally-assisted projects. The Proposed Action by USG is not a federally assisted project, and the designation only encourages coordination of federal, state, and local efforts for protection of groundwater resources under the Comprehensive State Ground Water Protection Program (CSGWPP).

Several studies involving the Ocotillo/Coyote Wells Groundwater Basin have been conducted. A partial list of these studies include:

- *Digital Model Evaluation of the Ground-Water Resources of the Ocotillo-Coyote Wells Basin, Imperial County, California*, U.S. Geological Survey Water-Resources Investigation 77-30, November 1977 (prepared by James A. Skrivan).
- *The Magnitude and Potential Effects of Declining Ground Water Elevations in the Ocotillo-Coyote Wells Basin*, prepared by David Huntley, October 1979.
- *Imperial County Groundwater Study – Final Report*, Montgomery Watson, December 1995.
- *Ocotillo/Coyote Wells Basin Hydrology and Groundwater Modeling Study*, Bookman-Edmonston Engineering, Inc., March 1996.
- *Geologic Review of the Ocotillo-Coyote Wells Basin, Imperial County California with Recommendations for Changes to the Proposed Groundwater Model*, Bookman-Edmonston memorandum from Ron Schnabel to Dick Rhone, March 13, 2003.
- *Ocotillo/Coyote Wells Hydrology and Groundwater Modeling Study*, Bookman-Edmonston, January 16, 2004.

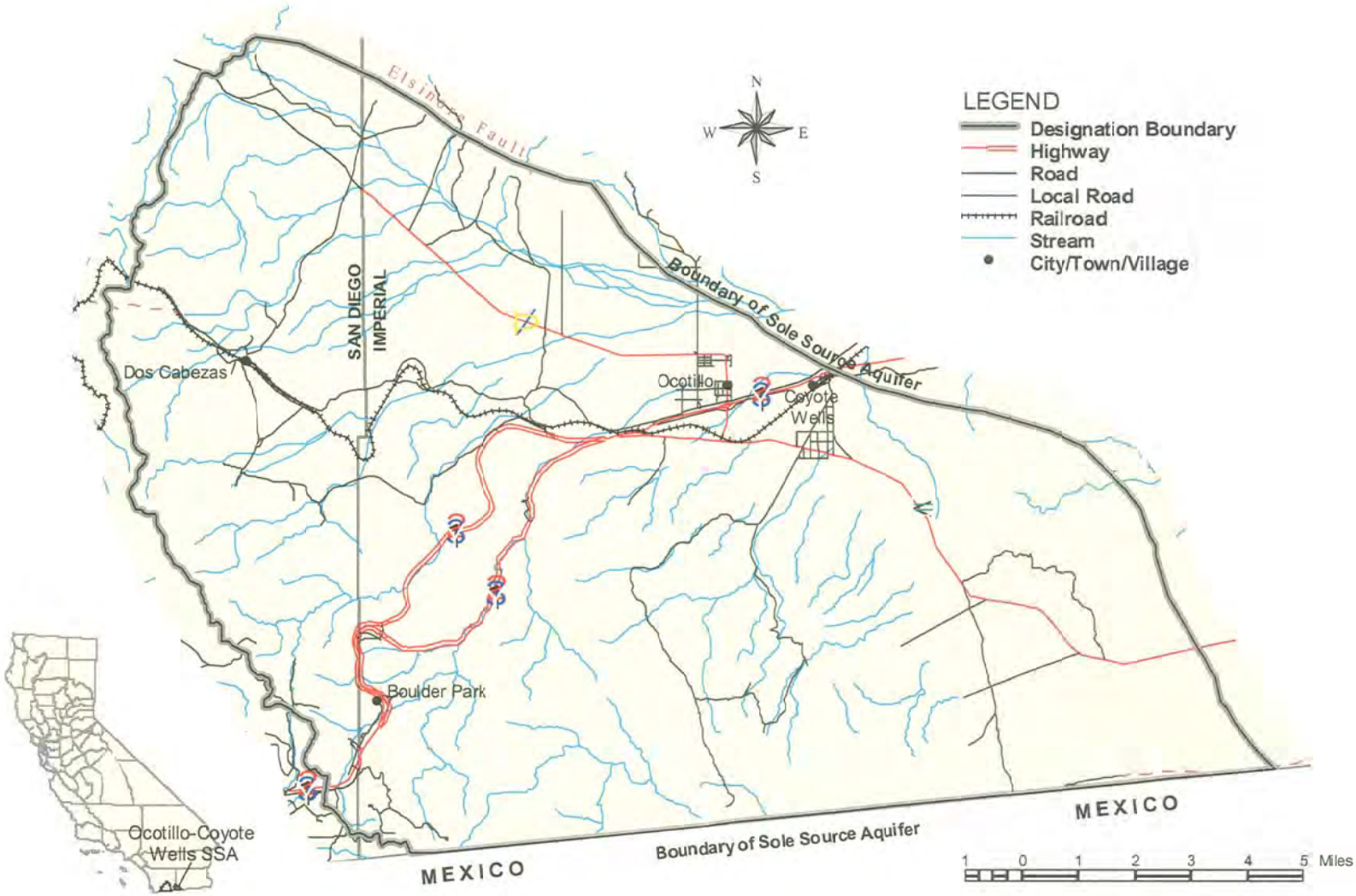

Figure 3.3-1
Groundwater Basin Location Map
US GYPSUM EXPANSION/MODERNIZATION PROJECT
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These studies were reviewed in detail for this analysis, and are incorporated by reference. Copies of these studies can be reviewed at the office of the County Planning Department, Imperial County, California. In addition, rainfall data from the National Oceanic and Atmospheric Administration (NOAA) rain gauge in Ocotillo (the Ocotillo 2 gauge), pumping data from USG, and water level and water chemistry data from the U.S. Geological Survey (USGS) were obtained and reviewed. The USGS has been measuring water levels on a semi-annual basis and water chemistry on an annual basis in several wells throughout the basin since the 1970s. These data were obtained from the USGS WATSTOR database and are presented in Appendix B-1, USGS Hydrologic Data.

The 1996 and 2004 Bookman-Edmonston reports also include discussions of several additional studies conducted in the Ocotillo/Coyote Wells Groundwater Basin. These studies include several consultant reports and several unpublished Masters Theses from San Diego State University.

Section 3.3.2.1 presents a summary of the setting of the Ocotillo/Coyote Wells Groundwater Basin, a description of the baseline conditions developed for the Proposed Action, and an evaluation of the existing data. Section 3.3.2.2 presents the analysis of potential environmental impacts related to the extraction of groundwater from the Ocotillo/Coyote Wells Groundwater Basin for the Proposed Action, and the potential alternatives to the proposed increase in pumping from the existing wells within the Ocotillo/Coyote Wells Groundwater Basin.

3.3.2.1 Affected Environment

Climate

The Ocotillo/Coyote Wells Groundwater Basin is located in the southwestern part of Imperial County, approximately 25 miles from the city of El Centro (Figure 3.3-1), in a desert environment, marked by relatively high temperatures and relatively low precipitation. Average daytime high temperatures range from 70 degrees Fahrenheit (F) in January to in excess of 110 degrees F in July and August. Average low temperatures range from 40 degrees F to 80 degrees F. In the vicinity of the communities of Ocotillo, Coyote Wells, Nomirage, and Yuha Estates, the surface elevation varies from approximately 250 feet above mean sea level (ft amsl) to 600 ft amsl. The Basin is bounded on the west by the Jacumba Mountains and on the north by the Coyote Mountains. The Basin extends approximately 12 miles to 15 miles to the east of Ocotillo to the Westside Main Canal, across the southern projection of the Elsinore

Fault and the Laguna Salada Fault, and another unnamed fault zone. To the south, the basin continues across the international border into Mexico.

Table 3.3-1, Monthly Rainfall Data, 1971-2002, presents monthly rainfall data from 1971 through 2002, as measured at the NOAA Ocotillo 2 rainfall gauge, located in Ocotillo, CA. The raw data provided by NOAA are presented in Appendix B-1. Rainfall in the vicinity of the Ocotillo/Coyote Wells Groundwater Basin occurs from both Pacific storm fronts, which occur during the winter months, and from tropical monsoons, which occur during the summer months. To appropriately present the variation in rainfall over time, the annual precipitation is typically presented in terms of a water year. For the Project area, a water year extends from October of one year through September of the subsequent year. Table 3.3-2, Annual Water-Year Precipitation, presents the annual water-year precipitation for the Ocotillo area from 1948 through 2000. The data from 1948 through 1982 is taken from Table 7-3 of the 1996 Bookman-Edmonston report. The data from 1983 through 2000 are taken from the NOAA data presented in Table 3.3-1. Figure 3.3-2, Annual Water-Year Rainfall, presents the annual water-year precipitation for the Ocotillo area.

The average annual water-year precipitation for the time period represented in Table 3.3-2 is approximately 3.5 inches. The average annual precipitation is shown as a dashed line on Figure 3.3-2. The graph on Figure 3.3-2 indicates that rainfall was typically below average from 1949 through 1965. From 1975 through 1993, rainfall was typically above average, with 12 of 18 water years having above-average precipitation and only two water years having annual average precipitation that was less than 3.0 inches (i.e. one-half inch or more below the mean). Since 1993, rainfall has been average to below average.

The relatively high temperatures also result in a relatively high evaporation rate for the region. The California Department of Water Resources (Bulletin #113-3) reports a total evaporative demand for the area of approximately 100 inches per year, with a potential evapotranspiration rate of over 82 inches per year. The total evaporative demand is equivalent to the rate of evaporation from a Class A pan. The potential evapotranspiration is the rate of water lost to the atmosphere by irrigated agriculture.

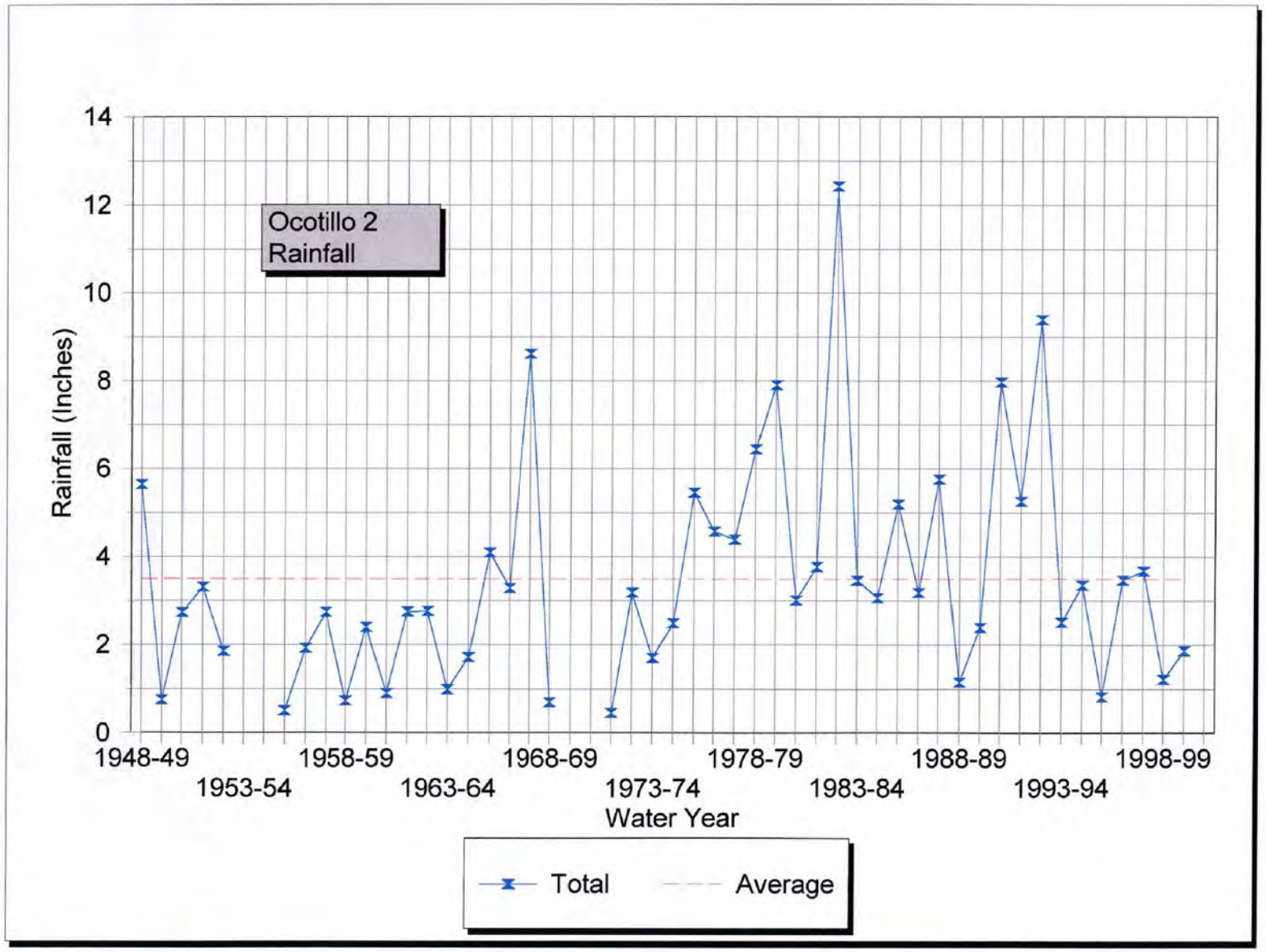

Figure 3.3-2
Annual Water - Year Rainfall
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TABLE 3.3-1
MONTHLY RAINFALL DATA, 1971-2002
OCOTILLO 2 RAINFALL GAUGE

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1971	-	-	-	-	-	0	0	77	14	3	0	3	-
1972	0	0	0	0	0	37	0	2	0	149	32	10	-
1973	13	49	23	0	0	0	0	42	0	0	0	0	-
1974	149	0	3	0	0	0	14	0	4	6	0	8	-
1975	0	0	2	70	0	0	80	0	82	3	25	10	-
1976	0	152	20	25	7	0	10	0	293	0	42	10	-
1977	24	0	2	0	0	0	0	379	0	60	0	129	-
1978	139	57	29	14	0	0	0	0	10	6	110	143	-
1979	235	26	4	0	35	0	55	30	0	0	0	12	-
1980	378	202	88	10	100	0	0	0	0	0	0	0	-
1981	79	58	129	0	14	0	6	14	0	0	80	0	-
1982	95	0	-	-	-	-	1	31	169	0	19	584	-
1983	29	258	194	0	0	0	13	100	45	5	1	42	687
1984	17	0	0	1	0	0	216	39	24	0	40	186	523
1985	6	27	9	0	0	0	0	10	28	54	122	129	385
1986	21	115	33	4	0	0	41	0	0	127	15	24	380
1987	25	62	8	0	0	0	0	36	21	138	23	60	373
1988	53	122	2	0	0	60	0	117	0	7	0	0	361
1989	47	0	2	0	0	0	39	19	0	3	0	0	110
1990	11	0	1	22	0	108	93	0	0	15	0	0	250
1991	42	62	140	0	0	0	310	211	17	0	15	205	1002
1992	12	123	124	11	8	0	0	27	0	115	0	155	575
1993	503	86	0	0	9	0	0	71	0	0	94	0	763
1994	41	29	57	0	23	0	0	6	0	0	46	52	254
1995	154	22	5	0	0	0	0	56	0	0	0	11	248
1996	0	70	0	0	0	0	0	0	0	4	0	2	76
1997	30	2	0	4	0	9	86	0	210	0	11	146	498
1998	39	121	19	0	0	0	0	16	15	0	0	39	249
1999	0	26	0	15	0	0	13	0	28	0	0	0	82
2000	0	42	12	0	0	15	0	116	1	57	2	0	245
2001	12	186	43	0	-	0	0	0	0	0	0	0	-
2002	11	-	-	-	-	-	-	-	-	-	-	-	-

Note: Units are measured in 1/100th of an inch.

TABLE 3.3-2
ANNUAL WATER-YEAR PRECIPITATION
1948 THROUGH 2000

Water Year	Total (Inches)	Water Year	Total (Inches)
1948-49	5.64	1974-75	2.48
1949-50	0.75	1975-76	5.45
1950-51	2.73	1976-77	4.57
1951-52	3.3	1977-78	4.38
1952-53	1.85	1978-79	6.44
1953-54	-	1979-80	7.9
1954-55	-	1980-81	3
1955-56	0.5	1981-82	3.77
1956-57	1.93	1982-83	12.42
1957-58	2.74	1983-84	3.45
1958-59	0.73	1984-85	3.06
1959-60	2.4	1985-86	5.19
1960-61	0.9	1986-87	3.18
1961-62	2.75	1987-88	5.75
1962-63	2.76	1988-89	1.14
1963-64	0.98	1989-90	2.38
1964-65	1.71	1990-91	7.97
1965-66	4.09	1991-92	5.25
1966-67	3.28	1992-93	9.39
1967-68	8.61	1993-94	2.5
1968-69	0.69	1994-95	3.35
1969-70	-	1995-96	0.81
1970-71	-	1996-97	3.47
1971-72	0.45	1997-98	3.67
1972-73	3.18	1998-99	1.21
1973-74	1.7	1999-00	1.86

Geology

The Ocotillo/Coyote Wells Groundwater Basin is an alluvial basin that contains silts, sands, and gravels that have been eroded from the surrounding mountains and were deposited on Tertiary marine (i.e., ocean or shallow sea) sediments. These Quaternary alluvial deposits are highly permeable and contain groundwater of relatively good quality, as discussed below. Along the western and northern edges of the Basin, the Quaternary gravels overlie and abut the bedrock that forms the Jacumba and Coyote Mountains. In the central and eastern parts of the Basin, the gravels overly the Tertiary marine sediments. Based on the total depth of wells installed in the Basin, the thickness

of the gravels varies from zero along the mountain fronts to at least 600 feet in the Ocotillo area.

There are several prominent fault zones within the Basin. The Elsinore Fault forms the boundary between the alluvial sediments of the Basin and the bedrock of the Coyote Mountains (see Figure 3.3-3, Generalized Geology). South of Yuha Springs, the Laguna Salada Fault separates the alluvial basin sediments on the west from an area of primarily Tertiary marine sediments to the east.

The Tertiary marine sediments are believed to be present beneath the alluvial gravels throughout most of the Ocotillo/Coyote Wells Groundwater Basin. East of Coyote Wells and the Laguna Salada Fault, there are numerous areas where the Tertiary marine sediments crop out and are exposed on the surface of the basin, as shown in Figure 3.3-3. In general, the geology east of Coyote Wells and the Laguna Salada Fault zone is dominated by the marine sediments, although the alluvial gravels are present in many areas.

The Tertiary marine sediments also crop out in several areas west of Coyote Wells and the Laguna Salada fault zone. Exposures of the marine sediments occur over a large area east of Yuha Estates, and in smaller areas to the west and south of Nomirage and several miles to the northwest of Ocotillo.

Several previous studies have assumed that the Elsinore Fault and the Laguna Salada Fault are connected in the subsurface to the east of Coyote Wells (USGS, 1977; Bookman-Edmonston, 1996). These studies also assume that the subsurface fault zone acts as a hydraulic barrier to groundwater flow and assigned low-permeability properties to the fault zone in numerical groundwater models. The basis for this assumption is a change in the hydraulic gradient (i.e. the slope of the groundwater surface) and a change in the water chemistry across the assumed fault zone. As discussed in more detail below, however, little evidence exists that the fault zone in this case, if present, has properties that differ from the adjacent geologic deposits and that the fault zone acts as a barrier to groundwater flow. More recent field evaluations (Bookman-Edmonston, 2003) indicate that the Elsinore Fault and Laguna Salada faults are not connected as a continuous fault zone through the area east of Coyote Wells.

Hydrology

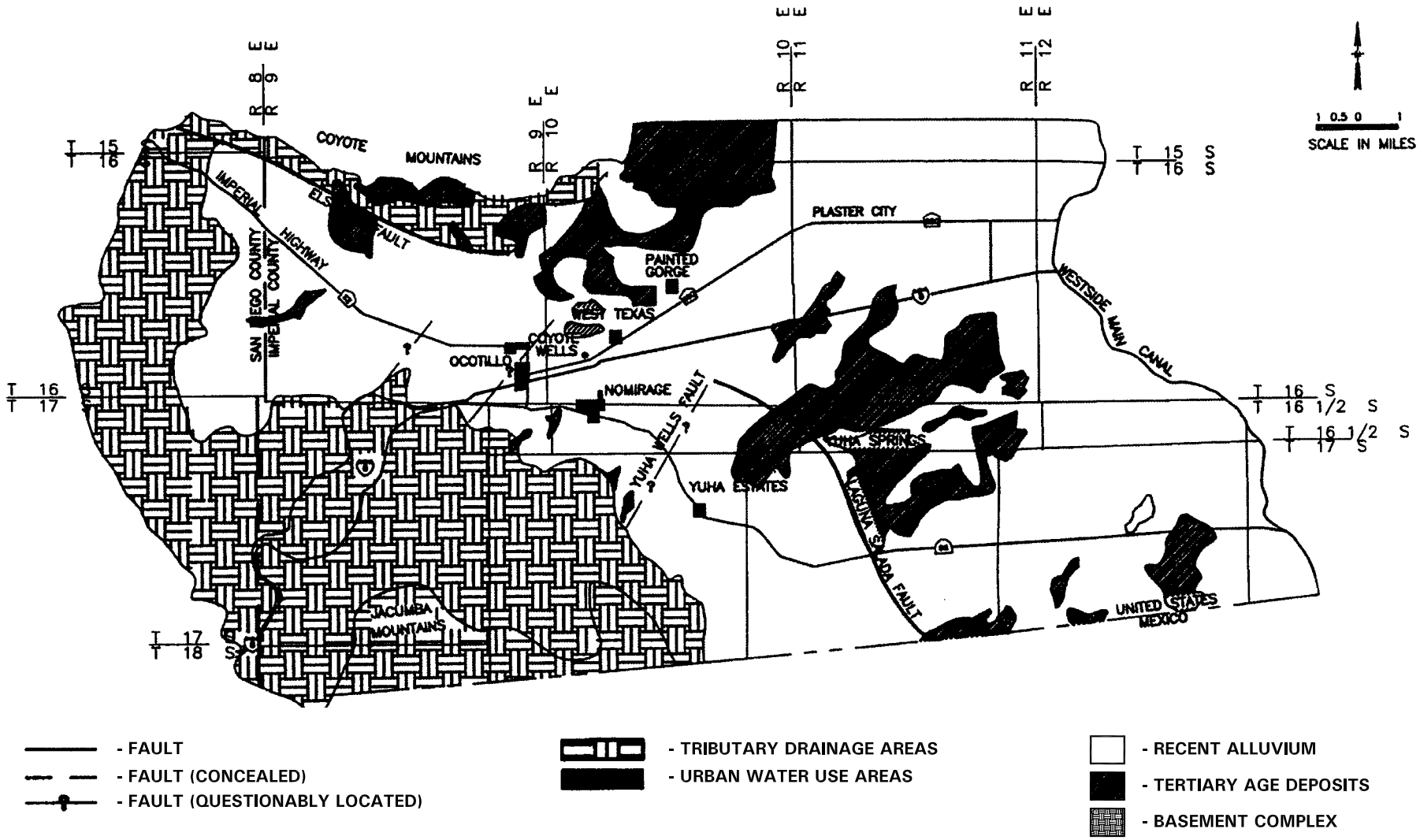
As discussed above, the Ocotillo/Coyote Wells Groundwater Basin contains appreciable quantities of potable water and, in fact, is the sole source of domestic and

commercial/industrial water supply for the area. Groundwater well locations are shown in Figure 3.3-4, Location of Wells. According to Bookman-Edmonston (1996), the watershed for the Basin consists of approximately 87 square miles of upland area within the Jacumba and Coyote Mountains and approximately 80 square miles of alluvial valley floor. Due to the relatively low precipitation and high evapotranspiration that occurs in the area, virtually all of the groundwater recharge that occurs in the Basin comes from runoff from the mountains.

The depth to groundwater varies depending on the ground surface elevation and the slope of the groundwater surface. In the Yuha Springs area, to the east of Yuha Estates, the water table is only a few feet below ground surface (ft bgs). Just east of Coyote Wells, the depth to groundwater ranges from 10 ft bgs to 25 ft bgs. However, the groundwater in these two areas could be perched. In the Ocotillo area, the depth to groundwater ranges from under 100 ft bgs to over 160 ft bgs. At some locations in Yuha Estates, the depth to groundwater may exceed 200 ft bgs.

A study conducted by the USGS (1964) suggests that recharge to the groundwater basin may consist of 0.5 inches per year of runoff from the mountains and 0.02 inches per year of direct recharge from precipitation that falls on the valley floor. As discussed below, however, the upper few feet of groundwater throughout the Ocotillo/Coyote Wells Groundwater Basin tends to be saline and have an elevated total dissolved solids (TDS) content. The presence of saline water at the water table indicates that there is no appreciable recharge of fresh, meteoric water from rainfall across the valley floor. Thus, the only significant source of recharge occurs at the base of the mountain front, where surface runoff reaches the alluvium.

Prior estimates of Basin recharge have ranged from 536 AF/yr to 7,200 AF/yr. The most recent groundwater modeling effort for the basin (Bookman-Edmonston, 2004), which is based on extensive review and input from the USGS and the preparers of this EIR/EIS, yields a calibrated recharge to the basin of approximately 1,077 AF/yr. The model estimated recharge of 1,077 AF/yr was used to calibrate the groundwater model and is a conservative recharge estimate. The recharge rate of 1,077 AF/yr is lower than most analytical estimates for the Basin. Mark (1987) estimates recharge using four methods and obtained results of 536, 1044, 1650, and 1820 AF/yr. Mark (1987) concluded that 536 AF/yr was unrealistic and used 1650 AF/yr for his work. Skrivan (1977) estimated the recharge at 2600 AF/yr. Huntley (1979) states that recharge is between 870 and 1672 AF/yr. Zipp (1982) suggests that the recharge rate may be as high as 4600 to 7200 AF/yr.



FROM: Modified from digital evaluation of the grounwater resources in the Ocotillo-Coyote Wells Basin.
James Skrivan November 1977

Figure 3.3-3
Generalized Geology
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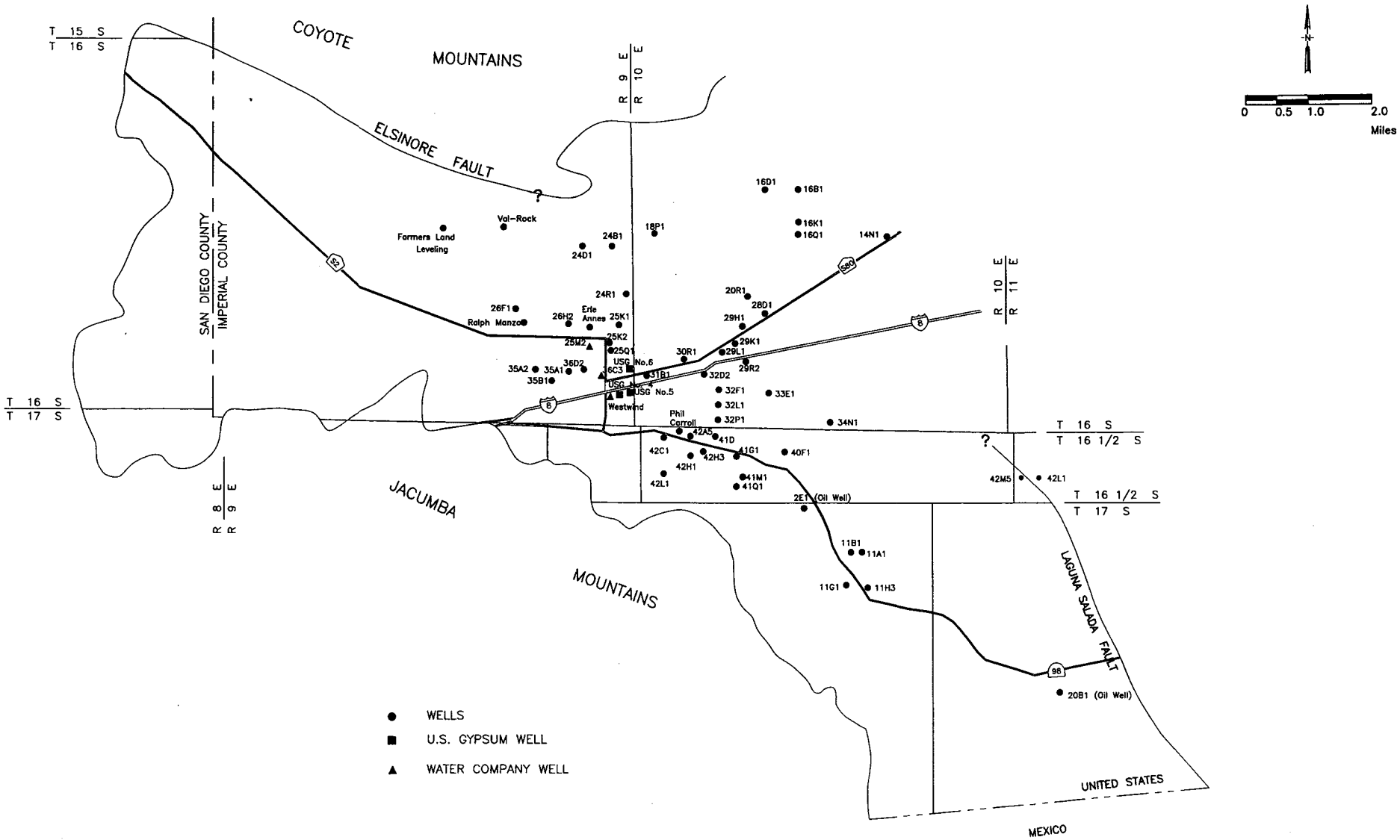

Figure 3.3-4
Location of Wells
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Bookman-Edmonston (1996) estimates the recharge at 2400 AF/yr. The recharge to the Groundwater Basin may consist of 0.5 inches per year of runoff from the mountains (USGS), which suggests a total recharge of about 2,300 AF/yr. Nonetheless, as stated above, for the modeling efforts undertaken for this Project, a conservative recharge rate of 1,077 AF/yr was used.

The groundwater flow direction trends from the northwest toward the southeast. Figure 3.3-5, Simulated Water-Level Contours, and Figure 3.3-6, Simulated 1995 Contours, are contour maps of the groundwater surface developed by the USGS (1977) and Bookman-Edmonston (1996). In the upper part of the Basin, approximately four to five miles northwest of Ocotillo, the hydraulic gradient is approximately 30 feet per mile or greater, or about 0.006 ft/ft (i.e. $6x10^{-3}$ ft/ft). In the southern part of the Basin, near the international border with Mexico, the hydraulic gradient is only approximately six feet per mile, or about 0.001 ft/ft (i.e. $1x10^{-3}$ ft/ft). To the east of Coyote Wells, in the area of primarily Tertiary marine sediment outcrops, the hydraulic gradient is approximately 40 feet per mile, or about 0.0075 ft/ft (i.e. $7.5x10^{-3}$ ft/ft).

Groundwater Quality

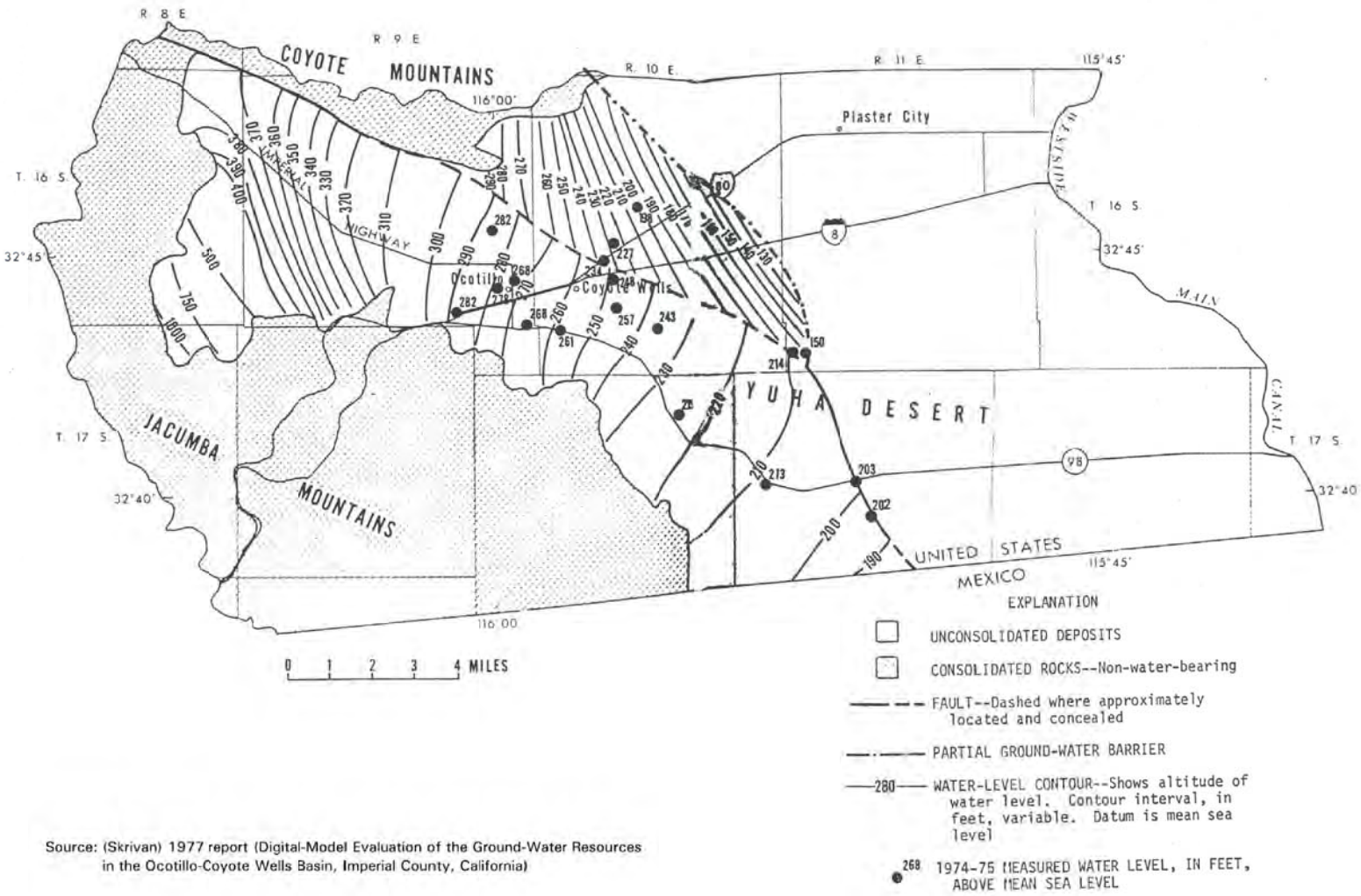
The groundwater quality within the Ocotillo/Coyote Wells Groundwater Basin is variable at different locations. Some areas of the Basin produce waters of relatively good quality and other areas produce highly saline waters. Table 3.3-3A, Summary of Water Chemistry Data, presents a summary of water chemistry data for selected wells throughout the Basin, as reported in the USGS WATSTOR database. The general water quality of the Basin can be evaluated primarily based on the TDS content of the water (Table 3.3-3B, TDS Data Versus Time). The TDS is a measurement of the total amount of salts and other naturally-occurring minerals in the groundwater. The EPA secondary TDS standard for drinking water is 500 milligrams per liter (mg/L), which is equivalent to 500 parts per million (ppm). Thus, groundwater with TDS levels below 500 mg/L is considered high-quality, potable water. In general, water with a TDS level exceeding 1,000 mg/L is not considered potable, although it is not uncommon for local drinking water supplies to exceed this level in some areas of the country.

Figure 3.3-7, Groundwater Quality (TDS Concentrations in mg/L), taken from Bookman-Edmonston (1996), shows the distribution of TDS in the Ocotillo/Coyote Wells Groundwater Basin. The TDS levels range from about 300 mg/L to over 54,000 mg/L. By comparison, sea water has a TDS level of about 30,000 mg/L. In the area of

TABLE 3.3-3A
SUMMARY OF WATER CHEMISTRY DATA
OCOTILLO/COYOTE WELLS GROUNDWATER BASIN

Well		Date	PH	Ca mg/L	Mg mg/L	K mg/L	Na mg/L	Bicarb mg/L	Carb mg/L	Cl mg/L	Fl mg/L	SO4 mg/L	TDS mg/L	Boron ug/L	Fe ug/L
16S/9E	24B1	03/18/97	8.7	3.8	1.4	2.4	430	186	9	390	1.9	270	1220	744	210
	24D1	03/17/97	8.3	14	4.2	3.7	140	117	1	91	1.1	140	475	406	10
	25K2	03/18/97	8	24	5.7	4.6	81	136	0	78	0.9	41	342	211	<1
	25Q1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	35M1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	36D2	04/10/90	8.2	15	2.5	2.7	100	NM (115)	NM	82	1.9	27	347	660	100
	36G4	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	36H1	03/18/97	8.1	16	3.3	4	70	124	0	57	0.8	31	288	190	40
	27R1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	29H1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	29L1	03/17/88	8.5	7.9	3.6	3.3	240	NM (100)	NM	240	0.9	66	670	380	30
	29R2	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	11B1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	11G1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	11G2	03/10/82	8.1	17	5	5	112	NM (135)	NM	99	0.4	67	392	20	<1
	11G4	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	11H1	No data	-	-	-	-	-	-	-	-	-	-	-	-	-
	11H2	04/04/86	8.1	20	4.5	4.4	75	NM (140)	NM	47	0.5	52	293	170	10
	11H3	03/17/97	8.1	19	4	3.9	82	137	0	53	0.6	58	309	178	<1

Notes:
NM = Not Measured



Source: (Skrivan) 1977 report (Digital-Model Evaluation of the Ground-Water Resources in the Ocotillo-Coyote Wells Basin, Imperial County, California)

Figure 3.3-5
Simulated Water-Level Contours
US GYPSUM EXPANSION/MODERNIZATION PROJECT
IMPERIAL COUNTY, CALIFORNIA

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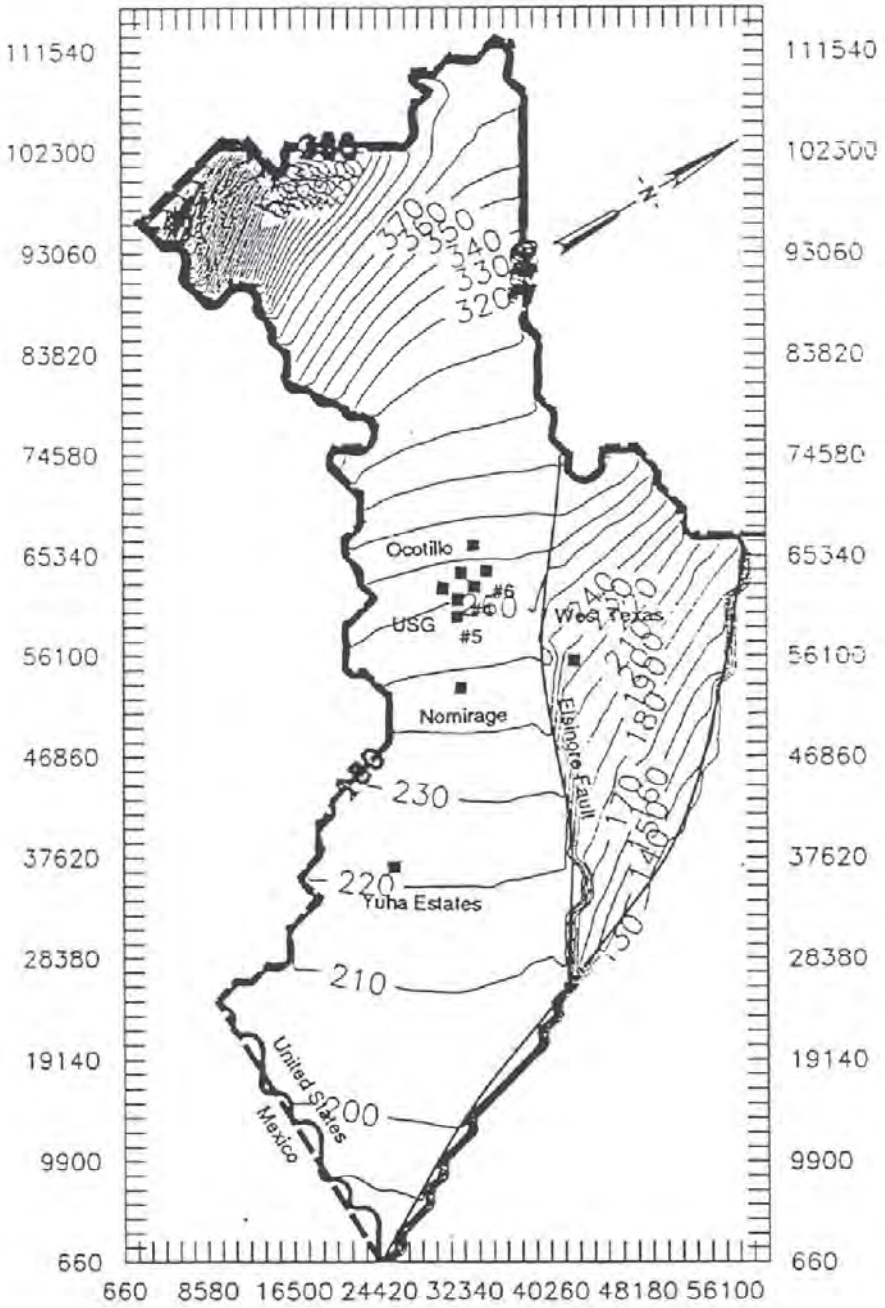

BOOKMAN-EDMONSTON ENGINEERING, INC. MARCH 1996

Figure 3.3-6
Simulated 1995 Contours

US GYPSUM EXPANSION/MODERNIZATION PROJECT
IMPERIAL COUNTY, CALIFORNIA

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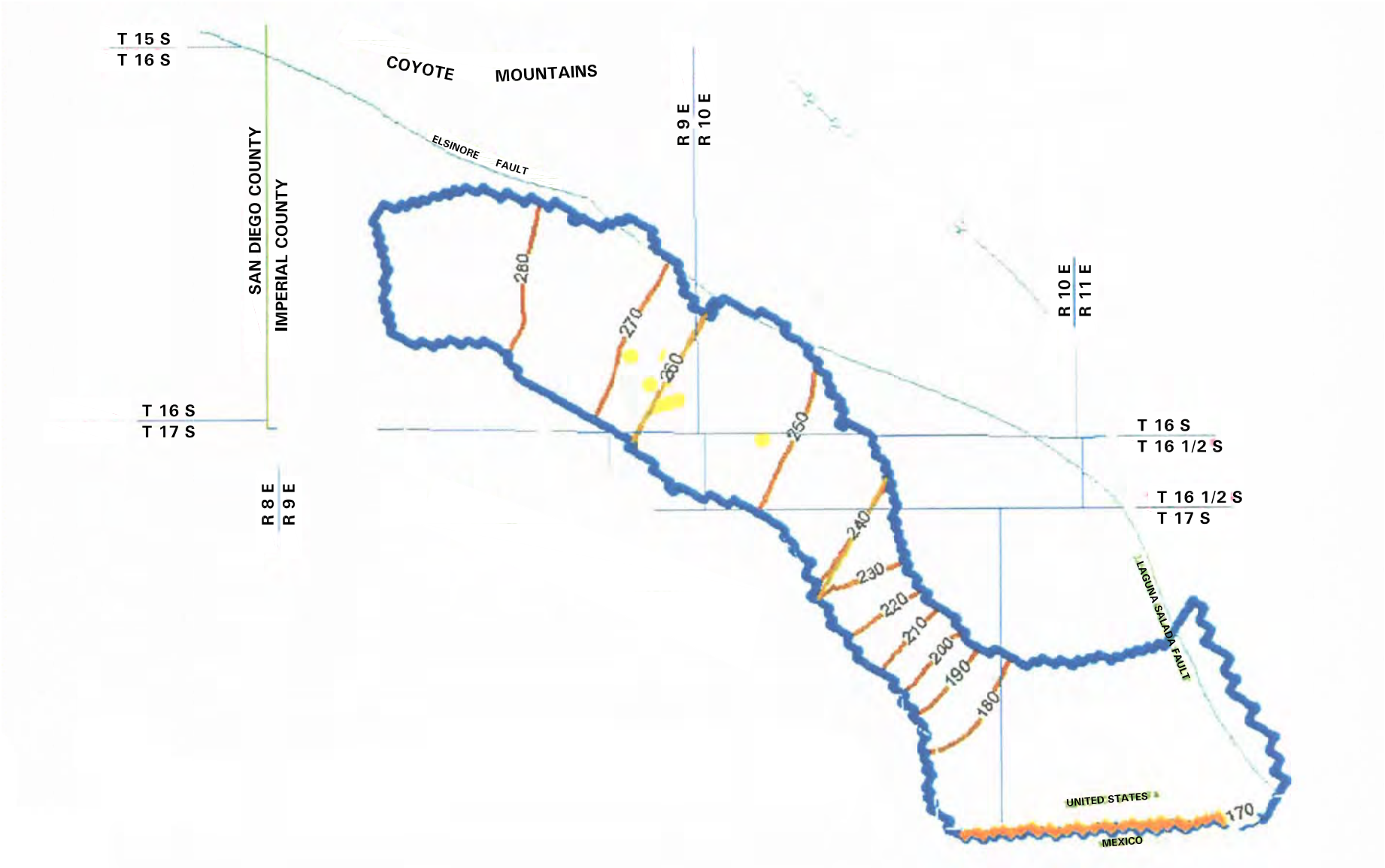

Figure 3.3-7
Groundwater Quality (TDS Concentrations in mg/l)
US GYPSUM EXPANSION/MODERNIZATION PROJECT
IMPERIAL COUNTY, CALIFORNIA

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TABLE 3.3-3B
TDS DATA VERSUS TIME
OCOTILLO/COYOTE WELLS GROUNDWATER BASIN

Date	R16S-T9E					R16S-T10E	R17S-T10E		
	16S/9E-24B1 (mg/L)	24D1 (mg/L)	25K2 (mg/L)	36D2 (mg/L)	36H1 (mg/L)	29L1 (mg/L)	11G2 (mg/L)	11H2 (mg/L)	11H3 (mg/L)
02/07/63	-	-	-	-	288	-	-	-	-
12/01/72	-	-	253	-	-	-	335	-	-
12/03/74	-	-	245	-	-	-	-	-	-
06/26/75	-	-	307	356	-	-	-	-	-
04/28/77	1270	495	303	350	312	713	363	-	-
04/27/77	1210	471	304	358	300	690	369	-	-
03/15/79	1220	473	301	347	303	662	370	-	-
05/01/80	1240	476	305	353	300	667	377	-	-
04/30/81	1200	478	325	356	296	639	377	-	-
03/10/82	1210	487	383	361	294	656	392	-	-
03/29/83	1230	480	306	344	304	660	-	300	-
04/18/84	1260	479	-	375	294	665	-	291	-
04/26/85	1270	475	-	363	305	667	-	297	-
04/02/86	1340	467	-	349	296	640	-	293	-
04/03/87	1290	486	-	354	299	651	-	-	313
03/16/88	1300	486	405	351	301	670	-	-	311
03/15/89	1290	506	393	352	305	-	-	-	319
04/10/90	1270	492	337	347	-	-	-	-	-
04/04/91	-	-	-	-	299	-	-	-	316
04/06/92	1230	488	326	-	-	-	-	-	-
04/14/93	-	-	-	-	295	-	-	-	307
03/22/94	1240	485	337	-	298	-	-	-	315
03/29/95	1180	483	335	-	297	-	-	-	312
03/19/96	1200	464	334	-	290	-	-	-	306
03/18/97	1220	475	342	-	288	-	-	-	309
03/30/98	1190	472	330	-	300	-	-	-	307
03/22/99	1180	475	325	-	298	-	-	-	299
03/27/00	1210	476	313	-	321	-	-	-	307
03/22/01	1200	470	360	-	295	-	-	-	280

Notes:
- No data

predominantly Tertiary marine sediment outcrops east of Coyote Wells, most wells have TDS levels exceeding 1,000 mg/L, although there is at least one location with a TDS level of 544 mg/L. West of the southern projections of the Elsinore Fault, the TDS

levels are generally below 500 mg/L, but there are several wells with TDS concentrations as high as 6,900 mg/L. The distribution of TDS appears to be controlled by two factors:

1. *Well depth*. The uppermost few feet of groundwater tend to have an elevated TDS level. This may be due to the concentration of salts near the water table due to evapotranspiration of groundwater in the past, when the water table was closer to the ground surface; and

2. *Proximity to the Tertiary marine sediments*. The Tertiary sediments were deposited in a marine environment. Thus, the connate water in the pores of the sediments, at the time of deposition, was saline.

The relatively high TDS levels east of Coyote Wells are most likely a result of the greater occurrence of the Tertiary marine sediments. Some of the wells with elevated TDS levels on the west side of the southern projections of the Elsinore Fault are near mapped outcrops of the marine sediments. A 1983 unpublished Masters Thesis from San Diego State University (Jansen, 1983) indicates that a transition in water quality occurs just east of Nomirage and that the available data do not support the theory of a distinct and singular groundwater boundary along a hypothetical connection of the Elsinore and Laguna Salada fault zones. The analysis conducted for this EIR/EIS is consistent with the findings of Jansen (1983).

Where high TDS levels are found, there are also several trace elements that could be of concern in the Ocotillo/Coyote Wells Groundwater Basin. These elements include fluoride, boron, and iron. The state drinking-water standard for fluoride is 1.4 mg/L, based on the local air temperatures. The California Department of Health Services drinking water action level for boron is 1.0 mg/L. Action Levels are advisory levels and not enforceable actions. Levels greater than the action level require a drinking water system to notify the governing body of the local agency in which users of the drinking water reside. The EPA drinking-water standard for iron is 0.05 mg/L. As shown in Table 3.3-3A, there are several wells in the Basin that have fluoride, boron, and/or iron levels that approach or exceed these standards.

Groundwater Use

Groundwater from the Ocotillo/Coyote Wells Groundwater Basin is used for domestic, commercial, industrial, and agricultural purposes for users in the Basin and outside of the Basin. Surface water is not present within the Basin and water is not imported into the Basin.

Domestic water users include the communities of Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. Water is also piped to the community of Painted Gorge. Domestic water supply is provided by a combination of private wells and community water services. Table 3.3-4, Current and Historic Groundwater Use, presents current and historic water use for various users. In the 1996-1997 time period, community domestic water use is estimated to be approximately 110 AF/yr to 115 AF/yr. Changes in water use over time are based on the rate of population growth, as described by Bookman-Edmonston (1996). Current domestic water use is anticipated to be approximately 120 AF/yr to 125 AF/yr.

TABLE 3.3-4
CURRENT AND HISTORIC GROUNDWATER USE
OCOTILLO/COYOTE WELLS GROUNDWATER BASIN

Year	US Gypsum		Community Use (AF/yr)	Export to Mexico	
	Based on Production (AF/yr)	*Reported to USGS (AF/yr)*		*Clifford Well (AF/yr)*	*McDougal Well (AF/yr)*
1925	153	-	-	-	-
1926	153	-	-	-	-
1927	153	-	-	-	-
1928	153	-	-	-	-
1929	153	-	-	-	-
1930	153	-	-	-	-
1931	153	-	-	-	-
1932	153	-	-	-	-
1933	153	-	-	-	-
1934	153	-	-	-	-
1935	153	-	-	-	-
1936	153	-	-	-	-
1937	153	-	-	-	-
1938	153	-	-	-	-
1939	153	-	-	-	-
1940	153	-	-	-	-
1941	153	-	-	-	-
1942	153	-	-	-	-
1943	153	-	-	-	-
1944	153	-	-	-	-
1945	153	-	-	-	-
1946	153	-	-	-	-
1947	264	-	-	-	-
1948	264	-	-	-	-
1949	264	-	-	-	-
1950	306	-	-	-	-
1951	253	-	-	-	-
1952	255	-	-	-	-

Table 3.3-4 (Continued)

Year	US Gypsum		Community Use	Export to Mexico	
	Based on Production	***Reported to USGS***		***Clifford Well***	***McDougal Well***
1953	241	-	-	-	-
1954	278	-	58.2	-	-
1955	295	-	59.4	-	-
1956	274	-	60.6	-	-
1957	272	-	61.8	-	-
1958	353	-	63.0	-	-
1959	375	-	64.2	-	-
1960	395	-	65.4	-	-
1961	348	-	66.6	-	-
1962	422	-	67.8	-	-
1963	442	-	69.0	-	-
1964	480	-	70.2	-	-
1965	415	-	71.4	-	-
1966	451	-	72.6	-	-
1967	511	-	73.8	-	-
1968	552	-	75.0	-	-
1969	560	-	76.2	-	-
1970	393	668	77.4	-	-
1971	338	575	78.6	-	-
1972	451	767	79.8	-	-
1973	375	638	81.0	-	-
1974	406	691	82.2	138	-
1975	361	614	83.4	211	-
1976	414	-	84.6	213	-
1977	473	-	85.8	222	-
1978	491	-	87.0	137	143
1979	496	-	88.2	137	143
1980	469	-	89.4	137	143
1981	261	-	90.8	137	143
1982	456	-	92.1	137	143
1983	472	-	93.5	137	-
1984	472	-	94.8	137	-
1985	489	-	96.2	-	-
1986	521	-	97.6	-	-
1987	512	-	98.9	-	-
1988	518	-	100.3	-	-
1989	492	-	101.6	-	-
1990	476	-	103.0	-	-
1991	428	-	104.5	-	-
1992	379	-	106.0	-	-
1993	362	-	107.4	-	-
1994	378	-	108.9	-	-
1995	327	-	110.4	-	-
1996	367	-	112.1	-	-
1997	332				
1998	333				

Notes:

- No data

The primary current commercial and industrial use of water is by USG at its wallboard Plant and Quarry. Groundwater is extracted from three wells in the Ocotillo area and piped approximately eight miles to Plaster City. There are several sources of information on the rate of water used by USG. These include a January 5, 1975 letter to the USGS, a January 9, 1997, letter to the Imperial County Public Works Department, a discussion by Bookman-Edmonston (1996), and annual groundwater reports made to the Imperial County Public Works Department by USG. The information from these sources is summarized in Table 3.3-4. The average pumping rate for the five-year period from 1994 through 1998 is 347 AF/yr.

For the period from 1925 through 1975, USG reported water use to the USGS for use in the USGS groundwater modeling study (USGS, 1977). The basis for the pumping rates reported over this time period are uncertain. For the period from 1970 through 1980, USG also provided Bookman-Edmonston estimates of water use based on wallboard production rates (Bookman-Edmonston, 1996, page 6-2). Bookman-Edmonston reports "Estimates of water use provided to USGS are 70 percent greater than estimates of water use based upon production records during 1970 to 1975 (the only years where these records overlap). This difference could not be reconciled." Table 3.3-4 shows the water use reported to the USGS and the values based on production rates for the period from 1970 to 1975. The rates reported to the USGS range from 575 AF/yr to 767 AF/yr. The rates based on production range from 338 AF/yr to 451 AF/yr. The difference between these two data sets is referred to as the "U.S. Gypsum Variance" on Figure 3.3-8, Annual Water Production.

Since 1981, the groundwater extraction rate has reportedly been measured at each well by USG. Thus, these data are considered the most reliable.

Other current commercial and industrial users include several gravel quarries located within the Basin, near Interstate Highway 8 and northwest of Ocotillo. According to the Ocotillo/Nomirage Community Area Plan (ONCAP), the Val Rock and Farmers Land Leveling quarries each use between six to eight AF/yr of water. Bookman-Edmonston (1996, page 6-3) also reports at least three other gravel quarries in the area. Based on these values, annual water use for gravel quarry operations could be as high as 35 AF/yr, or more.

As early as 1958, a well in Ocotillo was used in part to export water to Mexico. Estimates of early water export are not available. In 1979, the Imperial County Planning Department had a study prepared (Copley, 1979) to estimate the amount of water

exported to Mexico from the well in Ocotillo (referred to as the Clifford well, or well 16S/9E-25K2), based on the rate of electricity used to pump the well. From 1974 through 1978, the estimated export reportedly ranged from 137 AF/yr to 222 AF/yr. Exports from this well reportedly continued until about 1984.

Water exports also occurred from a well in Yuha Estates (the McDougal well, or well 17S/10E-11G4). Export reportedly began in September 1977 and continued until September 1982. It is estimated that approximately 143 AF/yr were being pumped from the Clifford Well. Table 3.3-4 shows the presumed rate of water export from 1974 through 1984. The information presented in the table assumes that production from the Clifford well continued from 1979 through 1984 at the same rate as that which occurred in 1978 (137 AF/yr). Imperial County attempted to halt or limit the export of water from the basin as early as 1979 due to concerns regarding overdraft and degradation of water quality (Mitchell, 1979; Huntley, 1980). McDougal Water Company ceased groundwater extraction for export in 1984.

1998 Baseline Conditions

Partial implementation of the Proposed Action has resulted in variable but presumably increasing water consumption since approximately 2000, based on the annual groundwater reports provided to the County by USG.

Water level measurements have been made by the USGS at wells in the Basin since at least the 1970s. The USGS has also conducted water-quality sampling at some of these wells over the same time period. The USGS monitoring was established in the 1970s to evaluate suspected overdraft conditions and the threat of water quality degradation in the basin (Montgomery-Watson, 1995, page 2-1). Table 3.3-5, Summary of Well Data, lists the wells with available water level data and water quality data, the dates of the available data, and the well construction information. Well locations are shown on Figure 3.3-4. For some wells, water-quality sampling only occurred in the 1980s or 1990. For other wells, a complete analysis of all significant water-quality parameters (most notably the alkalinity) did not begin until 1997.

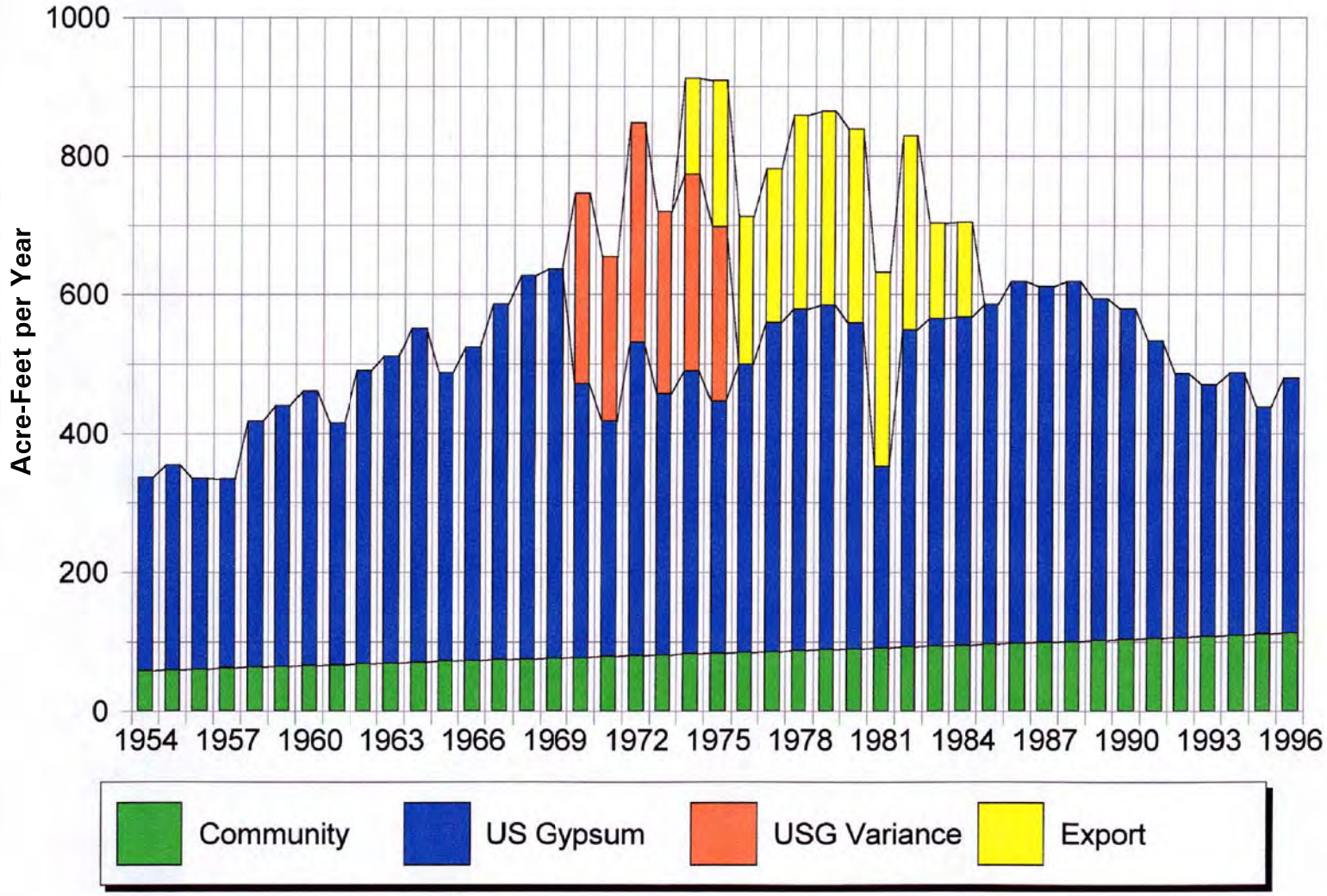

Figure 3.3-8
Annual Water Production
US GYPSUM EXPANSION/MODERNIZATION PROJECT
IMPERIAL COUNTY, CALIFORNIA

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TABLE 3.3-5
SUMMARY OF WELL DATA
OCOTILLO/COYOTE WELLS GROUNDWATER BASIN

Well	Surface Elev (ft amsl)	Total Depth (ft bgs)	Perforated Interval (ft bgs)	Diameter (inches)	Use	Available Water-Level Data	Available Water Chemistry Data	Notes	Lat	Long
Yuha Estates Area										
17S/10E-11B1	376	301		7	Domestic	1975-76, 1978-01		McDougal	324138	1155529
17S/10E-11G1	380	300	160-300	8	Domestic/ Commercial	1976, 1971-72, 75-76, 78-01			324123	1155529
17S/10E-11G2	375	335	235-315	6.6	Domestic	1971, 1975-82, 1984	1972, 1977-82		324123	1155531
17S/10E-11G4	382	199/500		10.75	Unused	1978, 81-01			324119	1155532
17S/10E-11H1	380	329.9		8	Domestic	1968, 1978-91			324114	1155523
17S/10E-11H2	376	344		4		1973, 1978-87	1983-86		324118	1155521
17S/10E-11H3	380	348	202-333	5	Domestic	1987-2001	1987-89, 1991, 1993-2001		324117	1155520
Elsinore-Laguna Salada Fault Area										
16S/9E-24B1	385	129	125-128.5	2	Observation	1976-2001	1977-1990, 1992, 1994-01	USGS	324608	1155935
16S/9E-24D1	385	149	145.5-149	2	Observation	1976-2001	1977-1990, 1992, 1994-01	USGS	324558	1155952
16S/10E-27R1	300	104	102-104	2	Observation	1975-2001		USGS	324430	1155555
16S/10E-29H1	251	39	37-39	2	Observation	1975-2001		USGS	324458	1155703
16S/10E-29L1	280	48	44.5-48	2	Observation	1976-1988	1977-88	USGS	324440	1155743
16S/10E-29R2	258	30	28-30	2	Unused	1975-1989			324428	1155707
Ocotillo-Nomirage Area										
16S/9E-25K2	364	372	132-192, 242-372	10	Commercial	1972, 1975-01	1972-83, 1988-90, 1992, 1994-01	McDougal	324439	1155934
16S/9E-25Q1	372	128		8	Unused	1974, 1976, 1981-92			324426	1155936
16S/9E-35M1	616	535	415-495	8	Domestic	1962, 1975-89			324345	1160100
16S/9E-36D2	433	200	150-200	8	Domestic	1975-2001	1975-90		324422	1160003
16S/9E-36G4	382	560	340-560	10.75	Commercial	1975-2001		Westwind	324401	1155932
16S/9E-36H1 USGS	338	410	157-372	10.75	Industrial	1954, 60, 66, 74, 76-2001	1963, 1977-89, 1991, 1993-01	US Gypsum #5	324407	1155909

The variations in the time period of available and reliable data regarding water production, water levels, and water quality complicate the process of identifying the baseline conditions for the Project. For the pumping by USG, the baseline is considered the average water production for the period form 1994 through 1998, which is 347 AF/yr. Based on the available information, the appropriate baseline for water levels and water quality parameters is defined by the conditions that existed in 1996-1997, since that was the latest pre-Proposed Action data available. Thus, the data from this time period will be used as the point of comparison to evaluate potential future impacts from the proposed increase in groundwater extraction rates for the Project. The baseline data are summarized in Tables 3.3-6A, B and C, Depth to Groundwater and Groundwater Surface Elevation. It is important to note, however, that due to the limited information available for definition of the baseline, the evaluation of potential impacts must rely heavily on all of the available historical data for the Ocotillo/Coyote Wells Groundwater Basin, as reported in these table references.

3.3.3 Plant Water Usage: Thresholds of Significance, Environmental Consequences, and Mitigation Measures

3.3.3.1 Approach

The County and local water users have expressed concerns regarding the conditions and possible degradation of water quality in the Ocotillo/Coyote Wells Groundwater Basin. These concerns were the basis for initiating the USGS water-level measurement and water-quality sampling program, and the reason the 1977 USGS modeling study was conducted. Previous studies of the Ocotillo/Coyote Wells Groundwater Basin have relied primarily on water-balance calculations and numerical modeling to evaluate potential impacts to water quantity and water quality from existing or projected rates of groundwater pumping (e.g. USGS, 1977; Huntley, 1979; Montgomery-Watson, 1995; Bookman-Edmonston, 1996). Based on detailed review of these previous studies, the available data appreciably limits the usefulness of these methods for evaluating impacts to the Basin.

The water-balance calculations and numerical modeling conducted previously were regional in approach. In general, they address the entire Ocotillo/Coyote Wells Groundwater Basin. This regional, basin-wide perspective provides valuable information and insight into the hydrologic conditions and behavior of the groundwater basin on a large-scale basis. This perspective, however, limits the ability of the previous studies to address local impacts or the performance of individual wells or groups of wells. These limitations are acknowledged by Montgomery-Watson (1995) and Bookman-Edmonston (1996).

Table 3.3-6A
Depth to Groundwater and Groundwater Surface Elevation
Ocotillo-Nomirage Area

WELL	16S/9E-25K2			16S/9E-25Q1			16S/9E-36D2			16S/9E-36G4			16S/9E-36H1			16S/9E-35M1		
	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf
DATE	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)
03/21/54													68.5	338	269.5			
05/15/60													85		253			
03/15/62																321	616	295
06/15/64																		
08/15/66													81		257			
04/26/67																		
09/30/71																		
07/25/72																		
08/25/72	83	364	281															
03/15/73																		
12/01/74				104.24	372	267.76							80.07		257.93			
12/30/74				104.3		267.7												
05/12/75																		
05/14/75																		
06/01/75																		
06/28/75	129.5		234.5				157.9	433	275.1	136.47	382	245.53				323.16		292.84
07/27/75																		
12/09/75																		
01/08/76	99.7		264.3	104.38		267.62	158.16		274.84	126.36		255.64	80.21		257.79			
10/14/76	111.57		252.43				158.46		274.54	128.39		253.61				323.08		292.92
11/10/76																		
11/17/76																		
12/10/76																		
04/27/77	104.1		259.9				158.57		274.43	129.43		252.57	81.66		256.34	327.04		288.96
10/04/77	145.62		218.38				158.87		274.13	126.14		255.86	82.65		255.35	325.38		290.62
04/26/78	98.05		265.95				158.79		274.21	124.7		257.3	80.89		257.11			
05/24/78																324.01		291.99
06/19/78																		
06/24/78																		
06/25/78																		
07/05/78																		
07/06/78																		
08/02/78																		
10/04/78	144.07		219.93				159.15		273.85	128.15		253.85	83.21		254.79	323.66		292.34
03/15/79	101.47		262.53															
03/16/79																		
03/22/79							159.1		273.9	126.68		255.32	91.82		256.18	325.26		290.74
09/13/79	105.8		258.2				159.35		273.65	126.05		255.95	83.26		254.74	323.8		292.2
03/12/80	93.22		270.78										82.01		255.99			
03/20/80	144.85		219.15															
04/18/80	147.3		216.7															
05/02/80	93.93		270.07				159.3		273.7	124.1		257.9				323.84		292.16
09/25/80	145.3		218.7				159.58		273.42	126.53		255.47	82.67		255.33	323.89		292.11
04/29/81	95.04		268.96				159.73		273.27	125.23		256.77	81.25		256.75	324.11		291.89
11/06/81	95.56		268.44	106.89		265.11	160.1		272.9	124.24		257.76	82.72		255.28	323.98		292.02

03/13/82	95.11		268.89	106.41		265.59	160.1		272.9	123.66		258.34	81.65		256.35	324.17		291.83
10/06/82										134.95		247.05	82.89		255.11			
10/07/82	96.84		267.16	107.2		264.8	160.36		272.64	125.77		256.23				324.41		291.59
04/01/83	95.1		268.9	105.85		266.15	160.04		272.96	124.66		257.34	81.02		256.98	324.43		291.57
09/22/83																		
10/26/83	95.9		268.1	107.18		264.82	160.49		272.51	123.3		258.7				324.69		291.31
10/27/83	96.22		267.78										82.51		255.49			
04/11/84										124.95		257.05	82.32		255.68			
04/12/84	94.04		269.96	106.24		265.76	160.32		272.68	123.71		258.29				324.48		291.52
10/24/84	93.48		270.52	106.08		265.92	160.31		272.69	126.35		255.65	82.78		255.22	324.56		291.44
04/25/85	93.73		270.27	106.14		265.86	160.23		272.77	124.86		257.14	82.62		255.38	325.77		290.23
10/31/85	93.86		270.14	106.56		265.44	160.56		272.44	122.63		259.37	84.08		253.92	324.87		291.13
03/27/86	93.63		270.37	105.92		266.08	160.37		272.63	122.14		259.86	83.29		254.71			
04/03/86	93.54		270.46													325.81		290.19
10/23/86	94.24		269.76	106.72		265.28	160.68		272.32	122.61		259.39	84.19		253.81	329.06		286.94
10/24/86	94.03		269.97															
04/01/87	93.78		270.22	106.04		265.96	160.5		272.5	122.4		259.6	83.42		254.58	325.27		290.73
10/23/87	94.06		269.94	106.73		265.27	160.78		272.22	123.39		258.61	84.06		253.94	325.13		290.87
03/15/88	93.94		270.06	106.25		265.75	160.7		272.3	122.65		259.35	83.84		254.16	326.21		289.79
10/19/88	94.4		269.6	107.17		264.83	160.92		272.08				84.65		253.35	325.16		290.84
03/17/89	94.23		269.77	106.71		265.29	160.94		272.06	123.1		258.9	83.67		254.33	326.01		289.99
10/31/89	94.47		269.53	107.33		264.67	161.15		271.85	125.9		256.1	84.2		253.8			
03/20/90	94.46		269.54	107.18		264.82	161.19		271.81	126.93		255.07	84.04		253.96			
10/24/90	94.59		269.41	107.51		264.49	161.3		271.7	129.04		252.96	84.07		253.93			
04/02/91	94.47		269.53	107.11		264.89	161.29		271.71	128.39		253.61	83.45		254.55			
10/07/91	94.57		269.43	107.27		264.73	161.36		271.64	131.26		250.74	83.75		254.25			
04/07/92	94.46		269.54				161.35		271.65	127.85		254.15	83.96		254.04			
10/28/92	95.07		268.93				161.57		271.43	127.62		254.38	84.9		253.1			
04/14/93							161.56		271.44	126.52		255.48	84.32		253.68			
10/21/93	95.08		268.92				161.74		271.26	126.05		255.95						
03/14/94							161.71		271.29	125.11		256.89						
03/24/94	94.85		269.15										83.67		254.33			
10/27/94							161.84		271.16	126.11		255.89	84.69		253.31			
03/30/95	94.32		269.68										82.02		255.98			
05/24/95							162.02		270.98	138.36		243.64						
07/31/95																		
10/17/95							161.85		271.15	123.97		258.03	82.6		255.4			
03/20/96	94.61		269.39				161.75		271.25	128.5		254.5	82.11		255.89			
10/16/96							162.02		270.98	129.87		252.13						
03/24/97	96.59		267.41				161.9		271.1	125.38		256.62	82.39		255.61			
10/20/97							162.05		270.95	125.96		256.04	82.81		255.19			
03/23/98							162.06		270.94	125.2		256.8						
03/30/98																		
10/13/98							162.09		270.91	126.97		255.03	83.36		254.64			
03/23/99							162.24		270.76	128.16		253.84	83.04		254.96			
10/25/99							162.33		270.67	127.93		254.07	83.67		254.33			
03/29/00							162.54		270.46	132.6		249.4	84.24		253.76			
10/23/00							162.57		270.43	128.7		253.3	85.13		252.87			
03/26/01							162.87		270.13				85.54		252.46			

DTW = Depth to water
Surf El = Surface elevation to well casing
GW Surf = Groundwater surface elevation

ft bgs = feet below ground surface
ft amsl = feet above mean sea level

Table 3.3.6B
Depth to Groundwater and Groundwater Surface Elevation
Yuha Estates Area
Ocotillo/Coyote Wells Groundwater Basin

WELL	17S/10E-11H1			17S/10E-11H2			17S/10E-11H3			17S/10E-11G1			17S/10E-11G2			17S/10E-11G4			17S/10E-11B1		
	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf
DATE	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)
06/15/64	158.27	380	221.73																		
04/26/67										170	380	210									
09/30/71										150		230	158	375	217						
07/25/72										164		216									
03/15/73				165	376	211															
06/01/75													164		211						
06/28/75													164.25		210.75				156.8	376	219.2
07/27/75										164.94		215.06									
01/08/76										165.11		214.89							154.8		221.2
10/14/76													164.04		210.96						
04/27/77													163.68		211.32						
10/04/77													164.45		210.55						
05/24/78				179.02		196.98							164.91		210.09						
06/19/78	226.46		153.54										164.98		210.02						
06/24/78	195.36		184.64	182.7		193.3													157.9		218.1
06/25/78	164.2		215.8	169.4		206.6							164.8		210.2						
07/05/78										195.56		184.44	165.09		209.91	193.18	382	188.82			
07/06/78										195.58		184.42	165.09		209.91	193.12		188.88			
08/02/78																193.35		188.65			
10/04/78													165.58		209.42						
03/15/79	164.29		215.71	171.16		204.84				204.38		175.62	165.58		209.42				158.27		217.73
03/16/79	164.27		215.73																		
03/22/79	164.24		215.76	170.52		205.48							165.6		209.4				158.25		217.75
09/13/79	166.05		213.95	176.29		199.71				216.86		163.14	166.84		208.16				159.53		216.47
03/12/80	166.55		213.45							222.82		157.18									
03/20/80	166.59		213.41							218.29		161.71									
04/18/80	166.81		213.19							213.7		166.3									
05/02/80	167.65		212.35	176.6		199.4				216.6		163.4	167.64		207.36				159.96		216.04
09/25/80	170.46		209.54	180.36		195.64				225.64		154.36	168.93		206.07				161.06		214.94
04/29/81	170.69		209.31	182.35		193.65				226.73		153.27	170.25		204.75	199.37		182.63	161.47		214.53
11/06/81	173.35		206.65	184.43		191.57				232.8		147.2	172.38		202.62				162.47		213.53
03/13/82	177		203	185.44		190.56				228.15		151.85	172.92		202.08				162.47		213.53
10/07/82	180.83		199.17	189.87		186.13				221.2		158.8	178.03		196.97	206.21		175.79	163.03		212.97
04/01/83	174.12		205.88	185.95		190.05				205.99		174.01				203.14		178.86	163.03		212.97
10/26/83	174.33		205.67	187.34		188.66				195.86		184.14				199.31		182.69	163.37		212.63
04/12/84	172.39		207.61	186.39		189.61				191.17		188.83				196.28		185.72	163.34		212.66
10/24/84	171.79		208.21	186.75		189.25				187.63		192.37				193.25		188.75	163.49		212.51
04/25/85	171.87		208.13	186.77		189.23										191.9		190.1	163.1		212.9
10/31/85	171.69		208.31	190.27		185.73				185.31		194.69				189.71		192.29	163.29		212.71
04/03/86	171.37		208.63	185.06		190.94				182.92		197.08				188.26		193.74	162.99		213.01
10/23/86	171.33		208.67	187.41		188.59				182.68		197.32				187.22		194.78	163.3		212.7

Table 3.3.6B (Continued)

WELL	17S/10E-11H1			17S/10E-11H2			17S/10E-11H3			17S/10E-11G1			17S/10E-11G2			17S/10E-11G4			17S/10E-11B1		
	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf	DTW	Surf El	GW Surf
DATE	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft amsl)
04/01/87	171.01		208.99							182.73		197.27				186.69		195.31	163.14		212.86
10/23/87	173.39		206.61				179.29	380	200.71	182.48		197.52				185.92		196.08	163.82		212.18
03/15/88	172.18		207.82				178.81		201.19	181.34		198.66				185.21		196.79	163.29		212.71
10/19/88	171.02		208.98				180.11		199.89	180.5		199.5				184.26		197.74	164.05		211.95
03/17/89	170.45		209.55				177.99		202.01	180.95		199.05				183.91		198.09	163.79		212.21
10/31/89	169.84		210.16				179.08		200.92	181.22		198.78				183.47		198.53	163.84		212.16
03/20/90	169.55		210.45				177.73		202.27	179.61		200.39				182.79		199.21	163.36		212.64
10/24/90							178.57		201.43	179.45		200.55				182.14		199.86	163.72		212.28
04/02/91	172.44		207.56				176.64		203.36	178.21		201.79				181.45		200.55	163.29		212.71
10/07/91	170.39		209.61							177.59		202.41				180.7		201.3	163.72		212.28
04/07/92							175.57		204.43	176.73		203.27				179.76		202.24	163.13		212.87
10/28/92							176.84		203.16	178.03		201.97				180.08		201.92	163.65		212.35
04/14/93							175.47		204.53	176.97		203.03				179.46		202.54	163.21		212.79
10/21/93							176.35		203.65	178.89		201.11				180.1		201.9	163.87		212.13
03/24/94										178.02		201.98				179.56		202.44	163.34		212.66
10/27/94							176.36		203.64							179.58		202.42	163.56		212.44
03/30/95							175.64		204.36							178.97		203.03	163.18		212.82
07/31/95										177.16		202.84									
10/17/95							178.32		201.68	177.15		202.85				178.46		203.54			
03/20/96										176.94		203.06				178.12		203.88	163.2		212.8
10/16/96							178.53		201.47	177.52		202.48				178		204	163.62		212.38
03/24/97							175.69		204.31	176.78		203.22				177.74		204.26	163		213
10/20/97							176.69		203.31	176.35		203.65				177.34		204.66	163.05		212.95
03/23/98							175.29		204.71	175.42		204.58				176.82		205.18			
10/13/98							175.43		204.57	175.5		204.5				176.3		205.7			
03.23/99							176		204	174.97		205.03				176.06		205.94	162.51		213.49
10/25/99							176.39		203.61	174.59		205.41				175.66		206.34	162.53		213.47
03/29/00							175.89		204.11	174.14		205.86				175.34		206.66	163.33		213.67
10/23/00							176.53		203.47	174.03		205.97				174.94		207.06	162.47		213.53
03/26/01							174.26		205.74	173.38		206.62				174.48		207.52	162.02		213.98

DTW = Depth to water ft bgs = feet below ground surface
Surf El = Surface elevation to well casing ft amsl = feet above mean sea level
GW Surf = Groundwater surface elevation

Table 3.3.6C
Depth to Groundwater and Groundwater Surface Elevation
Area East of Coyote Wells
Ocotillo/Coyote Wells Groundwater Basin

WELL	16S/9E-24B1			16S/9E-24D1			16S/10E-29H1			16S/10E-29L1			16S/10E-29R2		
DATE	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)
03/15/62															
06/15/64															
04/26/67															
09/30/71															
07/25/72															
03/15/73															
05/12/75							22.2	251	228.8				9.74	258	248.26
05/14/75															
06/01/75															
06/28/75							22.03		228.97				9.95		248.05
07/27/75															
12/09/75							22.02		228.98						
01/08/76													9.95		248.05
10/14/76							22.04		228.96				9.94		248.06
11/10/76	105.35	385	279.65							23.32	280	256.68			
11/17/76	105.34		279.66							23.34		256.66			
12/10/76				131	385	254									
04/27/77	105.4		279.6	103.86			21.9		229.1	23.64		256.36	10.32		247.68
10/04/77	105.44		279.56	103.93			21.76		229.24	23.98		256.02	10.95		247.05
05/24/78	105.49		279.51	104.07			21.53		229.47	24.08		255.92	10.47		247.53
06/19/78															
06/24/78															
06/25/78															
07/05/78															
07/06/78															
08/02/78															
10/04/78	105.59		279.41	104.16		280.84	21.66		229.34	24.59		255.41	11.75		246.25
03/15/79	105.62		279.38	104.2		280.8	21.55		229.45	24.37		255.63			
03/16/79															
03/22/79													11.07		246.93
09/13/79	105.4		279.6	104.28		280.72	21.96		229.04	25.07		254.93	12.61		245.39
03/12/80															
03/20/80															
04/18/80															
05/02/80	105.74		279.26	104.4		280.6	22		229	25.27		254.73	12.49		245.51

Table 3.3.6C (Continued)

WELL	16S/9E-24B1			16S/9E-24D1			16S/10E-29H1			16S/10E-29L1			16S/10E-29R2		
DATE	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)	DTW (ft bgs)	Surf El (ft amsl)	GW Surf (ft amsl)
09/25/80	105.78		279.22	104.48		280.52	22.24		228.76	25.8		254.2	13.49		244.51
04/29/81	105.84		279.16	104.58		280.42	22.34		228.66	26.03		253.97	13.67		244.33
11/06/81	105.9		279.1	104.71		280.29	22.53		228.47	26.63		253.37	14.43		243.57
03/13/82	105.95		279.05	104.77		280.23	22.55		228.45	26.5		253.5	14.13		243.87
10/07/82	106.03		278.97	104.89		280.11	22.74		228.26	27.05		252.95	14.92		243.08
04/01/83	106.1		278.9	104.97		280.03				26.29		253.71	13.89		244.11
09/22/83										27.25		252.75			
10/26/83	106.16		278.84	105.1		279.9				27.33		252.67	15.65		242.35
04/12/84	106.22		278.78	105.2		279.8				27.49		252.51	15.66		242.34
10/24/84	106.29		278.71	105.27		279.73	22.99		228.01	27.94		252.06	16.24		241.76

Due to the regional perspective of the previous water balance calculations and numerical models, there is a concern that these previous studies are not focused enough to predict the potential local impacts of future increases in pumping with sufficient detail for this evaluation. Therefore, a different set of analyses have been performed for this Project. For this evaluation, the analyses selected include analytical calculations of Basin conditions and comparative analysis of water level and groundwater chemistry data. In addition, the numerical modeling recently conducted (Bookman-Edmonston, 2004) was intended to address issues and concerns specific to the Proposed Action, and received significant input and review from the USGS and the preparers of this EIR/EIS. These evaluations are presented below.

3.3.3.2 Basin Conditions

The hydrologic conditions within the Ocotillo/Coyote Wells Groundwater Basin can be defined using standard hydrologic equations, such as Darcy's Law. Darcy's Law states that:

$$Q = K \times I \times A,$$

where Q is the rate of groundwater discharge (units of volume per time, such as AF/yr), K is the hydraulic conductivity of the aquifer (units of length per time, such as feet per day), I is the hydraulic gradient, or slope of the groundwater surface (units of length per length, such as foot per foot), and A is the cross-sectional area of the aquifer across which the groundwater discharge, Q, is perpendicularly occurring (units of area, such as square feet).

In some instances, it is easier to estimate the transmissivity of the aquifer, T, as opposed to the hydraulic conductivity, K. The transmissivity is simply the hydraulic conductivity, K, multiplied by the aquifer thickness, b. The cross sectional area of the aquifer, A, can also be defined as the aquifer thickness, b, multiplied by the length of the cross-sectional area across the ground surface, L (if the cross-section is assumed as rectangular). With these terms, Darcy's Law may also be rewritten as:

$$Q = T \times I \times L.$$

The groundwater flow rate, or velocity, q (units of distance per time, such as feet per year) is also defined as:

$$q = (K \times I)/n,$$

where n is the effective porosity of the aquifer and the other terms are as defined above.

Figures 3.3-5 and 3.3-6 present groundwater contours of the Basin as interpreted by the USGS (1977) and Bookman-Edmonston (1996) for the years 1975 and 1995, respectively. Comparison of these two figures indicates that the groundwater contours have been relatively consistent in the areas of the Basin that are more than a few miles from Ocotillo, Nomirage, and Yuha Estates. Thus, the hydraulic gradients that can be calculated from these figures can be used in the evaluation of Basin conditions.

Three lines extending across different parts of the Basin are indicated on Figures 3.3-5 and 3.3-6. These lines are drawn parallel to the groundwater contours. The first line is located in the upgradient part of the Basin, approximately three miles northeast of Ocotillo. A small embayment exists at this location where the bedrock of the Jacumba Mountains extends northward into the Basin, causing a narrowing of the alluvial aquifer. The second line exists in the downgradient part of the Basin located to the west of the Laguna Salada fault, north of the international border with Mexico. The third line extends across the downgradient part of the Basin that is present to the east of Coyote Wells and the Laguna Salada fault zone.

In the upgradient area of the aquifer, as indicated on Figures 3.3-5 and 3.3-6, the hydraulic gradient is approximately 30 feet per mile. The length across the alluvial basin is approximately 3.25 miles. For the recent numerical modeling (Bookman-Edmonston, 2004), the alluvial material in the basin was determined to have an average hydraulic conductivity of 15 ft/day, resulting in a transmissivity of about 1,000 ft^2/day. The effective porosity can be estimated at approximately 30 percent. Using these values and the equations presented above, the groundwater discharge, or amount of groundwater flowing through the upgradient area of the Basin, is approximately 800 AF/yr. The average groundwater velocity, or flow rate, is about 100 ft/yr, meaning that it takes over 50 years for the groundwater to flow one mile.

Figure 2 of the USGS (1977) model report and Figure 7-1 of the Bookman-Edmonston (1996) report each present a map of the mean annual precipitation across the Jacumba Mountains, Coyote Mountains, and the Ocotillo/Coyote Wells Groundwater Basin. Based on the distribution of rainfall in the mountains, and the extent of the mountain front along the edge of the Basin, it is estimated that at least two-thirds of the groundwater recharge enters the Basin in the upgradient area of the aquifer. Thus, if the groundwater discharge from the upgradient area of the aquifer is approximately 800 AF/yr, the total recharge to the Basin may be as high as 1,200 AF/yr. As discussed in

Section 3.3.1, the recharge to the Basin was calibrated to be approximately 1,077 AF/yr. These two estimates of recharge to the Basin differ by only about 10 percent. Thus, the average annual recharge to the Basin can be estimated to be between about 1,100 AF/yr and 1,200 AF/yr, given that the two estimates were calculated using completely different approaches (groundwater discharge versus model calibration) but yield similar results. It should be noted, however, that it takes several decades for the recharge that occurs along the mountain front to reach the communities of Ocotillo, Nomirage, and Yuha Estates.

In the downgradient area of the aquifer near the international border with Mexico, as indicated on Figures 3.3-5 and 3.3-6, the hydraulic gradient is approximately six feet per mile. The length across the alluvial basin is approximately 5.25 miles. Using the model-calibrated hydraulic conductivity of 15 ft/day, the transmissivity of the aquifer in this area of the Basin is about 2,100 ft^2/day. The effective porosity can be estimated at approximately 30 percent. Using these values and the equations presented above, the groundwater discharge, or amount of groundwater flowing through the downgradient area of the Basin and across the international border, is approximately 550 AF/yr. The average groundwater velocity, or flow rate, is about 20 ft/yr, meaning that it will take over 250 years for the groundwater to flow one mile.

In the downgradient area of the aquifer east of Coyote Wells and the Laguna Salada fault zone, as indicated on Figures 3.3-5 and 3.3-6, the hydraulic gradient is approximately 40 feet per mile. The length across the alluvial basin is approximately five miles. For the recent numerical modeling (Bookman-Edmonston, 2004), the Tertiary marine sediments in this area of the Basin were determined to have an average hydraulic conductivity of one ft/day, resulting in a transmissivity of about 500 ft^2/day. The effective porosity can be estimated at approximately 30 percent. Using these values and the equations presented above, the groundwater discharge, or amount of groundwater flowing through the downgradient area of the Basin to the east of the Elsinore-Laguna Salada fault zone, is approximately 840 AF/yr. The average groundwater velocity, or flow rate, is about 10 ft/yr, meaning that it will take over 500 years for the groundwater to flow one mile.

Based on the above calculations, the total groundwater discharge from the Basin is estimated to be approximately 1,300 AF/yr. This value is less than the total groundwater underflow of 1900 AF/yr to 1999 AF/yr estimated by the USGS (1977), Huntley (1979), and Bookman-Edmonston (1996) by approximately 33 percent, but is greater than the 990 AF/yr estimated by the recent groundwater model (Bookman-Edmonston, 2004) by approximately 31 percent. These same previous studies indicate

that historic natural evapotranspiration rates from the Basin in areas of shallow groundwater may have ranged from 250 AF/yr to 400 AF/yr. Thus, the total rate of natural groundwater loss from the Basin, exclusive of groundwater pumping for domestic, commercial, industrial, or agricultural purposes could have been between 1,550 AF/yr to 1,700 AF/yr. Comparing these estimates of loss with the total recharge estimate of 1,100 AF/yr to 1,200 AF/yr indicates that the rate of groundwater outflow from the Basin may have been greater than the rate of recharge prior to the initiation of pumping. Similar conditions have been observed in other basins in Imperial County (see, for example, Section 3.3.3, below) due to long-term climatic changes. Specifically, if climatic conditions were much wetter several centuries or even millennia ago, it would take thousands of years for the recharge from the prior wetter periods to drain from the basin given the very slow rates of groundwater movement cited above. The rate of natural groundwater outflow will exceed the rate of recharge until the Basin drains to the point where the hydraulic gradients decrease and the recharge and outflow are once again in equilibrium. Until this equilibrium point is reached, water level elevations throughout much of the Ocotillo/Coyote Wells Groundwater Basin will decrease, even in the absence of pumping.

In many groundwater basins, removal of groundwater, for example by pumping, can cause an increase in the rate of recharge. This can occur by increasing the hydraulic gradient in areas where inflow occurs from an adjacent groundwater basin. It can also occur by lowering the water table near surface-water bodies, resulting in a greater rate of percolation. In the Ocotillo/Coyote Wells Groundwater Basin, however, the only source of recharge is seasonal rainfall runoff from the adjacent mountains. The rate of recharge will fluctuate on an annual basis based on variations in the amount of rainfall. The average rate of recharge, however, is expected to remain constant unless there are major long-term shifts in climatic conditions. The long groundwater travel times across the basin (centuries to millennia) will tend to even out short-term (e.g. annual) fluctuations in rainfall amounts.

In the Ocotillo/Coyote Wells Groundwater Basin, pumping may reduce the rate of groundwater loss to some degree. For example, a drop in the water level to the east of Coyote Wells is believed to have reduced the rate of evapotranspiration by several hundred AF/yr (USGS, 1977). Pumping has also caused the hydraulic gradient near the international border with Mexico to flatten. The flatter hydraulic gradient reduces the rate of groundwater discharge. If the rate of pumping occurring in the Basin is approximately equal to the reduction in discharge, it is possible that the additional pumping will not accelerate the natural rate of water-level decline, even though an increase in extraction rates occurs. This possibility is discussed further below.

To the east of Coyote Wells and the Laguna Salada fault, the hydrogeology of the Ocotillo/Coyote Wells Groundwater Basin is dominated by the occurrence of the Tertiary marine sediments. As discussed above, these sediments have a transmissivity that is less than one tenth that of the alluvial aquifer, which is present primarily to the west of the fault zone. The hydraulic gradient to the east of the fault zone is about five times greater (or steeper) than the hydraulic gradient in the Ocotillo area. Several previous studies attribute this difference in hydraulic gradient to some sort of barrier that may exist at the location of a postulated subsurface connection between the Elsinore fault and the Laguna Salada fault.

As part of this evaluation, specific evidence that the fault zone has its own material properties, and acts as a barrier, could not be identified. The change in gradient can be attributed solely to the difference in material types, and their respective properties (e.g., transmissivity), on either side of the fault. Furthermore, the magnitude of the gradient to the east of the fault is not unprecedented within the Basin. In the upgradient area of the Basin, as discussed above, the narrowing of the Basin results in a hydraulic gradient that is almost the same as it is to the east of Coyote Wells in the Tertiary marine sediments. Thus, variations in the Basin are most likely a result of features that cause a restriction in flow. These features can be a narrowing of the Basin, acting like a bottleneck, or a change of material types to one that has a lower transmissivity. In accordance with Darcy's Law, as described above, if the length across the Basin decreases and/or the transmissivity decreases, then the hydraulic gradient must increase to maintain discharge. This issue is discussed further below.

Initial evaluations conducted for this EIR/EIS prompted USG's consultant, Bookman-Edmonston, to conduct additional literature research and field observations. Bookman-Edmonston (2003, p. 2) concluded that "modeling the eastern boundary (of the alluvial material) as a less permeable linear zone representing the extension of the Elsinore fault to the Laguna Salada fault is clearly inconsistent with current geologic interpretation of the basin." As a result of this additional study (Bookman-Edmonston, 2003), the revised numerical model shows the transition from alluvial material to Tertiary marine sediments east of Coyote Wells as a simple upward fold of the underlying bedrock and Tertiary sediments. This folding that has removed the alluvial material and brought the Tertiary sediments to the surface. The interpretation of conditions east of Coyote Wells in the revised numerical model is significantly different than the conditions assumed in previous modeling efforts (USGS, 1977; Bookman-Edmonston, 1996).

3.3.3.3 Water Level Data

As discussed above, the USGS has been monitoring water levels in a number of wells within the Ocotillo/Coyote Wells Groundwater Basin since the early 1970s due to concerns regarding potential overdraft conditions and degradation of water quality. The data collected by the USGS is included in Appendix B and summarized in Tables 3.3-6A-C for selected wells within the Basin. For this analysis, water level data from three separate areas of the basin have been evaluated. These areas include Ocotillo/Nomirage, Yuha Estates, and the area east of Coyote Wells.

Ocotillo/Nomirage

The majority of the groundwater pumping in the Ocotillo/Coyote Wells Groundwater Basin occurs in the Ocotillo/Nomirage area. Figure 3.3-9, Ocotillo/Nomirage Area Hydrograph, is a hydrograph of the water level data from the Ocotillo/Nomirage area. A hydrograph shows the water level data as it changes over time. The wells within the Ocotillo/Nomirage area for which adequate data exist include:

- 16S/9E-25K2 (Clifford well/McDougal Water Co.)
- 16S/9E-25Q1
- 16S/9E-35M1
- 16S/9E-36D2
- 16S/9E-36G4 (Westwind)
- 16S/9E-36H1 (U.S. Gypsum No. 5)

Information regarding well construction and sampling history are presented in Table 3.3-5.

Well 16S/9E-25K2 was pumped for export of water to Mexico from 1974 to 1984. As indicated in Table 3.3-4 and in Figure 3.3-8, Annual Water Production, water production from this well increased from 138 AF/yr in 1974 to 222 AF/yr in 1977, and then is presumed to have decreased to 137 AF/y from 1978 to 1984. Actual production data after 1978, however, is uncertain. The pumping of this well is readily apparent on the hydrograph (Figure 3.3-9). Pumping of this well caused drops in the water level of 50 feet to 60 feet between 1975 and 1981.

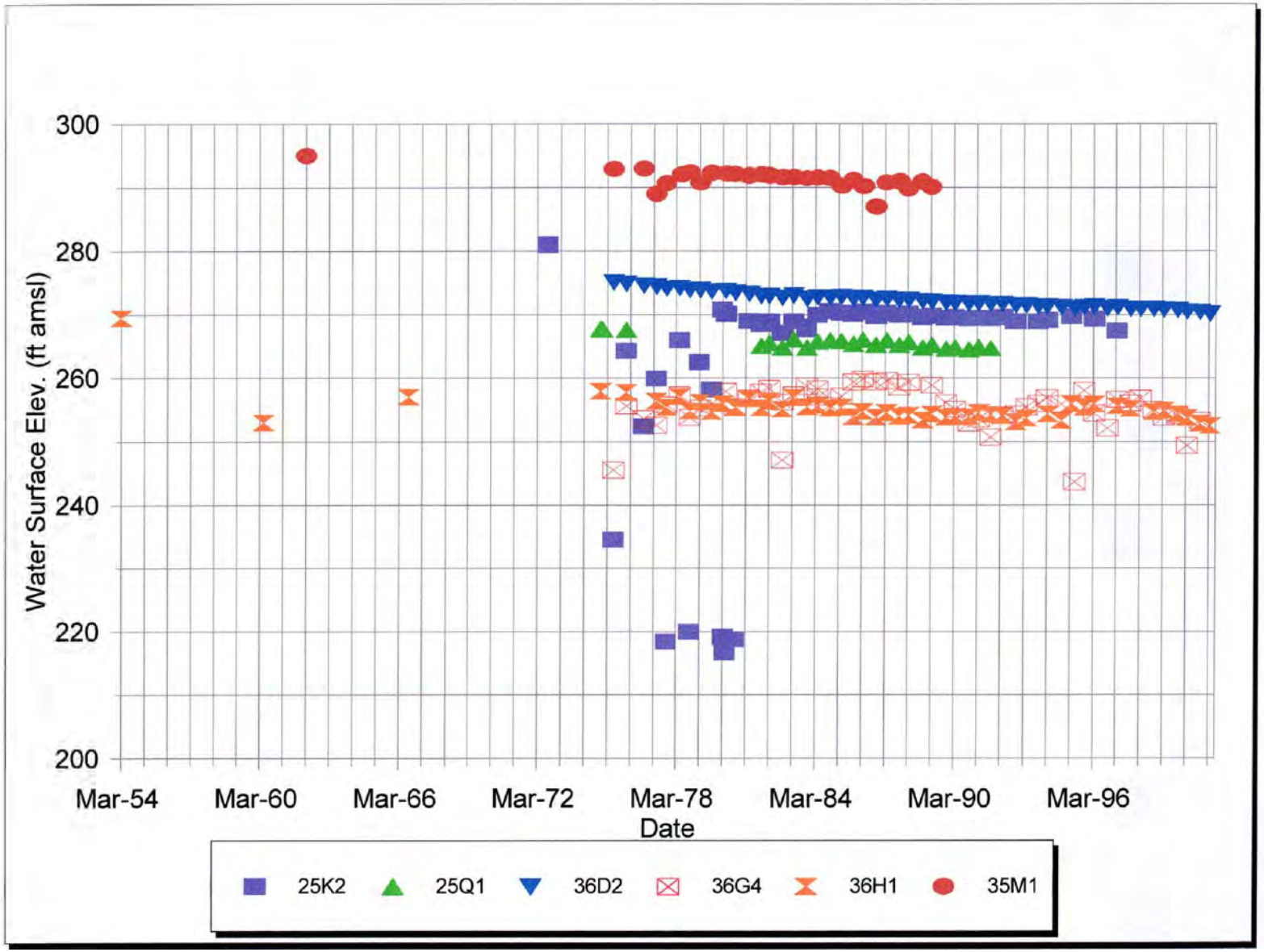

Figure 3.3-9
Ocotillo/Nomirage Area Hydrograph
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Wells 16S/9E-35M1 and 16S/9E-36G4 serve one or more domestic users. The exact pumping rate for each of these wells is unknown. The hydrograph in Figure 3.3-9, however, shows occasional short-term drops in the water level in both of these wells that are most likely indicative of the effects of pumping these wells. The short-term drops in water level are on the order of 10 feet in both wells.

The hydrograph for USG well No. 5 (16S/9E-36H1) shows only minor long-term fluctuations of only a few feet from 1976 through 2001. The total pumping from all three USG wells during this time period varied from about 260 AF/yr to over 500 AF/yr, as shown in Table 3.3-4 and on Figure 3.3-8. The slight fluctuations shown on the hydrograph for USG well No. 5 generally correlate with changes in annual production rate. It is not known how the total water production is distributed among the three USG wells, and it is not possible to evaluate the overall impact of pumping by USG based on the hydrograph for well No. 5.

The hydrographs for all of the wells shown in Figure 3.3-9 indicates that the static (non-pumping) water levels in the Ocotillo/Nomirage area have steadily declined over the last 30 years. The total decline is about five to six feet, for an average rate of water level decline of one foot every five years. The hydrographs for several of the wells, but most notably 16S/9E-36D2, indicate that the decline has been very consistent over this time period. This is somewhat surprising because the rate of rainfall in the basin from 1976 to 1993 was generally above average (see Figure 3.3-2) and the rate of water production from the basin from 1979 to 1996 decreased by almost 45 percent (see Figure 3.3-8).

Yuha Estates

Yuha Estates is located approximately three to four miles southeast and downgradient of the Ocotillo/Nomirage area. The recent literature research and field observations conducted by Bookman-Edmonston (2003) indicate that the geologic conditions in the Yuha Estates area are markedly different than those in the Ocotillo/Nomirage area. The Yuha Estates area sits on both a topographic and structural ridge trending northeast-southwest across the Ocotillo/Coyote Wells Groundwater Basin. The structural ridge is formed by a concave-down curvature of the sedimentary beds referred to as an anticline. The combination of the topographic and structural ridges means that the Tertiary sediments occur at a much higher elevation in the Yuha Estates area than in the Ocotillo/Nomirage area. Bookman-Edmonston (2003) indicates that water from some of the deeper wells in the Yuha Estates area comes, at least partially, from the Tertiary sediments underlying the alluvial material.

Most of the pumping in Yuha Estates is for local domestic use. From 1978 to 1982, water was pumped from one well (17S/10E-11G1) for export to Mexico at a reported rate of approximately 143 AF/yr. Figure 3.3-10, Yuha Estates Area Hydrograph, is a hydrograph of the water level data from the Yuha Estates area. A hydrograph shows the water level data as it changes over time. The wells within the Yuha Estates area for which adequate data exists include:

- 17S/10E-11H1
- 17S/10E-11H2
- 17S/10E-11H3
- 17S/10E-11G1 (McDougal Water Co.)
- 17S/10E-11G2
- 17S/10E-11G4
- 17S/10E-11B1

Information regarding well construction and sampling history are presented in Table 3.3-5.

The hydrograph (Figure 3.3-10) for the Yuha Estates area is dominated by the pumping of well 17S/10E-11G1. Pumping of this well at 143 AF/yr from 1978 to 1982 resulted in a drawdown, or decline in water levels, of almost 70 feet. Drawdown was also observed in all of the other wells in the Yuha Estates area. The magnitude of drawdown in other wells ranged from approximately 8 feet to over 60 feet.

Pumping of well 17S/10E-11G1 ceased 20 years ago. Water levels, however, have still not recovered to their pre-pumping levels. The water levels in the Yuha Estates area are approximately five to 10 feet below the levels recorded in the early 1970s. As shown in Figure 3.3-10, the rate of recharge has been very slow. The water levels in several of the wells appear to have stabilized and suggest that Yuha Estates is experiencing the same long-term decline in water levels as that observed in the Ocotillo/Nomirage area. As discussed above, this decline has occurred despite periods of above-average precipitation and a significant reduction in the rate of pumping over the same time period.

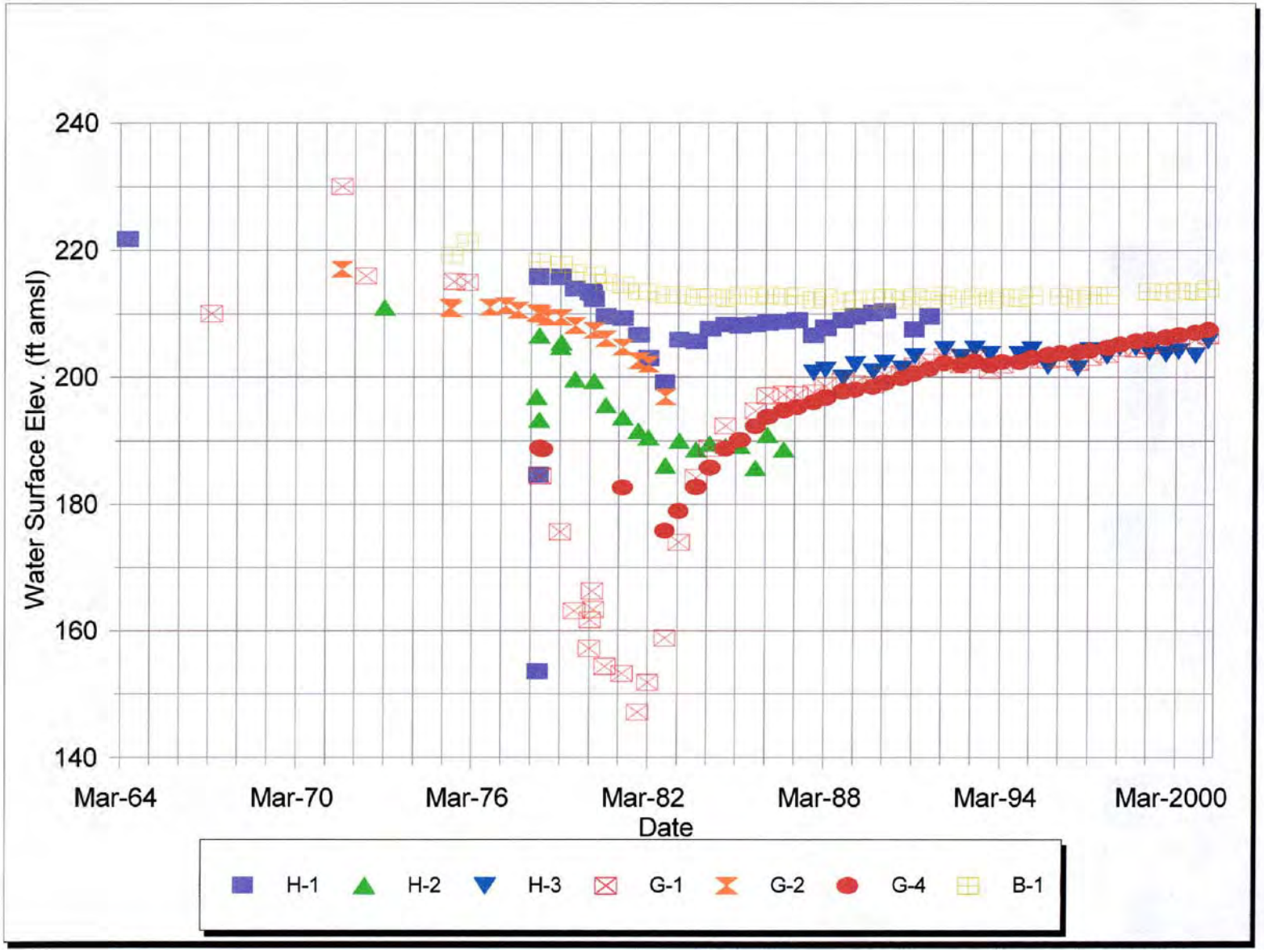

Figure 3.3-10
Yuha Estates Area Hydrograph
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Area East of Coyote Wells

There are several wells that have been monitored on a regular basis in the area east of Coyote Wells. Figure 3.3-11, Area East of Coyote Wells Hydro-Graph, is a hydrograph of the wells in the area near the transition from alluvial material to Tertiary marine sediment outcrops. Wells located west of this transition include:

- 16S/9E-24D1
- 16S/10E-29L1
- 16S/10E-29R2

Wells located east of this transition include:

- 16S/9E-24B1
- 16S/10E-29H1

Wells 16S/10E-24D1 and 16S/10E-24B1 are located across the transition from each other, approximately 1.5 miles north of Ocotillo. As shown in Figure 3.3-11, the water levels in these two wells are nearly identical and have steadily declined over the last 25 years. The total amount of the decline is approximately three feet. The rate of decline is about one-half of the rate of decline in water levels in the Ocotillo/Nomirage area and the Yuha Estates area. The virtually-identical hydrographs for wells 16S/10E-24D1 and 16S/10E-24B1 indicate that the transition is not a fault zone or other geologic feature with unique properties that may inhibit groundwater movement, as discussed above, and does not have any hydrologic influence in the area north of Ocotillo.

Wells 16S/10E-29L1 and 16S/10E-29H1 are located across the transition from each other, to the east of Coyote Wells. Well 16S/10E-29R2 is located approximately one-half mile south of well 16S/10E-29H1. As shown in Figure 3.3-11, data from wells 16S/10E-29L1 and 16S/10E-29R2, both located west of the transition, is only available for about 10 years, from the late 1970s to the late 1980s. Data from well 16S/10E-29H1, located east of the transition, is available from 1975 to 2001. The three wells are shown on Figure 3.3-11 to be declining at the same rate.

Water levels in wells 16S/10E-29L1 and 16S/10E-29R2, to the west of the transition, decreased by approximately eight feet from the late 1970s to the late 1980s, as shown on Figure 3.3-11. As indicated in Figure 3.3-8, this time period corresponds to the period of the greatest amount of groundwater pumping from the Basin. The water level in well 16S/10E-29H1, to the east of the transition, decreased by about five feet from 1975 to

2001. This corresponds to an average rate of decline of one foot every five years, which is identical to the rate of decline for the Ocotillo/Nomirage area over the same time period, as discussed above. Thus, the trend in water levels appears to be similar on both sides of the transition in the Coyote Wells area.

3.3.3.4 Groundwater Chemistry Data

In addition to monitoring water levels, the USGS has also been collecting water quality samples from several wells within the Ocotillo/Coyote Wells Groundwater Basin since the early 1970s due to concerns regarding potential overdraft conditions and degradation of water quality. The water quality data collected by the USGS is included in Appendix B and summarized in Tables 3.3-3a and b for selected wells within the Basin. The number of wells for which water quality data are available is less than the number of wells for which water level measurements are available. As with the analysis of the water level data, above, the water quality data are evaluated for three separate areas of the basin, including Ocotillo/Nomirage, Yuha Estates, and the area east of Coyote Wells.

As discussed in Section 3.3.1, the general water quality of the Basin can be evaluated primarily based on the total dissolved solids (TDS) content of the water. The TDS is a measurement of the total amount of salts and other naturally-occurring minerals in the groundwater. EPA secondary standard for TDS in drinking water is 500 mg/L, which is equivalent to 500 ppm. Thus, groundwater with TDS levels below 500 mg/L is considered potable water. In general, water with a TDS level exceeding 1,000 mg/L is not considered potable, although it is not uncommon for local drinking water supplies to exceed this level in some areas of the country.

Ocotillo/Nomirage Area

Long-term water chemistry data is available from three wells in the Ocotillo/Nomirage area. These wells are:

- 16S/9E-25K2 (Clifford well/McDougal Water Co.)
- 16S/9E-36D2
- 16S/9E-36H1 (U.S. Gypsum No. 5)

The TDS concentrations measured over time in these three wells are shown in Figure 3.3-12, TDS Trends – Ocotillo/Nomirage Area.

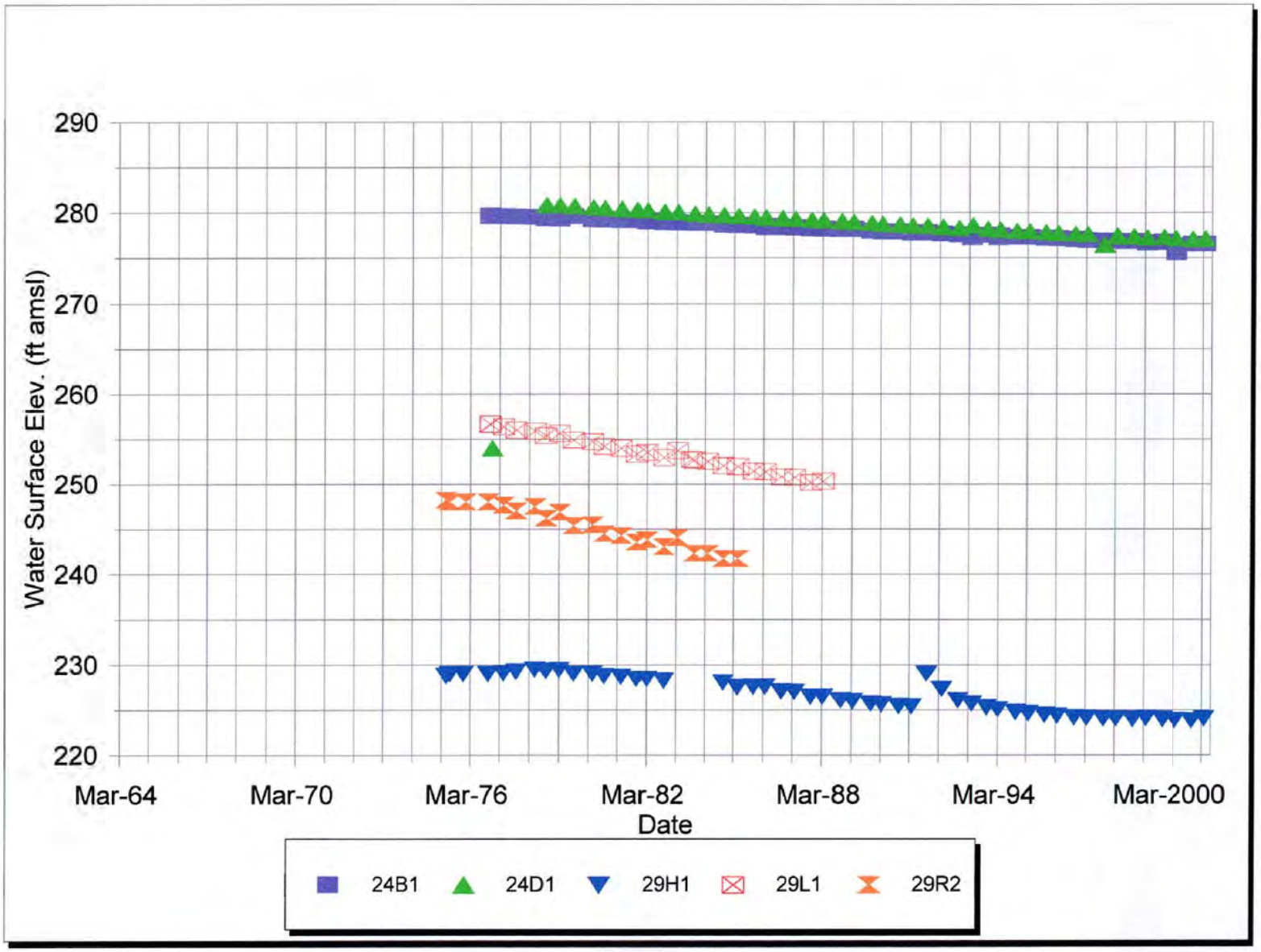

Figure 3.3-11
Area East of Coyote Wells Hydrograph
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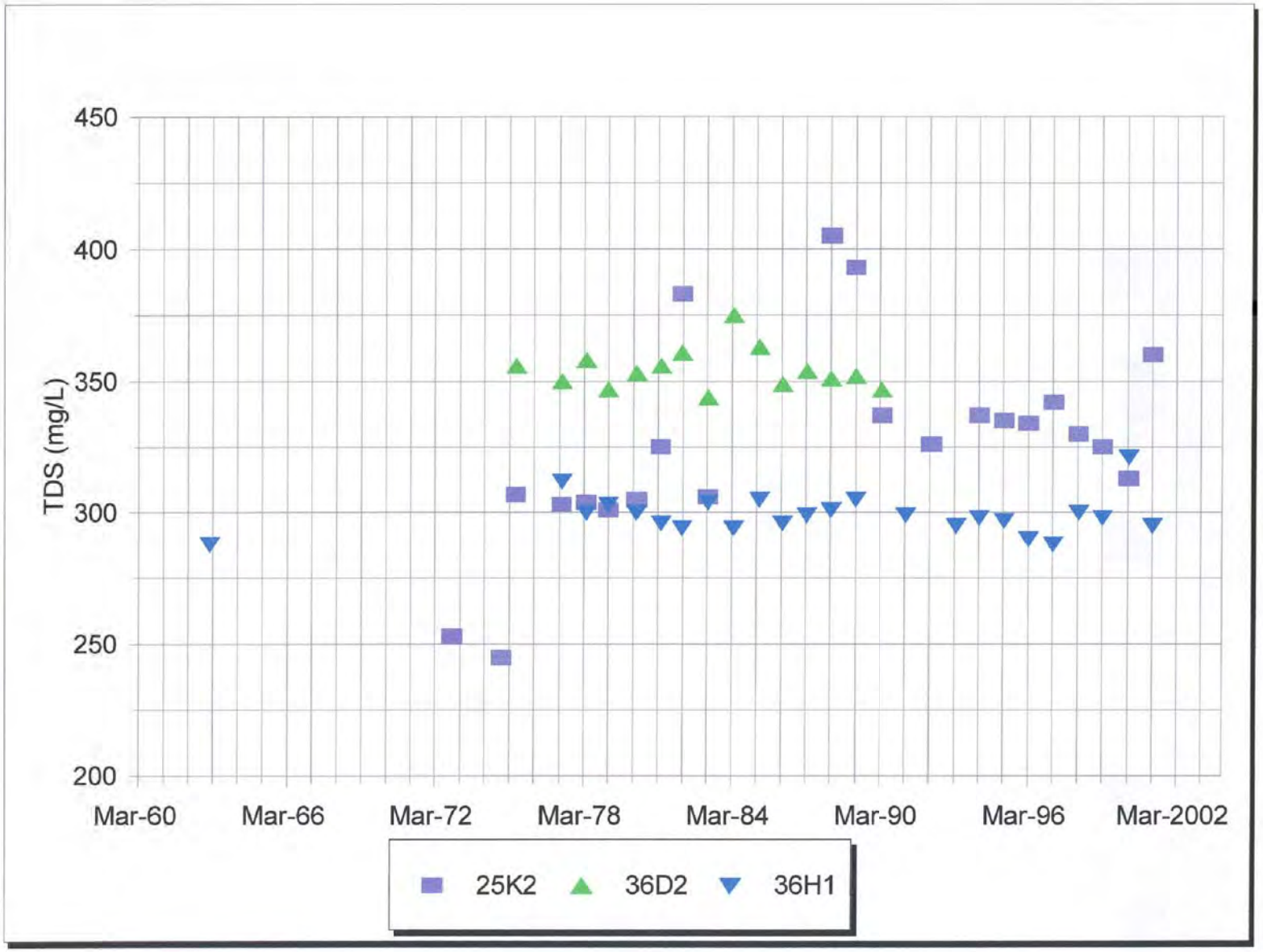

Figure 3.3-12
TDS Trends - Ocotillo/Nomirage Area
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As discussed above, well 16S/9E-25K2 was pumped for export of water to Mexico from 1974 to 1984. As indicated in Table 3.3-4 and in Figure 3.3-8, water production from this well increased from 138 AF/yr in 1974 to 222 AF/yr in 1977, and then is presumed to have decreased to 137 AF/y for 1978 to 1984. Actual production data after 1978, however, is uncertain. Prior to pumping of this well, TDS levels were approximately 250 mg/L to 310 mg/L. Within a few years after pumping began, the TDS concentration increased to as high as 400 mg/L, which is a 60 percent increase from pre-pumping levels. TDS levels have subsequently decreased to between 320 mg/L to 360 mg/L. As shown in Figure 3.3-12, TDS Trends Ocotillo/Nomirage Area, the TDS concentration has not returned to the levels measured prior to pumping.

There are only 15 years of data for well 16S/9E-36D2, from 1975 to 1990. During this time period, there was no distinct trend in TDS concentrations.

The TDS data for USG well No. 5 (16S/9E-36H1) show only minor long-term fluctuations of less than 25 mg/L from 1976 through 2001 (Figure 3.3-12). During the same time, the total pumping from all three USG wells varied from about 260 AF/yr to over 500 AF/yr, as shown in Table 3.3-4 and in Figure 3.3-8. The slight fluctuations in TDS shown in Figure 3.3-12 for USG well No. 5 may correlate with changes in annual production rate.

Yuha Estates

Long-term water chemistry data is available from three wells in the Yuha Estates area. These wells are:

- 17S/10E-11H2
- 17S/10E-11H3
- 17S/10E-11G2

The TDS concentrations measured over time in these three wells are shown in Figure 3.3-13, TDS Trends – Yuha Estates Area.

The data set from the Yuha estates area is, unfortunately, limited, as indicated in Table 3.3-3 and Figure 3.3-13. Despite the limited amount of data, however, the impacts of pumping of well 17S/10E-11G1 (McDougal Water Co.) for export to Mexico is readily apparent. As discussed above and shown in Table 3.3-4, pumping of this well occurred from 1978 to 1982 at 143 AF/yr.

Water quality data are not available for well 17S/10E-11G1. Well 17S/10E-11G2, however, is located a few hundred feet from well 17S/10E-11G1. Prior to pumping for export to Mexico, the TDS level in well 17S/10E-11G2 was approximately 330 mg/L. From 1977 to 1982, however, the TDS level in this well increased steadily to almost 400 mg/L, as shown in Figure 3.3-13.

In addition, from 1987 to 2001, the TDS level in well 17S/10E-11H3 has shown a steady decrease, as indicated in Figure 3.3-13.

Area East of Coyote Wells

Long-term water chemistry data is available from three wells in the area east of Coyote Wells. These wells are:

- 16S/9E-24B1
- 16S/9E-24D1
- 16S/10E-29L1

Well 16S/9E-24B1 is located east of the transition from alluvial material to Tertiary marine sediments. Wells 16S/9E-24D1 and 16S/10E-29L1 are located west of the transition from alluvial material to Tertiary marine sediments. The TDS concentrations measured over time in these three wells are shown on Figure 3.3-14, TDS Trends – Area East of Coyote Wells.

As discussed above, wells 16S/9E-24B1 and 16S/9E-24D1 are located adjacent to each other, but on opposite sides of the transition from alluvial material to Tertiary marine sediments. As shown on Figure 3.3-11, the water levels in these two wells are nearly identical. The TDS levels, however, are very different, as shown on Figure 3.3-14. The TDS concentration in well 16S/9E-24B1 ranges from approximately 1200 mg/L to 1300 mg/L, indicative of the influence of the Tertiary marine sediments. The TDS concentration in well 16S/9E-24D1 ranges from approximately 450 mg/L to 500 mg/L, indicative of the water quality in the alluvial aquifer.

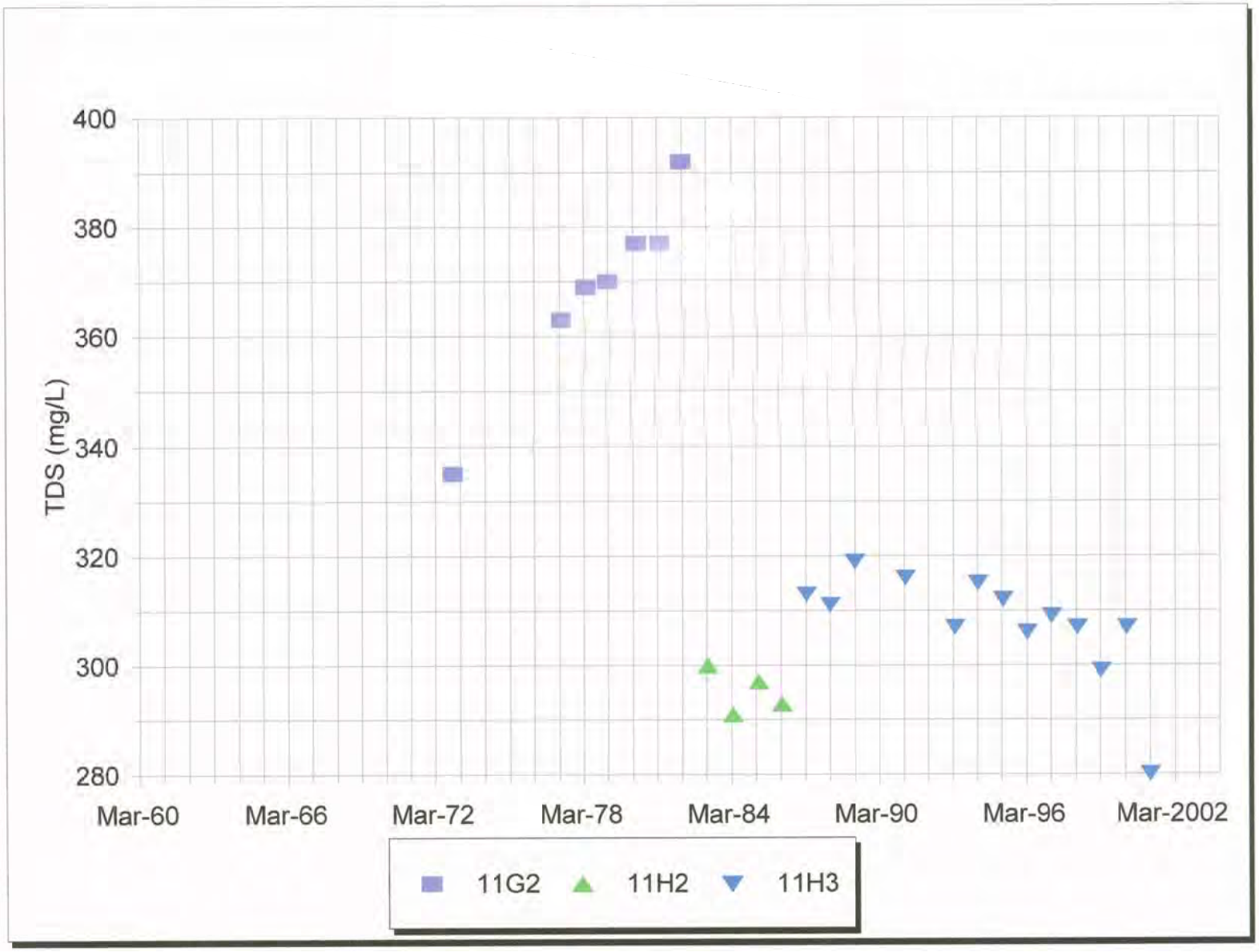

Figure 3.3-13
TDS Trends - Yuha Estates Area
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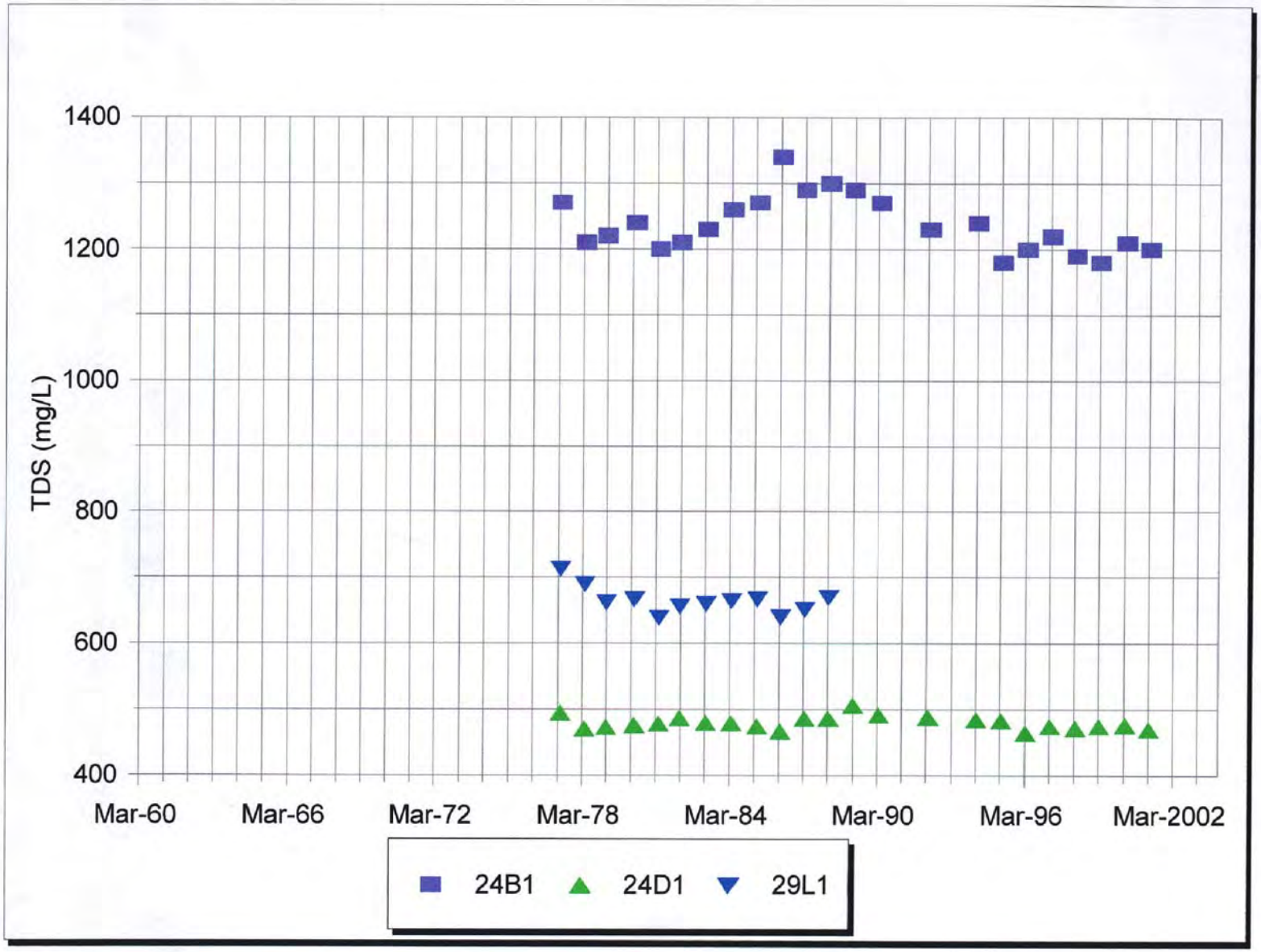

Figure 3.3-14
TDS Trends - Area East of Coyote Wells
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3.3.3.5 Discussion of Water Quality Data

The water quality data discussed above indicates that pumping of wells for a period of several years at rates of 100 AF/yr to 200 AF/yr or more can have a measurable impact on water quality in certain areas of the basin. When it occurs, this impact appears rapidly and persists for many years after pumping ceases. The decrease in water quality may be due to lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediment, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Figure 3.3-15, Piper Diagram of Groundwater Chemistry Data, is a Piper, or Tri-linear, diagram of water quality from the wells discussed above. A Piper diagram is a standard tool for analysis of water-quality data (USGS, 1989). The Piper diagram presents the water quality in terms of cations (positively-charged ions) in the triangle in the lower left corner, anions (negatively-charged ions) in the triangle in the lower right corner, and commonly associated chemical groupings in the central quadrilateral.

Many of the wells from the Ocotillo/Nomirage and Yuha Estates areas cluster together in the Piper diagram shown in Figure 3.3-15. Well 16S/9E-24B1 (labeled number "1" on the Piper diagram) stands apart from the other wells due to its elevated TDS concentration. Several other wells, however, show some TDS impact and plot in the areas between the larger cluster of wells and well 16S/9E-24B1. These wells include 16S/10E-29L1 (labeled number "6" on the Piper diagram), 16S/9E-24D1 (labeled number "2" on the Piper diagram), and 17S/10E-11G2 (labeled number "7" on the Piper diagram).

3.3.3.6 Thresholds of Significance

The significance criteria for this analysis were developed from Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact on hydrology and water quality if it would:

- Violate any water-quality standards or waste discharge requirements;
- Deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which a permit has been granted); or
- Otherwise substantially degrade water quality.

The impact analysis presented below is based upon the CEQA standards of significance. For the analysis of impacts caused by pumping from the USG wells in the Ocotillo area for the Proposed Project, a separate discussion is provided for impacts that may occur only to individual well owners as opposed to the Ocotillo/Coyote Wells Groundwater Basin resource.

3.3.3.7 Proposed Action: Impacts and Mitigation Measures

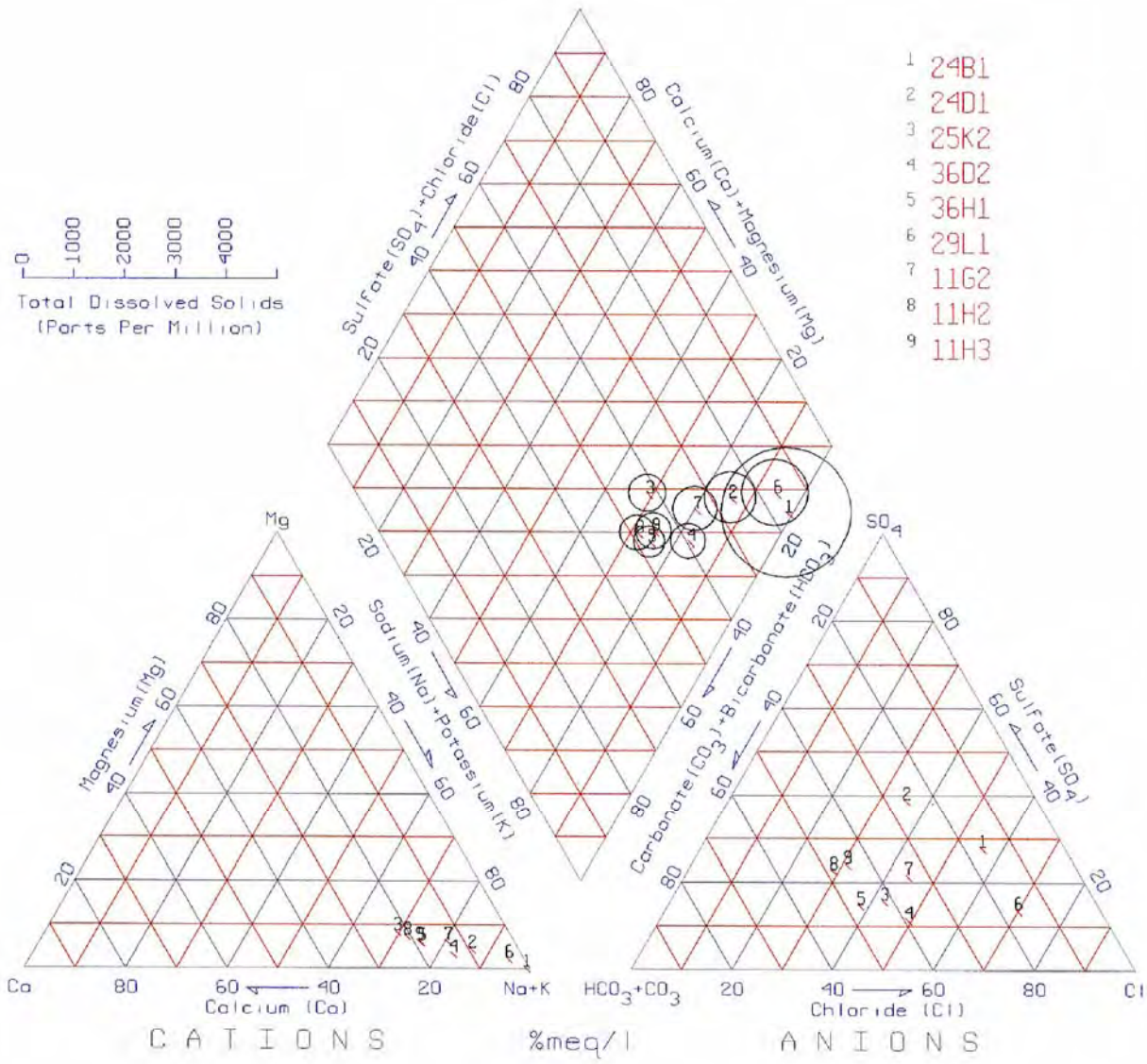
Impact 3.3-1: Water Depletion at Plant Affecting Individual Well Owners

Increased pumping of USG wells could reduce water levels, increasing the cost of pumping groundwater and, causing some wells to go dry.

Previous studies concluded that, since the total volume of water in the basin may range from over 600,000 AF to over 1.2 million AF, an annual overdraft of a few hundred AF/yr is nominal compared to the total volume of water in storage in the Basin. This view, however, may not be consistent with the conditions that occur in the Ocotillo/Coyote Wells Groundwater Basin.

The hydrographs of numerous wells from different locations in the Basin demonstrate that water levels have been steadily decreasing for at least the last 30 years. Periods of increased rainfall and a decreasing rate of groundwater pumping have not halted this long-term trend. However, a decrease of pumpage in USG wells from 1994 through 1998 did show groundwater levels recovered locally.

If water levels continue to drop, the maximum production rate of some shallower wells may be reduced due to the reduced available drawdown. The energy, and thus cost, necessary to pump groundwater, will increase in wells affected. These impacts are expected to occur without implementation of the increased pumping rates associated with the Proposed Action. The revised numerical groundwater model (Bookman-Edmonston, 2004) indicates that over the next 80 years, water levels may decline by up to 10 feet under baseline conditions, without any increase in pumping rates (Table 3.3-7). Thus, the baseline rate of water-level decline is approximately one foot every eight years.



NOTE: The Piper Diagram is a standard graphical tool for presentation and analysis of water-chemistry data. The concentrations of major cations are plotted in the lower left triangle, the concentrations of major anions are plotted in the lower right triangle, and groupings of various cation and anion pairs are plotted in the central quadrilateral. Thus, each water sample will plot at a unique location on all three parts of the Piper Diagram. The point where a specific water sample plots on the Piper Diagram defines the water type of the sample. In addition, the point where a water sample plots relative to other water samples from the same area can define whether the water samples are all chemically related (i.e. from the same hydrologic source) or different, and whether or not there is any mixing between water types.

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Figure 3.3-15
Piper Diagram of Groundwater Chemistry Data
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TABLE 3.3-7
LAYER 1 WELL DRAWDOWNS (FT) FOR BASELINE SCENARIO
(DRAWDOWN FROM GROUNDWATER ELEVATION AT THE END OF 2002)

	Well								
Years	42A5	36H1	36D2	24D1	29L1	29R2	25K2	25Q1	36 G4
	Drawdown (ft)								
10	-1.2	0.1	-1.4	-1.6	-1.3	-1.4	-1.3	-1.2	-0.2
20	-2.4	-1.2	-2.7	-3.1	-2.6	-2.6	-2.6	-2.6	-1.5
30	-3.6	-2.5	-4.0	-4.4	-3.8	-3.7	-3.9	-3.9	-2.8
40	-4.7	-3.7	-5.3	-5.7	-4.9	-4.8	-5.1	-5.1	-4.0
50	-5.8	-4.8	-6.5	-6.9	-6.0	-5.9	-6.3	-6.3	_5.1
60	-6.8	-5.8	-7.6	-8.1	-7.0	-6.9	-7.4	-7.4	-6.2
70	-7.7	-6.9	-8.6	-9.2	-8.0	-7.9	-8.5	-8.4	-7.2
80	-8.7	-7.8	-9.6	-10.2	-8.9	-8.8	-9.5	-9.4	-8.2

For the Proposed Action, USG plans to increase groundwater extraction rates by as much as 420 AF/yr over the average 1994 through 1998 baseline pumping rate of 347 AF/yr. This water demand is anticipated to continue for up to 80 years. The only empirical point of comparison to this magnitude of pumping over a long duration is the pumping that occurred in Ocotillo and Yuha Estates in the 1970s and 1980s for export to Mexico. In Ocotillo, groundwater was pumped at a rate of 137 AF/yr to 222 AF/yr for 11 years. Drawdowns of up to 60 feet occurred at or near the pumping well, and water levels did recover after pumping was suspended. At Yuha Estates, groundwater was pumped at an estimated rate of 143 AF/yr for five years. Drawdowns of nearly 70 feet occurred and nearby wells experienced drawdowns of several tens of feet. In addition, once the pumping ceased, water levels at Yuha Estates recovered very slowly and have not yet reached their pre-pumping levels. A review of the Basin's geology, however, suggests that the Ocotillo area consists of younger permeable alluvial material, whereas the Yuha Estates area is predominantly less permeable Tertiary sediments.

The revised numerical groundwater model (Bookman-Edmonston, 2004) evaluated the potential drawdown in the Ocotillo area from the Proposed Action, with pumping occurring at 767 AF/yr for 80 years. (See Appendix B-2). The total

drawdown in the alluvial aquifer after 80 years is predicted to be approximately 30 feet, which averages about 20 feet, but in two wells may be up to 23 feet, greater than the drawdown predicted to occur over the same time period under the baseline condition (Table 3.3-8, Layer 1 Well Drawdowns (ft) for 767 AF/yr Pumping Scenario).

TABLE 3.3-8
LAYER 1 WELL DRAWDOWNS (FT) FOR 767 AF/YR PUMPING SCENARIO
(DRAWDOWN FROM GROUNDWATER ELEVATION AT THE END OF 2002)

	Well								
Years	42A5	36H1	36D2	24D1	29L1	29R2	25K2	25Q1	36G4
	Drawdown (ft)								
10	-4.5	-7.0	-4.6	-2.9	-4.7	-4.3	-4.9	-5.0	-6.6
20	-8.0	-10.8	-8.3	-6.1	-8.3	-7.9	-8.5	-8.7	-10.4
30	-11.3	-14.2	-11.8	-9.4	-11.7	-11.2	-12.0	-12.3	-13.9
40	-14.5	-17.6	-15.3	-12.6	. -14.8	-14.3	-15.5	-15.8	-17.3
50	-17.6	-21.0	-18.9	-15.9	-18.0	-17.4	-19.0	-19.3	-20.7
60	-20.7	-24.4	-22.5	-19.3	-21.2	-20.5	-22.6	-22.9	-24.2
70	-23.8	-27.8	-26.2	-22.7	-24.3	-23.6	-26.2	-26.7	-27.7
80	-27.1	-31.4	-30.0	-26.2	-27.6	-26.8	-30.0	-30.5	-31.3

The revised numerical groundwater model (Bookman-Edmonston, 2004) also considered an intermediate project condition, where pumping rates are increased to only 650 AF/yr for 80 years, as opposed to the full 767 AF/yr for the Proposed Action. Under this intermediate condition, the total drawdown in the alluvial aquifer after 80 years is predicted to be up to 26 feet, which is up to 16 feet greater than the drawdown predicted to occur over the same time period under the baseline condition (Table 3.3-9, Layer 1 Well Drawdowns (ft) for 650 AF/yr Pumping Scenario).[1]

[1] The Applicant has provided estimates that indicate a typical residence using about one AF/yr would experience an increase in electrical energy of about 40 kilowatt hours (KWH) to pump water up this additional 20 feet to the surface. The current cost of electric energy in the area is about ten cents per KWH. This indicates an increase cost to a typical residence of approximately $4 per year in the 80th year. In the 40th year, assuming an increase pumping height of approximately 10 feet, the extra cost in the 40th year would be about $2 per year. The average increase cost over the life of the Proposed Action would be about $2 per year. The potential environmental impact from having to generate extra electricity needed to pump water from a greater depth over the life of the Project is speculative, but are not expected to be significant. The increased use of energy in Ocotillo by the increased pump lift is insignificant with respect to the total energy generation by IID. As an example the total increase energy use in 80 years by all affected wells, represents less than the amount of energy used by a single residence in a year. Assuming these estimates are accurate, then the *economic* impact of additional pumping would be insignificant.

TABLE 3.3-9
LAYER 1 WELL DRAWDOWNS (FT) FOR 650 AF/YR PUMPING SCENARIO
(DRAWDOWN FROM GROUNDWATER ELEVATION AT THE END OF 2002)

	Well								
Years	42A5	36H1	36D2	24D1	29L1	29R2	25K2	25Q1	36G4
	Drawdown (ft)								
10	-3.6	-5.1	-3.8	-2.5	-3.8	-3.5	-3.9	-4.0	4.9
20	-6.5	-8.2	-6.9	-5.3	-6.8	-6.5	-7.0	-7.1	8.0
30	-9.3	-11.1	-9.9	-8.1	-9.6	-9.2	-10.0	-10.2	-11.0
40	-12.0	-14.0	-12.9	-10.9	-12.3	-11.9	-13.0	-13.2	-13.9
50	-14.6	-16.9	-16.0	-13.8	-15.0	-14.5	-16.0	-16.3	-16.8
60	-17.3	-19.8	-19.2	-16.7	-17.7	-17.2	-19.2	-19.5	-19.8
70	-20.1	-22.8	-22.5	-19.7	-20.5	-19.9	-22.4	-22.7	-22.9
80	-22.9	-26.0	-25.9	-22.8	-23.4	-22.7	-25.7	-26.2	-26.1

The total potential drawdown in the alluvial aquifer, based on both the empirical data and the revised numerical groundwater model (Bookman-Edmonston, 2004), could lower the water level in some wells. Specifically, if the water level in a well drops to near the base of the screened interval, the ability to maintain current pumping rates in that well may be reduced. Wells in the Ocotillo area that are likely to experience this condition include the E. Annes and Property Construction wells and well 36D2, as shown in Figure 3.3-16, Ocotillo/Coyote Wells Groundwater Study Cross-Section of Screen Intervals.

Level of Significance Before Mitigation: Significant

Mitigation Measure: Mitigation Measure 3.3-1

If the water level in a well in the Ocotillo area decreases at a rate faster than one foot every eight years and the average water levels in the surrounding wells also decrease for more than two years in a row due to the Proposed Action, as measured from the interpolated linear of one foot every eight years with a starting reference point being the date that pumping by USG increases above the baseline rate, and there is a documented reduction in the available water to the affected user, then USG, at its election will:

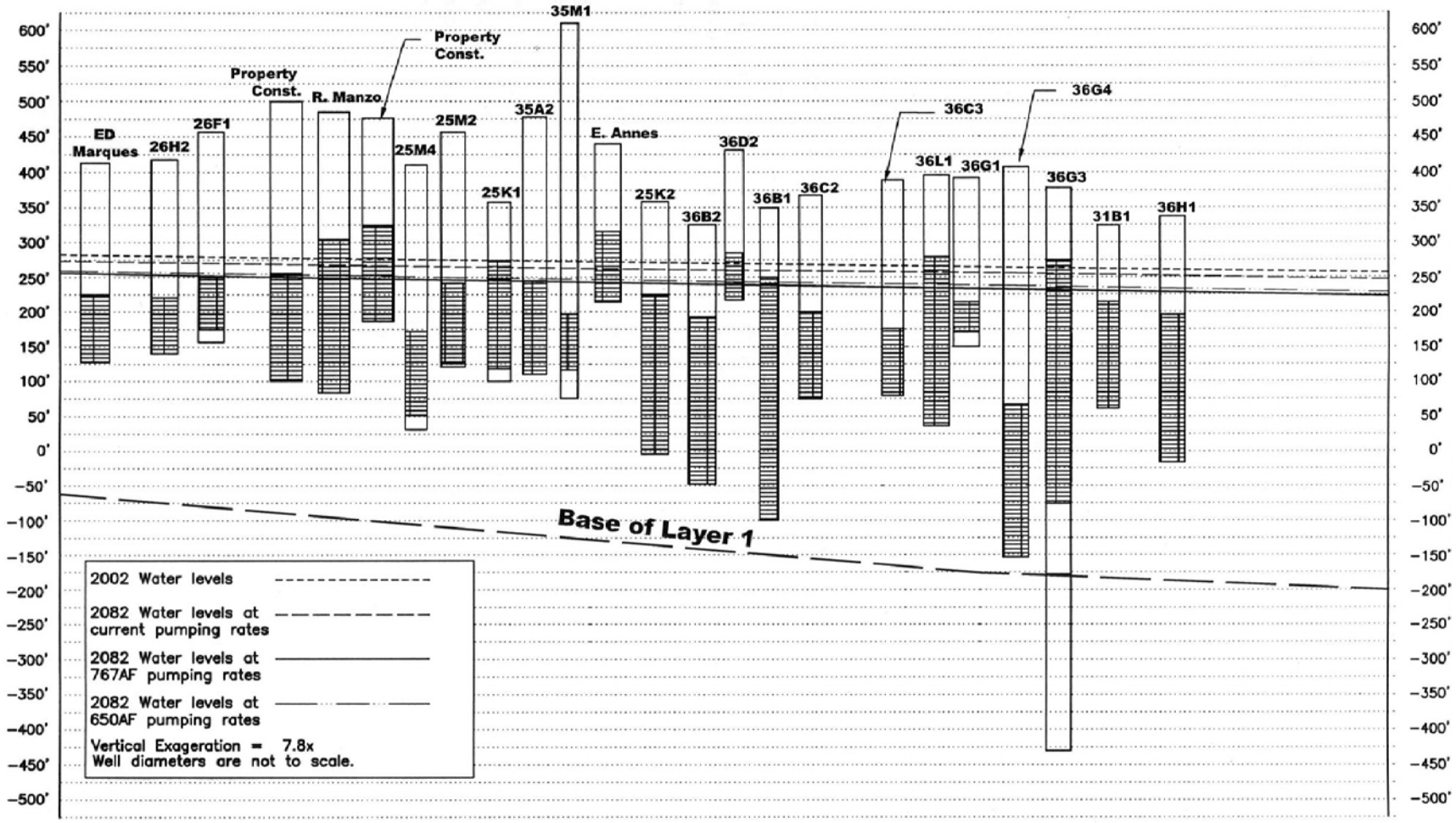
1. *Rehabilitate the well and/or install a new pump to restore the prior pumping rate; or*
2. *Provide an incremental replacement of water equivalent to the amount of the reduced rate of pumping by the affected party, of a like quantity and quality, and provide reimbursement for the incremental increase for the affected party to pump the remaining available groundwater; or*
3. *Provide a full replacement water supply to the affected party of a like kind and quality, at a cost that does not exceed the cost to the affected party at the time the impact occurred; or*
4. *Deepen the existing well or provide a new replacement well to the affected party, drilled to a depth that will not be affected by existing or future Project-related declines in the water table, and capable of providing an equivalent quantity and quality of water that existed prior to the impact, and provide reimbursement for incremental increase in cost for the affected party to pump the available water.*

The extent to which the Proposed Action will be considered as contributing to the decrease in water levels in the Ocotillo area will be determined only after a review of the water level data and a decision by the Imperial County Groundwater Management Committee (ICGMC).

The baseline condition in the Basin includes a declining water table, and existing data suggests that water levels recover slowly after significant drawdown occurs. Therefore, if USG elects to provide replacement water or a replacement water supply, arrangements must be made to provide this mitigation until groundwater levels stabilize at a level equal to the projected baseline condition.

Level of Significance After Mitigation: Less than Significant

Although the Proposed Action would increase the rate of drawdown in the alluvial aquifer as compared to baseline conditions, the impact on existing individual affected wells will be mitigated to a level of insignificance through implementation of Mitigation Measure 3.3-1.



SOURCE: Bookman-Edmonston, 2004

Figure 3.3-16
Ocotillo/Coyote Wells Groundwater Study
Cross-Section of Screen Intervals

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Impact 3.3-2: Water Depletion at Plant Affecting the Groundwater Basin

Increased pumping of USG wells could reduce water levels throughout broad areas of the Ocotillo/Coyote Wells Basin, reducing the total amount of water available in the basin.

Previous studies concluded that, since the total volume of water in the basin may range from over 600,000 AF to over 1.2 million AF, an annual overdraft of a few hundred AF/yr is nominal compared to the total volume of water in storage in the Basin. This view, however, may not be consistent with the conditions that occur in the Ocotillo/Coyote Wells Groundwater Basin. More recent assessments of the basin geology suggest that it is more complex, containing numerous uplifts of older sediments and large folds that bring the Tertiary marine sediments close to the surface. Thus, the available volume of water may be much less than previous estimates.

The hydrographs of numerous wells from different locations in the Basin demonstrate that water levels have been steadily decreasing for at least the last 30 years. Periods of increased rainfall and a decreasing rate of groundwater pumping have not halted this long-term trend. However, a decrease of pumpage in USG wells from 1994 through 1998 did show groundwater levels recovered locally.

The revised numerical groundwater model (Bookman-Edmonston, 2004) indicates that over the next 80 years, water levels may decline by up to 10 feet under baseline conditions, without any increase in pumping rates (Table 3.3-7). Thus, the baseline rate of water-level decline is approximately one foot every eight years.

For the Proposed Action, USG plans to increase groundwater extraction rates by as much as 420 AF/yr over the average 1994 through 1998 baseline pumping rate of 347 AF/yr. This water demand is anticipated to continue for up to 80 years. The only empirical point of comparison to this magnitude of pumping over a long duration is the pumping that occurred in Ocotillo and Yuha Estates in the 1970s and 1980s for export to Mexico. In Ocotillo, groundwater was pumped at a rate of 137 AF/yr to 222 AF/yr for 11 years. Drawdowns of up to 60 feet occurred at or near the pumping well, and water levels did recover after pumping was suspended. At Yuha Estates, groundwater was pumped at an estimated rate of 143 AF/yr for five years. Drawdowns of nearly 70 feet occurred and nearby wells experienced drawdowns of several tens of feet. In addition, once the pumping

ceased, water levels at Yuha Estates recovered very slowly and have not yet reached their pre-pumping levels. A review of the Basin's geology, however, suggests that the Ocotillo area consists of younger permeable alluvial material, whereas the Yuha Estates area is predominantly older less permeable formations.

The revised numerical groundwater model (Bookman-Edmonston, 2004) evaluated the potential drawdown in the Ocotillo area from the Proposed Action, with pumping occurring at 767 AF/yr for 80 years. (See Appendix B-2). The total drawdown in the alluvial aquifer after 80 years is predicted to be approximately 30 feet, which averages about 20 feet, but in two wells may be up to 23 feet, greater than the drawdown predicted to occur over the same time period under the baseline conditions (Table 3.3-8, Layer 1 Well Drawdowns (ft) for 767 AF/yr Pumping Scenario).

The revised numerical groundwater model (Bookman-Edmonston, 2004) also considered an intermediate project condition, where pumping rates are increased to only 650 AF/yr for 80 years, as opposed to the full 767 AF/yr for the Proposed Action. Under this intermediate condition, the total drawdown in the alluvial aquifer after 80 years is predicted to be up to 26 feet, which is up to 16 feet greater than the drawdown predicted to occur over the same time period under the baseline conditions (Table 3.3-9, Layer 1 Well Drawdowns (ft) for 650 AF/yr Pumping Scenario).

Because the depth to groundwater in the Ocotillo area currently ranges from about 100 ft bgs to 160 ft bgs, an additional 20-23 foot lowering of groundwater level over an 80 year period will not have an adverse effect on any rare, threatened, endangered, or sensitive species of plant or animal life or habitat.

The pumping from the alluvial aquifer for the Proposed Project, based on both the empirical data and the revised numerical groundwater model (Bookman-Edmonston, 2004), will lower the water level over a broad area of the Basin. As discussed above, this lowering of water levels will be in addition to the existing condition in the basin where the water table is already declining. Periods of increased rainfall and decreased pumping have not resulted in a Basin-wide recovery of water levels. Thus, the additional decline in water levels caused by the additional pumping of up to 420 AF/yr for the Proposed Project can not be readily offset by decreases in pumping elsewhere in the Basin, enhancing recharge, or importing water.

Level of Significance Before Mitigation: This is a significant and unavoidable impact on the Basin-wide groundwater. This impact is also unmitigatable.

Mitigation Measures: None available

Impact 3.3-3: Water Quality Degradation at Plant Affecting Individual Well Owners

Increased pumping from USG wells could degrade water quality in individual wells due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Increases in TDS were observed in wells in the Ocotillo area and the Yuha Estates area as a result of groundwater pumping for export to Mexico. In the Ocotillo area, TDS concentrations have not recovered to their pre-pumping levels in the well that was pumped for export. At Ocotillo, groundwater was pumped at a rate of 137 AF/yr to 222 AF/yr for 11 years. At Yuha Estates, groundwater was pumped at an estimated rate of 143 AF/yr for only five years.

USG is proposing to increase groundwater extraction rates by as much as 420 AF/yr over the average baseline pumping rate of 347 AF/yr for the five-year period from 1994 through 1998. This water demand, under the Proposed Action, is anticipated to continue for 80 years. Based on a comparison with past impacts in the Basin, the proposed increased groundwater extraction rates for the Project could have an impact on water quality.

As discussed, water levels are decreasing throughout most of the Basin and are expected to decrease further from the Proposed Project. As the depth to groundwater decreases, the saline water that is present at the water table may eventually reach the screened interval of some wells. Several wells have relatively short screened intervals, so that the saline water present at the water table could appreciably affect the quality of the water in certain wells.

Groundwater flow directions during the Project duration were evaluated as part of the revised numerical groundwater model (Bookman-Edmonston, 2004). The numerical model indicates that groundwater will continue to flow from west to east across the transition from alluvial material to Tertiary marine sediments east of Ocotillo. Thus, there is not likely to be a significant potential for saline water

to migrate laterally from the area east of Coyote Wells into the Ocotillo area. The model did indicate that there is a small potential for upward migration of saline water from Tertiary marine sediments underlying the alluvial aquifer in the Ocotillo area. Due to geologic complexities related to fault blocks and elevated areas of Tertiary marine sediments, however, the model was not able to accurately reproduce the change in water quality caused in both Ocotillo and Yuha Estates by the pumping for export to Mexico.

Level of Significance Before Mitigation: Significant

Mitigation Measure: Mitigation Measure 3.3-2

USG will provide an alternative or replacement source of water if the water quality significantly deteriorates in any well in the Ocotillo area and such deterioration is caused by the Proposed Action. As discussed above, the secondary drinking water standard for TDS is 500 mg/L and water with a TDS level in excess of 1,000 mg/L is considered non-potable. Therefore, if the TDS level in any well exceeds 500 mg/L, or the concentration of any other measured parameter, as described in the Mitigation Monitoring Program below, exceeds its drinking-water standard that is in force at the time of the measurement, then USG will provide the affected party or parties with an alternative supply of water for drinking and cooking, at no cost to the affected party or parties. This alternative supply could be bottled water or a hookup to a replacement water source. If the TDS level in any well exceeds 1,000 mg/L and is caused by the Proposed Action, then the water quality will be such that use of the water for any domestic purpose will be significantly affected due to scale buildup, damage to plumbing, corrosion, and other similar impacts. If the TDS level exceeds 1,000 mg/L and is caused by the Proposed Action, USG will provide the affected party or parties with a hookup to a replacement supply of water. This replacement supply may be a hookup to an existing municipal district or other appropriate drinking water supply system. USG will bear the full cost of the hookup. The affected party or parties, however, would only be responsible for the annual cost of the replacement water equivalent to their costs to pump water prior to the occurrence of the impact. If the annual cost of water for the replacement supply exceeds the affected party or parties costs to pump water prior to the occurrence of the impact, USG will pay the incremental difference.

The extent to which the Proposed Action will be considered as contributing to the decrease in water quality in the Ocotillo area, will be determined only after a

review of the water quality data and a decision by the Imperial County Groundwater Management Committee (ICGMC).

The existing data from Ocotillo and Yuha Estates indicates that, once the water quality decreases, it may take many decades for the water quality to recover once the pumping causing the impact has ceased. Therefore, USG will need to provide the alternative and/or replacement water supply until concentrations of the above-listed constituents in excess of applicable water-quality standards return to levels below such standards or until the water quality parameters, for which there is data that currently exists, return to pre-Proposed Action levels.

Level of Significance After Mitigation: Less than Significant

With implementation of Mitigation Measure 3.3-2, the potential impacts on individual wells will be mitigated, and the Proposed Action will not violate any water quality standard For these reasons, the impact of the Proposed Action on individual wells, after mitigation, will be less than significant.

The long-term affect to the Basin-wide groundwater resource, however, is still potentially significant and there are no feasible mitigation measures that would reduce the impact to less than significant.

Impact 3.3-4: Water Quality Degradation at Plant Affecting the Groundwater Basin

Increased pumping from USG wells could degrade water quality in the groundwater Basin due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Relatively rapid increases in TDS were observed in wells in the Ocotillo area and the Yuha Estates area as a result of groundwater pumping for export to Mexico. In the Ocotillo area, TDS concentrations in affected wells have not recovered to their pre-pumping levels in the well that was pumped for export. At Ocotillo, groundwater was pumped at a rate of 137 AF/yr to 222 AF/yr for 11 years. At Yuha Estates, groundwater was pumped at an estimated rate of 143 AF/yr for only five years.

USG is proposing to increase groundwater extraction rates by as much as 420 AF/yr over the average baseline pumping rate of 347 AF/yr for the five-year period from 1994 through 1998. This water demand, under the Proposed Action, is anticipated to continue for 80 years. The past water-quality impacts in the Basin were the result of much lower pumping rates and much shorter durations than the proposed increased groundwater extraction rates for the Project. Thus, the Proposed Project could have an impact on water quality.

Groundwater flow directions during the Project duration were evaluated as part of the revised numerical groundwater model (Bookman-Edmonston, 2004). The numerical model indicates that groundwater will continue to flow from west to east across the transition from alluvial material to Tertiary marine sediments east of Ocotillo. Thus, there is not likely to be a significant potential for saline water to migrate laterally from the area east of Coyote Wells into the Ocotillo area. The model did indicate that there is a small potential for upward migration of saline water from Tertiary marine sediments underlying the alluvial aquifer in the Ocotillo area. Due to geologic complexities related to fault blocks and elevated areas of Tertiary marine sediments, however, the model was not able to accurately reproduce the change in water quality caused in both Ocotillo and Yuha Estates by the pumping for export to Mexico.

The declining water levels in the Basin indicate that the amount of recharge is less than the amount of water being removed from the Basin. Therefore, if the water quality in areas of the Basin decreases to the point where the water is not suitable for its current use, then it is unlikely that there will be sufficient influx of non-saline water to improve the water quality.

Level of Significance Before Mitigation: Significant

Mitigation Measure: None available

> *As part of the Proposed Project, USG will implement the Groundwater Monitoring Program described below. The data from the groundwater monitoring program will provide an indication of a trend of progressively decreasing water quality in individual wells and throughout the basin, if such a trend occurs and is a result of the increased pumping for the Proposed Project. If such a trend is identified in only a few wells in close proximity to the USG pumping wells, and an impact subsequently occurs in any or all of those few wells, then USG can mitigate the impacts in the individual wells as discussed*

above for Impact 3.3-2A: Water Quality Degradation at Plant Affecting Individual Well Owners. If, however, such a trend is identified in a larger number of wells, and these wells are located over a broader area of the basin and not just in the area of the USG pumping wells, it would not be possible to restore the Basin-wide water quality once it is degraded to concentrations at which the groundwater is no longer suitable for its current uses. There is insufficient recharge to restore the Basin and dilute the salts in the saline water. Therefore, it is not possible to mitigate the Basin-wide degradation of water quality. If such trends are detected by the Groundwater Monitoring Program, the only way to halt or reverse these trends would be to curtail pumping by reducing production at the Plant, or by implementing one or more Alternatives that reduce or eliminate withdrawals from the basin, prior to the groundwater quality being degraded to the point where it was no longer suitable for its current uses.

Level of Significance After Mitigation: Significant

Groundwater Monitoring Program

The Proposed Action includes a Monitoring Program to provide consistent, long-term data regarding the Ocotillo/Coyote Wells Groundwater Basin. The Monitoring Program will involve the measurement of water levels and the collection of groundwater samples for chemical analysis. As discussed above, the Proposed Action is predicted to accelerate the decline of the groundwater level in the Ocotillo/Coyote Wells Groundwater Basin, and may potentially cause the migration of saline water. As such, the primary objectives of the Monitoring Program are to:

1. Identify any increases in the rate of water-level decline greater than the baseline rate; and
2. Provide an early warning of potential degradation of groundwater quality from the Proposed Action.

The primary cause of the potential degradation of groundwater quality would be lateral migration of saline water from Tertiary marine sediments that crop out in the Ocotillo and Nomirage area and to the east of Coyote Wells, or vertical migration of saline water from the Tertiary marine sediments that are present at depth below the alluvial aquifer.

The USGS currently monitors water levels and water quality in a number of wells in the Ocotillo/Coyote Wells Groundwater Basin, as listed in Table 3.3-10, List of Current and Proposed Monitoring Wells in the Ocotillo/Coyote Wells Groundwater Basin. For the

Mitigation Monitoring Program, water chemistry and/or water levels will be monitored in the wells currently monitored by the USGS and in 10 additional wells, as shown in Table 3.3-10. Eight of the additional well locations are existing wells and the other two are new nested wells that will be installed by USG. Note that several of the additional wells listed in Table 3.3-10 are already monitored for water levels by the USGS but will also be sampled for water quality as part of this Monitoring Program. The additional monitoring locations were selected based on location, variation in depth and screened interval, and historic trends in water levels and TDS concentrations. In addition, any private currently operating well owner in the Ocotillo, Coyote Wells, and Nomirage areas that would like to include their well in the Monitoring Program may do so by notifying the County within one year after this document is certified. If the groundwater levels, or quality, in any of the monitoring wells included in this Monitoring Program show a declining trend greater than that specified in the Monitoring Program, then the private well owner(s) in the Ocotillo area indicating such a trend that has requested that their groundwater level and water quality be determined, will have their well tested until such time as the groundwater or water quality declines return to below levels of concern as specified in this Monitoring Program.

One new nested monitoring well (MW-1A and MW-1B) will be constructed approximately three-quarters of a mile east of USG Well No. 6 (see Figure 3.3-17, Current and Proposed Monitoring Wells in the Ocotillo Area). This monitoring well location, along with 29L1, 31B1, and 30R1, would show changes in the TDS levels as a result of the potential migration of saline water from the area east of Coyote Wells, and potential upward vertical migration. The deeper interval in this nested well will be screened just above the base of the alluvial aquifer, which is anticipated to be up to 400 ft bgs. The shallower interval will be screened in the same depth range as other wells in the area, which is typically 100 ft bgs to 200 ft bgs. The nested monitoring well will be drilled and constructed in accordance with applicable state and county requirements, including but not limited to those described in California Department of Water Resources Bulletins 74-81 and 74-90.

The second new nested monitoring well (MW-2A and MW-2B) will be constructed in the area between existing USG wells Nos. 4, 5, and 6. The approximate area is shown on Figure 3.3-17. This monitoring well location will provide information regarding the potential vertical migration of saline water from underlying Tertiary marine sediments. The deeper interval in this nested well should be screened just above the base of the alluvial aquifer, which is anticipated to be up to 700 ft bgs. The shallower interval

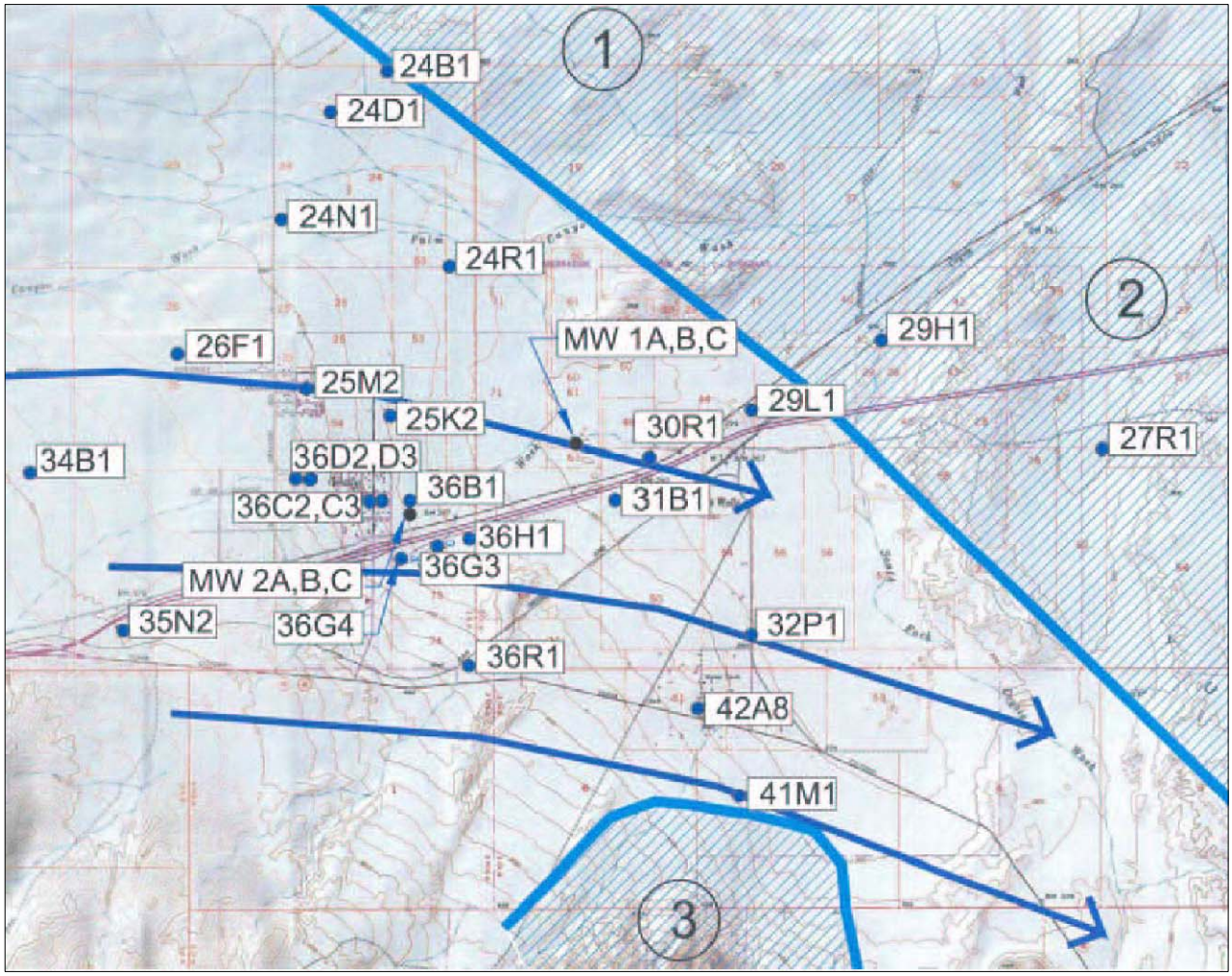

Figure 3.3-17
Current and Proposed Monitoring Wells in the Ocotillo Area

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TABLE 3.3-10
LIST OF CURRENT AND PROPOSED MONITORING WELLS IN THE OCOTILLO/COYOTE WELLS GROUNDWATER BASIN

Well Number	Owner	Water Level	Water Quality	Well Number	Owner	Water Level	Water Quality
Current Program				16S/11E-27F1	US Government	X	
15S/11E-32R1		X		16S/11E-42L1	US Government	X	
16S/9E-24B1		X	X	16S/10E-42A8	Alan Heinrich		X
16S/9E-24D1	US BLM	X	X	17S/10E-11B1	Samual Gallaghe	X	
16S/9E-25K2	Clifford Water Company		X	17S/10E-11G1	W.E. Simpson	X	
16S/9E-25M2	Ocotillo Mutual Water Co.	X		17S/10E-11G4		X	
16S/9E-26F1	Neil Emory	X	X*	17S/10E-11H3	James Harmon	X	X
16S/9E-34B1	Rick Hamilton	X	X	17S/11E-16J1	Frank Souza	X	
16S/9E-35N2		X		17S/11E-22E2		X	
16S/9E-36C2	Coyote Valley Mutual Water Co.		X	Proposed Additional Monitoring Wells - Existing Wells			
16S/9E-36C3	Coyote Valley Mutual Water Co.	X		16S/9E-24N1	US Government	X	X
16S/9E-36D2		X		16S/9E-24R1	US BLM	X	X
16S/9E-36D3			X	16S/10E-29L1		X	X
16S/9E-36G4	Westwind	X		16S/10E-31B1			X
16S/9E-36H1	USG #5	X	X	16S/9E-36B1	USG #6		X
16S/10E-27R1		X		16S/9E-36G3	USG #4		X
16S/10E-29H1		X		16S/9E-36R1			X
16S/10E-30R1			X	16S/10E-41M1	C. Smith		X
16S/10E-31B1		X		Proposed New Monitoring Wells			
16S/10E-32P1		X		USG MW 1A, 1B	USG	X	X
16S/11E-23B1		X		USG MW 2A, 2B	USG	X	X

* Alternate well; to be sampled in place of a primary well when necessary.

should be screened in the same depth range as other wells in the area, which is typically up to 500 ft bgs to 600 ft bgs. The nested monitoring well will be drilled and constructed in accordance with applicable state and county requirements, including but not limited to those described in California Department of Water Resources Bulletins 74-81 and 74-90.

Water levels will be measured semi-annually in each well listed in Table 3.3-10, so long as allowed by the well owner, with the exception of the two new nested wells. The two screened intervals in each of the two nested wells will each be monitored using a dedicated pressure transducer-data logger combination (e.g. *In-Situ* MiniTROLL; *Global Water* WL15; etc) that will allow the daily measurement and recording of water levels.

The measurement of water levels in the two screened intervals in each of the two nested wells using dedicated pressure transducer-data logger combinations will continue for 10 years, after which water levels will be measured by hand on the same schedule as the other wells listed in Table 3.3-10.

The water-level data will be posted on a map and groundwater contours will be plotted to evaluate potential changes in groundwater flow direction. As discussed under Impact 3.3-1, the Proposed Action, based on modeling, will result in an acceleration of the baseline rate of water-level decline, which was predicted by the revised numerical groundwater model to be 10 feet over the 80-year life of the Proposed Action, or one foot every 8 years. The water-level data will be evaluated to determine if the rate of decline at a specific location is less than or greater than the model-predicted baseline rate of decline. The water-level decline at a specific well will be considered significant, and subject to mitigation as described in the Mitigation Measure for Impact 3.3-1, if four consecutive semi-annual groundwater levels from that well show a declining trend that is at least 50 percent greater than the baseline trend identified in the revised numeric groundwater model (i.e. 15 feet over the 80-year life of the Proposed Action, or one foot every five years and four months), and all monitoring wells located between the affected well and USG wells Nos. 4, 5, and 6, if any, also show a declining trend that is greater than the baseline trend.

Water-quality samples will be collected from each well listed in Table 3.3-10 on a semi-annual basis. The water samples will be collected following accepted well-sampling protocols and standards of practice, and analyzed by a laboratory certified by the California Department of Health Services for the analyses being conducted. At a minimum, the analyses will include pH, electrical conductivity, TDS, alkalinity, sodium, potassium, calcium, magnesium, chloride, sulfate, bicarbonate, carbonate, fluoride, bromide, boron, and iron.

A sufficient number of samples will be collected so that an adequate number of samples are present from each well listed in Table 3.3-10 to calculate the 95-percent upper confidence limit or other statistical estimate of the upper bound of the mean, such as those described in California Code of Regulations, Title 27, Section 20415(b). Subsequent groundwater monitoring data will be compared with the statistical estimate of the upper bound of the mean to determine if a significant change in concentration may be occurring at a specific well location, or area of the aquifer. A significant increasing trend in concentration will be determined to be present if a chemical constituent is detected at a concentration that exceeds its 95 percent one-sided tolerance limit as defined by Gibbons (Statistical Methods for Detection Monitoring, in

Groundwater Contamination and Analysis at Hazardous Waste Sites edited by Suzanne Lesage and Richard E. Jackson, Marcel Dekker, Inc., 1992, pp. 199-243) for four consecutive monitoring periods. If a significant increasing trend is determined to exist, the monitoring frequency for that well will be increased to quarterly, and any of the private well owner(s) adjacent to any well indicating such a trend that has requested that their groundwater level and water quality be determined at the time the Mitigation Monitoring Program is implemented, will have their well tested until such time as the water quality decline returns to below levels of concern as specified in this Mitigation Monitoring Program. No other specific mitigation action will be required other than an increase in monitoring frequency until the TDS level reaches 500 mg/L, or the concentration of any other monitored constituent exceeds their secondary drinking-water standard in force at the time of the measurement as described in the mitigation measure for Impact 3.3-2 for the Proposed Action, in Section 3.3.2.7 above.

The water-level data, water-quality data, and statistical analysis of trends will be submitted to the County and the USGS within 60 days after the end of each calendar monitoring period. The monitoring will be conducted at the expense of USG. The actual party conducting the monitoring and the financial arrangements will be approved by the County. If no impacts have been identified, the Monitoring Program will continue until the sooner of either the end of the Proposed Action (80 years), or such time as USG implements a Project Alternative that results in USG wells Nos. 4, 5, and 6 being pumped at rates no greater than pre-Proposed Action rates. If significant impacts to groundwater have been identified, then this Monitoring Program will continue until those impacts have been fully mitigated and water levels and/or water quality returns to baseline levels, but no longer than 10 years after the Plant ceases operation.

3.3.3.8 No Action Alternative: Impacts and Mitigation Measures

Impact 3.3-1: Water Depletion at Plant Affecting Individual Well Owners

Increased pumping of USG wells could reduce water levels, increasing the cost of pumping groundwater and, causing some wells to go dry.

The No Action Alternative assumes the rate of water usage at the Plaster City Plant would not increase above pre-Proposed Action levels. As discussed above in Section 3.3.3, the water levels in the Basin are declining at the rate of approximately one foot every eight years under baseline conditions. This rate of water-level decline would continue under the No Action Alternative, but there

would not be any additional increment of water-level decline associated with the Proposed Action since there would not be any additional increment of pumping above the historic level, and therefore no increased impact to individual well owners. Therefore, the No Action Alternative would maintain the pre-Project conditions in the Basin.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-2: Water Depletion at Plant Affecting the Groundwater Basin

Increased pumping of USG wells could reduce water levels throughout broad areas of the Ocotillo/Coyote Wells Basin, reducing the total amount of water available in the basin.

The No Action Alternative assumes, the rate of water usage at the Plaster City Plant would not increase above pre-Proposed Action levels. As discussed above in Section 3.3.3, the water levels in the Basin are declining at the rate of approximately one foot every eight years under baseline conditions. This rate of water-level decline would continue under the No Action Alternative, but there would not be any additional increment of water-level decline associated with the Proposed Action since there would not be any additional increment of pumping above the historic level. Therefore, the No Action Alternative would maintain the pre-Project conditions in the Basin.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-3: Water Quality Degradation at Plant Affecting Individual Well Owners

Increased pumping from USG wells could degrade water quality in individual wells due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

The No Action Alternative assumes, the rate of water usage at the Plant would not increase above pre-Proposed Action levels. As discussed above, the

pumping that has occurred in the Basin since the mid-1920s has not caused any measurable decrease in groundwater quality. There would not be any potential for the No Action Alternative to change groundwater quality beyond the baseline level since there would not be any additional increment of pumping above the baseline level, and therefore no increased impact to individual well owners. Therefore, the No Action Alternative would maintain the baseline conditions in the basin.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-4: Water Quality Degradation at Plant Affecting the Groundwater Basin

Increased pumping from USG wells could degrade water quality in the groundwater Basin due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

The No Action Alternative assumes, the rate of water usage at the Plant would not increase above pre-Proposed Action levels. As discussed above, the pumping that has occurred in the Basin since the mid-1920s has not caused any measurable decrease in groundwater quality. There would not be any potential for the No Action Alternative to change groundwater quality beyond the baseline level since there would not be any additional increment of pumping above the baseline level. Therefore, the No Action Alternative would maintain the baseline conditions in the basin.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

3.3.3.9 Partial Use of Water from Imperial Irrigation District: Impacts and Mitigation Measures

Impact 3.3-1: Water Depletion at Plant Affecting Individual Well Owners

Increased pumping of USG wells could reduce water levels, increasing the cost of pumping groundwater, causing some wells to go dry, and reducing the amount of available water in the Basin.

This alternative would supply the Plant with a portion of the water needed for operations from USG's existing wells in Ocotillo. The balance of the water needed for operations would be supplied by the IID. Under this alternative, water from IID would be blended with water from the Ocotillo/Coyote Wells Groundwater Basin as needed to achieve the level of water quality and consistency necessary for use in manufacturing wallboard without the need for further treatment of the process water. The quality of IID water, which comes from the Colorado River, varies over time. Thus, the amount of water that would need to be extracted from USG's wells in Ocotillo would vary over time. However, this alternative assumes that over the life of the Project, the amount of water extracted from the existing wells at Ocotillo would not increase above pre-Proposed Action levels. Water in excess of the pre-Proposed Action amount would be provided by IID under a water service agreement with USG. Payment of the required user fees and water rates to IID would contribute to any mitigation that IID conducts for use of Colorado River water, maintenance of the distribution system, and disposal of any waste or tail water.

The rate of pumping from the three USG wells in the Ocotillo/Coyote Wells Groundwater Basin would remain at the baseline rate. The baseline rate, as discussed above, is an average of 347 AF/yr over a five-year period. As discussed above, the modeled water levels in the Basin are declining at the rate of approximately one foot every eight years under baseline conditions. This rate of water-level decline would continue under this alternative, but there would not be any additional increment of water-level decline since there would not be any additional increment of pumping above the baseline level. Therefore, this alternative would maintain the baseline conditions in the Ocotillo/Coyote Wells Groundwater Basin.

Level of Significance Before Mitigation: Potentially Significant

Implementation of this partial use of IID water alternative will reduce USG's consumption of water from the Ocotillo/Coyote Wells Groundwater Basin to pre-Project levels. However, as discussed above, implementation of this alternative is not expected to occur until about 2008, or later. Thus, usage of groundwater above the pre-Project levels from 2000 until this alternative is implemented has the potential to adversely affect other wells in the Basin.

Mitigation Measures: Same as Proposed Action (See Mitigation Measure 3.3-1)

Level of Significance After Mitigation: Less than Significant

Impact 3.3-2: Water Depletion at Plant Affecting the Groundwater Basin

Increased pumping of USG wells could reduce water levels throughout broad areas of the Ocotillo/Coyote Wells Basin, reducing the total amount of water available in the basin.

Under the Partial IID Water Supply Alternative, USG's consumption of water from the basin would be reduced to pre-project levels. Increased long-term affects to the basin groundwater table would be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-3: Water Quality Degradation at Plant Affecting Individual Well Owners

Increased pumping from USG wells could degrade water quality in individual wells due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Under the Partial IID Water Supply Alternative, USG's consumption of water from the basin would be reduced to pre-project levels. The potential for the Project to exacerbate drawdown that could influence migration of higher-TDS water would be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-4: Water Quality Degradation at Plant Affecting the Groundwater Basin

Increased pumping from USG wells could degrade water quality in the groundwater Basin due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Under the Partial IID Water Supply Alternative, USG's consumption of water from the basin would be reduced to pre-project levels. The potential for the Project to exacerbate drawdown that could influence migration of higher-TDS would be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

3.3.3.10 Full Use of IID Water Alternative: Impacts and Mitigation Measures

Impact 3.3-1: Water Depletion at Plant Affecting Individual Well Owners

Increased pumping of USG wells could reduce water levels, increasing the cost of pumping groundwater, causing some wells to go dry, and reducing the amount of available water in the Basin.

This alternative would provide essentially the full water supply for the Plant from the IID. Under this alternative, water from IID would be piped to the Plant for use in wallboard processing. This alternative assumes that over the life of the Project, groundwater would not be extracted from the existing USG wells at Ocotillo. Therefore, the total pumping in the Ocotillo/Coyote Wells Groundwater Basin would be reduced by the baseline amount. Payment of the required user fees and water rates to IID would contribute to any mitigation that IID conducts for use of Colorado River water, maintenance of the distribution system, and disposal of any waste or tail water.

As discussed above, the water levels in the Basin are declining at the rate of approximately one foot every eight years under baseline conditions. Under the

Full IID Alternative, this rate of water-level decline would be reduced or even reversed, possibly resulting in restoration of water-levels in the Ocotillo area.

Level of Significance Before Mitigation: Potentially Significant

Implementation of this full use of IID Water Alternative will reduce USG's consumption of water from the Ocotillo/Coyote Wells Groundwater Basin to zero. However, as discussed above, implementation of this alternative is not expected to occur until about 2008, or later. Thus, usage of groundwater above pre-Project levels from 2000 until this alternative is implemented has the potential to adversely affect other wells in the Basin.

Mitigation Measures: Same as Proposed Action (see Mitigation Measure 3.3-1)

Level of Significance After Mitigation: Less than Significant

Impact 3.3-2: Water Depletion at Plant Affecting the Groundwater Basin

Increased pumping of USG wells could reduce water levels throughout broad areas of the Ocotillo/Coyote Wells Basin, reducing the total amount of water available in the basin.

Under the Full IID Water Supply Alternative, USG's consumption of water from the basin would be reduced below baseline consumption levels. Long term effects to the basin groundwater table would therefore be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-3: Water Quality Degradation at Plant Affecting Individual Well Owners

Increased pumping from USG wells could degrade water quality in individual wells due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

Under the Full IID Water Supply Alternative, USG's consumption of water from the basin would be reduced below baseline consumption levels. The potential

for the Project to exacerbate drawdown that could influence migration of higher-TDS water would be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-4: Water Quality Degradation at Plant Affecting the Groundwater Basin

Increased pumping from USG wells could degrade water quality in the groundwater Basin due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the basin.

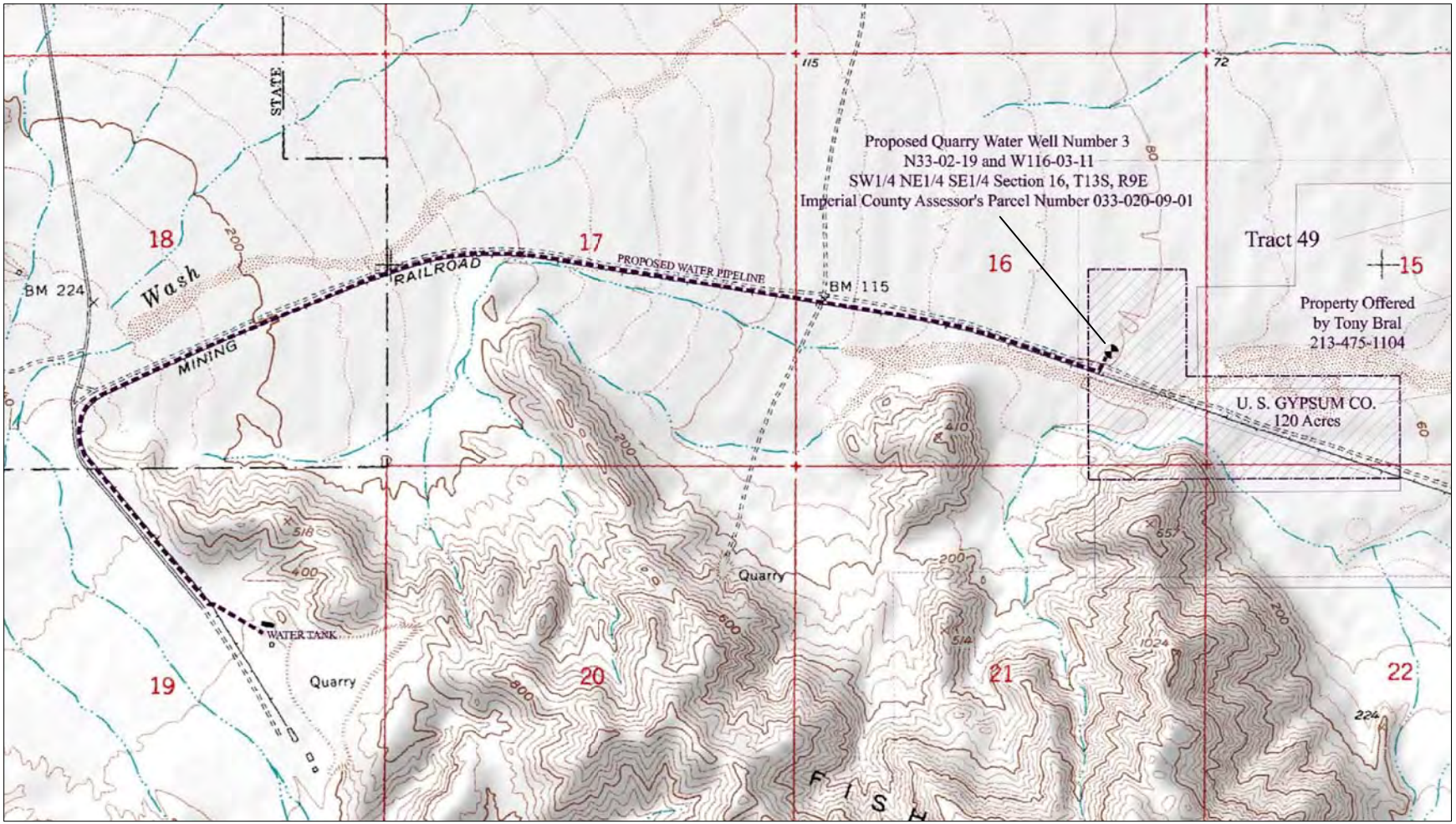
Under the Full IID Water Supply Alternative, USG's consumption of water from the basin would be reduced below baseline levels. The potential for the Project to exacerbate drawdown that could influence migration of higher-TDS water would be avoided.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

3.3.4 Quarry Water Usage

As part of the Proposed Action, USG is proposing to drill a new water supply well, known as Quarry Water Well No. 3, near the Quarry. (See Figure 3.3-18, Proposed Location of Quarry Water Well Number 3). Approximately 26 AF/yr are needed from this new well for dust control in the quarrying, crushing, and screening operations. Quarry Water Well No. 1, located near the main entrance to the Quarry, was installed in 1983 under an Imperial County Conditional-Use Permit (CUP) limiting maximum withdrawal to 7,000 gallons per day.



NORTH

0 2000'

SCALE: 1" = 2000'

Figure 3.3-18
Proposed Location of Quarry Water Well Number 3
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For comparison purposes, the current permit limit of 7,000 gallons per day is approximately equivalent to 7.8 AF/yr, or 4.9 GPM assuming that the pump is operated continuously. The needed 26 AF/yr is approximately equivalent to 23,000 gallons per day, or 16.1 GPM assuming that the pump is operated continuously. Thus, the Proposed Action will result in an increase in the rate of groundwater extraction of approximately 18.2 AF/yr.

The existing and proposed Quarry water wells are located along the southwestern boundary of the Ocotillo Valley Groundwater Basin. This basin is distinctly different from the Ocotillo/Coyote Wells Groundwater Basin in which the USG production wells for the Plant are located.

Quarry Water Well No. 1 could not achieve the original permitted extraction rate due to the limited presence of groundwater in the penetrated aquifer and severe scale buildup in the well casing due to high TDS levels. In 1993, Quarry Water Well No. 2 was installed. Quarry Water Well No. 2 is not capable of producing the current permit limit of 7,000 gallons per day.

In 2001, USG drilled a test hole approximately three miles east-northeast of the Quarry on company-owned land along the USG railroad right-of-way. Pumping tests indicate that a production rate of 25 gpm to 50 gpm may be sustainable at the test-hole location. The TDS level of the water sampled from the test hole was 1,066 ppm. USG is proposing to install Quarry Water Well No. 3 within one-half mile of the successful test hole.

The following studies and reports were reviewed for this analysis of the proposed installation of Quarry Water Well No. 3 and the increase in annual pumping from 7.8 AF/yr to 26 AF/yr:

- *Imperial County Groundwater Study – Final Report*, Montgomery Watson, December 1995;
- *California's Ground Water*, California Department of Water Resources Bulletin 118-75, September 1975, reprinted January 1994;
- *Hydrogeologic Investigation for Allegretti Farms, Western Imperial County, California*, Krieger & Stewart, Incorporated, February 7, 1997; and
- *Potential Impacts of Pumping the Proposed Quarry Water Well No. 3*, Bookman Edmonston memorandum from John Rotert to Richard Rhone, March 28, 2003.

The information presented in the following section was obtained from these references, and copies of these studies can be reviewed at the office of the County Planning Department, Imperial County, California.

3.3.4.1 Affected Environment

The Ocotillo Valley Groundwater Basin is located to the west of the southwestern corner of the Salton Sea. This area is also commonly referred to as the Borrego Valley. It is bounded on the southwest by the Vallecito and Fish Creek Mountains, on the west by the Peninsular Ranges, on the north by the Borrego badlands, and on the east by the Salton Sea. The climate is comparable to that of the Ocotillo/Coyote Wells Groundwater Basin described above.

The Ocotillo Valley consists of sedimentary deposits derived from the surrounding mountain ranges, similar to the sedimentary deposits of the Ocotillo/Coyote Wells Groundwater Basin. The Coyote Creek fault trends northwest near the southwestern margin of the basin. The proposed location of Quarry Water Well No. 3 is approximately 4 miles southwest of the Coyote Creek fault. The surface deposits in the lower part of the Ocotillo Valley are reported to consist of the remnant shoreline of ancient Lake Cahuilla, which likely filled on several occasions in the Pliestocene due to meandering of the Colorado River. As the ancient lake dried out, saline evaporite deposits were left behind in the sediments.

The primary drainage in the Ocotillo Valley is San Felipe Creek. San Felipe Creek extends from the Peninsular Ranges to the Salton Sea. In the area of proposed Quarry Water Well No. 3, the primary surface drainage is the Fish Creek Wash. San Felipe Creek and Fish Creek Wash only flow seasonally, when runoff occurs from the upper reaches of their respective watersheds. In Section 32, T12S, R10E, approximately 10 miles northeast of the proposed location for Quarry Water Well No. 3, groundwater discharges from two springs near the confluence of San Felipe Creek and Fish Creek Wash. Prior to 1984, flow from these springs only occurred intermittently. Since 1984, however, flow from these two springs has occurred year round. These two springs, the San Felipe Creek Spring and the Fish Creek Spring, support the habitat for a population of Desert Pupfish (Cyprinodon mascularius, see Section 3.5, Wildlife), an endangered species.

Groundwater is reported to occur in two aquifers. The shallow aquifer is present at depths above approximately 100 ft bgs in the center of the basin and contains water with TDS levels reported in the range of 8,000 ppm. The elevated TDS levels are most

likely due to leaching of the saline evaporite deposits in the surficial sediments. An aquitard that may be 100 to 200 feet thick separates the shallow aquifer from the lower aquifer. The lower aquifer extends to at least 650 ft bgs at some locations and contains water with TDS levels reported in the range of 1,400 ppm. Groundwater from the lower aquifer is used for agricultural purposes. According to DWR (Bulletin 118-75), the Ocotillo Valley groundwater basin covers an area of about 410 square miles, with a storage capacity of 5,800,000 AF and a usable groundwater capacity of 1,900,000 AF.

Groundwater is reported to be discharging to the Salton Sea at rates of 2,200 AF/yr to 4,500 AF/yr. The rate of outflow from the Ocotillo Valley Groundwater Basin is greater than the rate of inflow, as evidenced by declining water levels in the lower aquifer. Water levels are decreasing at the rate of three feet per year. Approximately one-third to one-half of this decline is due to agricultural pumping and the balance is due to natural outflow. The naturally-occurring groundwater deficit is most likely due to long-term climatic changes and/or drainage of the lower aquifer due to the lowering of the hydrologic base level caused by the disappearance of ancient Lake Cahuilla.

Water-quality data and the timing of the change in flow from intermittent to year-round indicate that the discharges at San Felipe Creek Spring and Fish Creek Spring are due to increased rates of irrigation to the west. Excess irrigation water percolates to the shallow aquifer and raises the water table. The elevated water table intersects the surface at the location of the springs. From 1983 through 1996, irrigation rates have ranged from approximately 9,250 AF/yr to over 12,000 AF/yr, based on reported groundwater production.

Stream gauge data along San Felipe Creek show that, beginning in 1984, the base flow averaged several cubic feet per second (cfs). Seasonal peak flow generally occurs in late summer or early fall and may reach 50 cfs. If it is assumed that the base flow averages two cfs, then the minimum annual discharge of San Felipe Creek Spring is approximately 1,500 AF/yr. The actual discharge is likely to be appreciably greater due to seasonal peak flows.

3.3.5 Quarry Water Usage: Thresholds of Significance, Environmental Consequences, and Mitigation Measures

3.3.5.1 Thresholds of Significance

The significance criteria for analysis of proposed Quarry Water Well No. 3 were developed from Appendix G of the CEQA Guidelines. The Proposed Action would have a significant impact on hydrology and water quality if it would:

- Violate any water-quality standards or waste discharge requirements;
- Deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which a permit has been granted, or the rate of discharge at San Felipe Creek Spring or Fish Creek Spring would decrease to the point that it would degrade the Desert Pupfish habitat); or
- Otherwise substantially degrade water quality.

3.3.5.2 Proposed Action: Impacts and Mitigation Measures

Impact 3.3-5: Water Depletion at Quarry

The increased pumping rate in the Quarry vicinity from 7.8 AF/yr to 26 AF/yr could reduce water levels in other areas of the Basin, increasing the cost to pump groundwater, reducing the amount of available water in the Basin, or decreasing flow at springs that support Desert Pupfish habitat.

The nearest supply wells are located several miles to the north of the proposed Quarry Water Well No. 3 location. In addition, these wells typically pump at the rate of several hundred to over 1,000 gpm. The average pumping rate for the proposed well will be 16 gpm. The natural discharge from the Basin is 2,200 AF/yr to 4,500 AF/yr and the agricultural pumping ranges from 9,250 AF/yr to over 12,000 AF/yr. The maximum annual production from the proposed well will increase from 7.8 AF/yr to 26 AF/yr. The pumping rate and annual production for the proposed Quarry Water Well No. 3 are miniscule in comparison to agricultural pumping rates, and the rate of natural discharge of both groundwater and surface water. Therefore, the proposed well will not have any perceptible affect on the existing water levels or on the current rate of decline of the water table.

The proposed increase in pumping is also small compared to the minimum base flow from San Felipe Creek Spring of 1,500 AF/yr. Water quality data from the USG test hole also demonstrate that the new well would tap groundwater that is part of the lower aquifer. Discharge at San Felipe Creek Spring and Fish Creek Spring is from the shallow aquifer. Therefore, the proposed increase in pumping from 7.8 AF/yr to 26 AF/yr will not affect the flow at springs that support Desert pupfish habitat.

Level of Significance Before Mitigation: Less Than Significant

Mitigation Measures: None required

Impact 3.3-6: Water Quality Degradation at Quarry

The increased pumping rate in the Quarry vicinity from 7.8 AF/yr to 26 AF/yr could degrade water quality due to vertical migration of saline water from the shallow aquifer.

Based on the test hole drilling results, the shallow aquifer is not present in the area of proposed Quarry Water Well No. 3. In addition, the incremental increase in pumping from 7.8 AF/yr to 26 AF/yr is miniscule compared to the agricultural pumping rates from the lower aquifer in the central part of the basin.

Level of Significance Before Mitigation: Less Than Significant

Mitigation Measures: None required

Impact 3.3-7: Surface Water Flow at Quarry

Under normal flow conditions, there could be a negative impact on, or disruption of, existing flows of surface water at the Quarry site, as a result of expanded mining.

According to hydrology reports (Joseph E. Bonadiman & Associates 2004), a study was made of approximately 6,856 acres of the drainage area tributary to Fish Creek Wash natural channel. It was estimated that a maximum peak flow-rate for the area is approximately 5,204 cubic feet/second (cfs) for the 3-hrs-100-year storm frequency. It was concluded that the proposed Quarry expansion will not produce a significant reduction of runoff tributaries to Fish Creek because: 1) the Quarry expansion is adjacent to a mountain range that provides the smallest contribution of rainfall in the entire drainage area due to topographic and geologic conditions; and 2) rainfall east of the Quarry or within the Quarry will percolate into the ground, recharging the water table. The proposed Quarry expansion will have no effect on the natural groundwater process, therefore groundwater will transmigrate towards Fish Creek along the standard pattern. However, the main drainage patterns from the western mountain range of the drainage area produces the largest flow rate tributary to Fish Creek, potentially causing a disruption of periodic flows at the Quarry site.

Level of Significance Before Mitigation: Significant

Mitigation Measures: Mitigation Measure 3.3-7

An earthen berm will be constructed along the west side of the Quarry in order to preserve the natural drainage pathway. The berm would work as a natural earth channel, to preserve existing flow characteristics in the drainage area and protect the Quarry from flood waters by diverting water away from the Quarry and towards the Fish Creek Wash. This channel requires a minimum 50-foot bottom width for the floodway and 2:1 channel side slopes. The graded channel only requires an earthen berm of approximately 5 feet high, assuming 2 feet of freeboard. The berm would be 5 feet high by 20 feet wide, and would provide an adequate solution to contain and divert run-off.

Level of Significance After Mitigation: Less than Significant

3.3.5.3 No Action Alternative: Impacts and Mitigation Measures

Impact 3.3-5: Water Depletion at Quarry

The increased pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could reduce water levels in other areas of the Basin, increasing the cost to pump groundwater, reducing the amount of available water in the Basin, or decreasing flow at springs that support Desert Pupfish habitat.

The nearest supply wells are located several miles to the north of the proposed Quarry Water Well No. 3 location. In addition, these wells typically pump at the rate of several hundred to over 1,000 gpm. The average pumping rate for the No Action Alternative is 4.9 gpm. The natural discharge from the Basin is 2,200 AF/yr to 4,500 AF/yr and the agricultural pumping ranges from 9,250 AF/yr to over 12,000 AF/yr. The maximum annual production from the No Action Alternative is 7.8 AF/yr. The pumping rate and annual production for the No Action Alternative are equivalent to the existing baseline conditions and are miniscule in comparison to agricultural pumping rates, and the rate of natural discharge of both groundwater and surface water. Therefore, the proposed well will not have any perceptible affect on the existing water levels or on the current rate of decline of the water table.

The No Action Alternative pumping rate is also small compared to the minimum base flow from San Felipe Creek Spring of 1,500 AF/yr. Water quality data from the USG test hole also demonstrate that the existing well taps groundwater that

is part of the lower aquifer. Discharge at San Felipe Creek Spring and Fish Creek Spring is from the shallow aquifer. Therefore, the No Action Alternative will not affect the flow at springs that support Desert Pupfish habitat.

Level of Significance Before Mitigation: Less Than Significant

Mitigation Measures: None required

Impact 3.3-6: Water Quality Degradation at Quarry

The increased pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could degrade water quality due to vertical migration of saline water from the shallow aquifer.

Based on the test hole drilling results, the shallow aquifer is not present in the area of the existing Quarry Water Well No. 2. In addition, the pumping of 7.8 AF/yr is miniscule compared to the agricultural pumping rates from the lower aquifer in the central part of the basin.

Level of Significance Before Mitigation: Less Than Significant

Mitigation Measures: None required

Impact 3.3-7: Surface Water Flow at Quarry

Under normal flow conditions, there could be a negative impact on, or disruption of, existing flows of surface water at the Quarry site, as a result of expanded mining.

Under the No Action Alternative, existing mining would not expand as outlined in the Proposed Action. Therefore, baseline conditions of surface flows would be maintained.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

3.3.5.4 Partial IID Water Supply Alternative

Impact 3.3-5: Water Depletion at Quarry

The increased pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could reduce water levels in other areas of the Basin, increasing the cost to pump groundwater, reducing the amount of available water in the Basin, or decreasing flow at springs that support Desert Pupfish habitat.

This alternative does not affect water pumping or usage at the Quarry, therefore the partial IID alternative does not change impacts or mitigation measures, as compared to the Proposed Action.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-6: Water Quality Degradation at Quarry

Increasing the pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could degrade water quality due to vertical migration of saline water from the shallow aquifer.

Partial use of IID water affects the water usage from the three USG wells in the Ocotillo/Coyote Wells Groundwater Basin. This alternative does not affect water pumping or usage at the Quarry, therefore the partial IID alternative does not change impacts or mitigation measures, as compared to the Proposed Action.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-7: Surface Water Flow at Quarry

Under normal flow conditions, there could be a negative impact on, or disruption of, existing flows of surface water at the Quarry site, as a result of expanded mining.

Under this alternative, mining would expand at the Quarry as outlined in the Proposed Action, therefore there is the possibility that natural drainage patterns from the western mountain range of the drainage area could be disrupted at the Quarry site.

Level of Significance Before Mitigation: Significant

Mitigation Measures: Same as Proposed Action (See Mitigation Measure 3.3-3)

Level of Significance After Mitigation: Less than Significant

3.3.5.5 Full IID Water Supply Alternative

Impact 3.3-5: Water Depletion at Quarry

The increased pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could reduce water levels in other areas of the Basin, increasing the cost to pump groundwater, reducing the amount of available water in the Basin, or decreasing flow at springs that support Desert Pupfish habitat.

Full use of IID water affects the water usage from the three USG wells in the Ocotillo/Coyote wells Groundwater Basin. This alternative does not affect water pumping or usage at the Quarry, therefore the full IID alternative does not change impacts or mitigation measures, as compared to the Proposed Action.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-6: Water Quality Degradation at Quarry

Increasing the pumping rate in the Quarry vicinity of 7.8 AF/yr to 26 AF/yr could degrade water quality due to vertical migration of saline water from the shallow aquifer.

Full use of IID water affects the water usage from the three USG wells in the Ocotillo/Coyote Wells Groundwater Basin. This alternative does not affect water pumping or usage at the Quarry, therefore the full IID alternative does not change impacts or mitigation measures, as compared to the Proposed Action.

Level of Significance Before Mitigation: Less than Significant

Mitigation Measures: None required

Impact 3.3-7: Surface Water Flow at Quarry

Under normal flow conditions, there could be a negative impact on, or disruption of, existing flows of surface water at the Quarry site, as a result of expanded mining.

Under this alternative, mining would expand at the Quarry as outlined in the Proposed Action, therefore there is the possibility that natural drainage patterns from the western mountain range of the drainage area could be disrupted at the Quarry site.

Level of Significance Before Mitigation: Significant

Mitigation Measures: Same as Proposed Action (See Mitigation Measure 3.3-3)

Level of Significance After Mitigation: Less than Significant

3.3.6 Cumulative Impacts and Mitigation Measures

The revised groundwater model (Bookman-Edmonston, 2004) assumed a 1.4 percent constant annual population increase in the Ocotillo area based on U.S. Census data and information contained in the Ocotillo-Nomirage Community Area Plan and therefore considered potential cumulative impacts resulting from regional growth.

The County Board of Supervisors recently upheld the County Planning Commission's determination of historical water usage and water well registration terms for a commercial well (State Well #16S/9E-36G4, Westwind Water Company) in the vicinity of the USG wells, and limited future pumping from this well to 40 AF/yr. This maximum rate of pumping is higher than the rate assumed in the modeling conducted for the Proposed Action (Bookman-Edmonston, 2004). The combined effects of the Proposed Action and the proposed additional pumping from the Westwind well have the potential to cause cumulative impacts on water levels and water quality in the Groundwater Basin.

The Proposed Action itself is comprised of three separate components (Quarry, Plant, and Pipeline) that are somewhat separated geographically, reducing the potential for cumulative effects. For example, the existing and proposed Quarry water wells are located along the southwestern boundary of the Ocotillo Valley Groundwater Basin. This Basin is distinctly different from the Ocotillo/Coyote Wells Groundwater Basin in which the USG production wells for the Plant are located.

Impact 3.3-8: Cumulative Reduced Water Levels

Increased pumping of USG wells and the additional commercial pumping from the Westwind well could reduce water levels, increasing the cost of pumping groundwater, causing some wells to go dry, and reducing the amount of available water in the Groundwater Basin.

As discussed for Impact 3.3-1, the Proposed Action could result in a significant impact on water levels and water quantity in the Groundwater Basin. The cumulative impact of the additional commercial pumping has the potential to further exacerbate this impact.

Level of Significance Before Mitigation: Significant

Mitigation Measure: Same as Mitigation Measure 3.3-1. The Monitoring Program for this Mitigation Measure is the same as for Mitigation Measure 3.3-1, as described in Section 3.3.3.

Level of Significance After Mitigation: Less Than Significant as to individual wells; Significant as to Basin-wide impacts

Impact 3.3-9: Cumulative Water Quality Degradation

Increased pumping of USG wells and the additional commercial pumping from the Westwind well could degrade water quality due to lateral migration of higher-TDS water located to the east of Coyote Wells, lateral migration of higher-TDS water from areas near outcrops of Tertiary marine sediments, or vertical migration of water from or near Tertiary marine sediments underlying the alluvial aquifer throughout most areas of the Groundwater Basin.

As discussed for Impact 3.3-2, the Proposed Action could result in a significant impact on water quality in the Groundwater Basin. The cumulative impact of the additional commercial pumping has the potential to further exacerbate this impact.

Level of Significance Before Mitigation: Significant

Mitigation Measure: Same as Mitigation Measure 3.3-2. The Monitoring Program for this Mitigation Measure is the same as for Mitigation Measure 3.3-2, as described in Section 3.3.3.

Level of Significance After Mitigation: Less Than Significant as to individual wells; Significant as to Basin-wide impacts

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REPORT

GROUNDWATER EVALUATION REPORT
DAN BOYER WATER COMPANY
STATE WELL NO. 16S/9E-36G4
OCOTILLO, CALIFORNIA

PREPARED FOR:

TESSERA SOLAR NORTH AMERICAS INC.

URS PROJECT NO. 27657106.00807

APRIL 26, 2010

R E P O R T

GROUNDWATER EVALUATION REPORT DAN BOYER WATER COMPANY WELL STATE WELL NO. 16S/9E-36G4 OCOTILLO, CALIFORNIA

Prepared for

Mr. Richard Knox
Tessera Solar North America, Inc.
4800 N. Scottsdale Road, Suite 5500
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URS Project No. 27657106.00807

Robert K. Scott
Vice President and Principal Geologist

April 26, 2010

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April 26, 2010

Mr. Richard Knox
Tessera Solar North America, Inc.
4800 N. Scottsdale Road, Suite 5500
Scottsdale, AZ 85251

Subject: Groundwater Evaluation Report
Dan Boyer Water Company Well (State Well No. 16S/9E-36G4)
Ocotillo, California
URS Project/Reference No. 27657106.00807

Dear Mr. Knox:

URS Corporation Americas (URS) is pleased to provide Tessera Solar North America, Inc. (Tessera Solar) this letter report summarizing the results of a groundwater evaluation conducted for the Dan Boyer Water Company well (State Well No. 16S/9E-36G4), located approximately 3.5 miles southwest of the western boundary of the project site, immediately south of the County Road S22 exit (Exit 89) on Interstate Highway 8 (I-8) near Ocotillo, California. Tessera Solar is considering this well as an alternative water supply during the initial six months to three years of construction and/or operations of the Imperial Valley Solar Project (the Project). Our services have been performed in accordance with Work Order No. 7106-26 dated April 5, 2010. The results of our evaluation indicate that groundwater at the rate specified in the Conditional Use Permit for the well (40.3 acre-feet/year) will not have a significant effect on water quality or effect water supply in surrounding wells. If you have any questions concerning the findings of this groundwater evaluation appearing in this report, please give us a call.

Sincerely,

URS CORPORATION

Robert K. Scott, P.G., C.Hg.
Vice President and Principal Geologist

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AFC	Application for Certification
afy	Acre-feet per year
APN	Assessor's Parcel Number
bgs	Below ground surface
CUP	Conditional Use Permit
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DWSAP	California Drinking Water Source Assessment and Protection
EIS	Environmental Impact Statement
gpd	Gallons per day
gpm	Gallons per minute
MCL	Maximum Contaminant Level
msl	Mean sea level datum
NTV	Nephelometric Turbidity Units
NWIS	National Water Information System
OCWGB	Ocotillo/Coyote Wells Groundwater Basin
OCPs	Organochlorine Pesticides
PCBs	Polychlorinated Biphenyls
SVOCs	Semivolatile Organic Compounds
SWWTF	Seeley Wastewater Treatment Facility
TDS	Total Dissolved Solids
Tessera Solar	Tessera Solar North America LLC
TPH	Total Petroleum Hydrocarbons
URS	URS Corporation Americas
USEPA	United States Environmental Protection Agency
USG	United States Gypsum Company
VOCs	Volatile Organic Compounds
Westwind	Westwind Water Company
ZOI	Zone of influence

SECTION 1 INTRODUCTION

URS Corporation Americas (URS) has prepared this report for Tessera Solar North America, LLC (Tessera Solar) to evaluate the potential effects of groundwater extraction from an existing water supply well owned by the Dan Boyer Water Company (State Well No. 16S/9E-36G4) in Ocotillo, California. Water from this well will serve as a temporary, alternative water supply for the Project.

1.1 BACKGROUND

The Dan Boyer Water Company operates a well and sells water to users within the local groundwater basin, which includes the area of the Project. The well is located approximately 3.5 miles southwest of the Project site. This offsite water supply is permitted for construction and potable use. The water supply would be used temporarily until water is made available from the Seeley Waste Water Treatment Facility (SWWTF), as described in the Supplement to the Application for Certification (AFC), filed in June 2009. The projected average annual construction water use is approximately 50 afy (45,000 gallons per day). In order to achieve the peak construction water demand (such as prior to large amounts of concrete mixing/pouring during construction), the Project may temporarily store water in the proposed onsite lined evaporation ponds. Maximum peak demand is estimated to be 90,000 gpd. Additionally, the Project would employ Best Management Practices in order to manage and meet the water needs for construction. The alternative source could provide all operational water needs for the project (33 afy) if it were needed. To evaluate the potential effect short-term pumping might have on wells in the surrounding area and on water quality, URS performed the scope of services described below.

1.2 SCOPE OF SERVICES

URS conducted the following services to evaluate water quantity and quality associated with the Boyer well:

- Reviewed existing historical groundwater quality and well yield information for the area;
- Removed the existing turbine pump from the well;
- Installed a pump suitable to pump the well within the limits specified in the CUP;
- Performed aquifer testing;
- Conducted groundwater sampling and analyses;
- Evaluated the data; and
- Prepared this report summarizing historical information, the results of the aquifer test and potential impacts resulting from pumping at the permitted rate.

SECTION 2 AVAILABLE GROUNDWATER INFORMATION

Information related to the subject well has been provided by Mr. Dan Boyer, owner of the Dan Boyer Water Company that operates the well and owns the property on which it is located. Geological and hydrogeological information described herein was presented in the Draft Environmental Impact Report (DEIR), Environmental Impact Statement (EIS) for the United States Gypsum Company (USG) Expansion/Modernization Project, dated April 2006. In addition, URS conducted a query of the United States Geological Survey National Water Information System (NWIS) web interface to identify any additional water-level and/or water quality information that may have been recorded subsequent to the USG DEIR/EIS for the subject well.

2.1 PROPOSED WATER SUPPLY WELL

The Dan Boyer Water Company (Formerly the Westwind Water Company) is located on Assessors Parcel Number (APN) 033-564-02-01 at 1108 Imperial Avenue, Ocotillo, California 92259 (Figure 1). TSNA is currently involved in negotiations of a purchase agreement for the water, and a will serve letter demonstrating intent to furnish water is provided as Appendix A.

2.1.1 Water Use

The Dan Boyer Water Company operates State Well No. 16S/9E-36G4 under a Conditional Use Permit (CUP) issued by the County of Imperial. It is our understanding that Mr. Boyer purchased the property approximately a year ago. The water company was previously known as the Westwind Water Company. The well is permitted to extract water for construction uses and personal consumption at a rate of 40 acre-feet per year (afy) (or approximately 41,775 gallons per day based upon 6 days per week, 52 weeks per year of extraction [exportation is limited to tanker trucks]). Based upon information provided to Tessera Solar, the well historically extracted over 100 afy for uses such as construction, dust control, quarry operations, and personal use. Water use records for the Westwind Water Company (Westwind) were provided to URS by Mr. Boyer for the period 1990 to 2004. These records are provided in Appendix B. The records accompanied a letter dated July 23, 2004 that was submitted by a former owner of Westwind (Michele Brammer) to the Imperial County Planning Department regarding the CUP issued for the well to document water use.

The July 23, 2004 letter from Ms. Brammer indicated the earliest documentation of water sales was in 1958 by A & L Development Company. The letter provided a rough estimate of water use based on written records from 1958 through 1967. She estimated that an average of 16.56 af per month, or 198.2 af were sold annually. During that time and through 1982, the water was hauled to Mexicali. From 1983 through 1997, water was sold to a number of local users, but the volume sold was considerably less than that sold between 1958 and 1967. Ms. Brammer summarized records from the previous owner and after she and her husband assumed a lease of the property in 1998. According to these records, the reported water use ranged from 2.9 afy (1993) to 42.1 afy (2004) during this period, with the highest monthly extraction of 11 af. Based on this information Ms. Brammer requested that water sales be allowed at 17 af per month. The Specific Terms for Ground Water Well Registration is provided in Appendix C, which describes the current operational terms for the well. According to Section T-14, the applicant of the

groundwater well can request an amendment for increased water usage by showing "competent proof" that the well had a historic use greater than 40 afy within a period of one year.

2.1.2 Well Construction

Information on State Well No. 16S/9E-36G4 provided in the USG DEIR/EIS indicates that the well is 10.75 inches in diameter, is 560 feet deep and is screened from 340 feet to 560 feet below ground surface (bgs). The well was installed sometime in the 1950s. There is a second shallower well located on the property that has a total depth of approximately 212 feet. The screen interval in the shallow well is not known, although it is anticipated that it is probably approximately 100 feet in length.

2.1.3 Groundwater Depth and Elevation

Depth to groundwater in the well between 1975 and 2000 ranged from 122 to 137 feet bgs, corresponding to elevations ranging from approximately 245 to 260 feet above mean sea level datum (msl). Water-level data appearing in the USG DEIR/DEIS for this well were measured semi-annually (spring and fall) beginning in 1980. These data are also included in the USGS NWIS web interface and a hydrograph is included in Appendix D. Water levels were typically measured during or shortly after pumping had stopped. During pumping it appears that water-level drawdown may be on the order of 10 feet compared to static conditions. The data are not conclusive with respect to long-term trends in water levels in this well since monitoring began in the 1970s.

2.1.4 Groundwater Quality

Groundwater quality data is not provided for this well in the USG DEIR/EIS. However, there are general water quality data for the well during two monitoring events that occurred in 1974 and 1975. A summary of these data are provided in Table 1 for comparison with similar data collected following aquifer testing.

2.2 REGIONAL GROUNDWATER

Ocotillo/Coyote Wells Groundwater Basin (OCWGB) is described in Section 5.5 of the Project AFC based upon Department of Water Resources, Bulletin No. 118 data. Additional environmental setting data and a summary of findings from several groundwater studies for OCWGB is located in Section 3.3 of the DEIR/EIS prepared for the proposed expansion of the USG plant in Plaster City.

The OCWGB is characterized as an unconfined aquifer with 1,200,000 acre-feet of estimated storage (Bookman-Edmonston 2004). Runoff from the Coyote and Jacumba Mountains provides the majority of the recharge to OCWGB which is believed to occur in alluvial fans located along the mountain fronts. The groundwater flow direction trends from the northwest toward the southeast. The USG EIR/EIS indicates that the most recent estimate of groundwater recharge to OCWGB is approximately 1,100 to 1,200 afy. However, this is much lower than others have estimated for the basin. Other estimates of recharge have ranged from approximately 536 to 7,200 afy. Natural discharge from the OCWGB is estimated to be approximately 1,300 afy or higher. Comparing these estimates of loss with the total recharge estimate of 1,100 afy to 1,200 afy indicates that the rate of groundwater outflow from the basin may have been greater than the rate of recharge prior to the initiation of pumping. Based upon the USG DEIR/EIS, current domestic use in OCWGB is estimated to be 120 to 125 afy, and reported commercial

uses vary annually (typically around 400 to 500 afy or more). Total estimated pumping in the OCWGB in 2002 was estimated to be approximately 556 afy. The USG DEIR/EIS indicates that the static (non-pumping) water levels in the Ocotillo/Nomirage area have steadily declined over the last 30 years. The total decline is about five to six feet, for an average rate of water level decline of one foot every five years.

The groundwater quality within OCWGB varies by location. Groundwater in some areas of OCWGB is relatively good quality; however, groundwater is highly saline in some areas of the basin, particularly east of Coyote Wells where groundwater is present in Tertiary-age marine strata. These strata are generally fine-grained (silt and clay) and well yields are very low.

The OCWGB is designated as a sole source aquifer. The following information was provided in Section 3.3.2 of the USG DEIR/EIS:

"There are several communities in the Ocotillo/Coyote Wells Groundwater Basin, including Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. These communities, USG and several other commercial/industrial and agricultural users, depend on the Ocotillo/Coyote Wells Groundwater Basin as their source of potable water. Surface water is not present in the Basin and there are no water imports into the Basin. The Ocotillo/Coyote Wells Groundwater Basin was designated as a “sole source aquifer” by the Environmental Protection Agency (EPA) in 1996 (61 FR 47752, September 10, 1996) and is, thus, part of the Sole Source Aquifer Protection Program, authorized by Section 14245(e) of the Safe Drinking Water Act. The sole source aquifer designation requires U.S. EPA review of proposed federally assisted projects."

Designation of an aquifer as a sole source aquifer provides EPA with the authority to review federal financially assisted projects planned for the area to determine their potential for contaminating the aquifer. The Project would not introduce any contaminants into the aquifer, and an aquifer test performed for this well indicates that pumping of the well at the prescribed rates will have no significant impact on water levels and water quality in the area, as the zone of influence (ZOI) is considerably less than the distance to the closest well, approximately 500 feet away. The use of State Well No. 16S/9E-36G4 by the Imperial Valley Solar Project would be consistent with the sole source aquifer provisions included in Section 1424(e) of the Safe Drinking Water Act.

2.2.1 Other Wells in the Vicinity

Figure 3.3-4 in the USG DEIR identifies approximately 60 water wells in the OCWGB and the approximate locations of the wells are shown on Figure 1. Other than the two wells on the property, there are 11 wells located within one mile of the proposed water supply well (16S/9E-36G4). USG has operated three of these wells (USG Nos. 4, 5 and 6) in the basin that have been used by USG for water supply. USG Nos. 4 and 5 are located approximately 500 and 1,000 feet respectively, east of well 16S/9E-36G4. Well USG No. 6 is located approximately 3,000 feet northeast of well 16S/9E-36G4. The DEIR indicates that USG pumped an average of 347 acre-feet per year (afy) from the three wells during the period from 1994 to 1998. If it were assumed that the wells pumped continuously and at the same rate, the average well yield would be approximately 72 gallons per minute (gpm). The expansion of USG’s operations proposed in the DEIR was to increase pumping to a maximum of 767 afy, which was the amount reported by USG in 1972. Two of the remaining seven wells are noted as water company wells (State well nos.

16S/9E-25M2 and -36C3). The other wells are residential wells and it is unknown how much water is extracted using these wells.

2.2.2 Groundwater Depth, Elevation and Gradient

According to Table 3.3-6A in the DEIR that summarizes historical depth to groundwater information for the Ocotillo-Nomirage area where the proposed water supply well is located, depth to groundwater has varied widely from year to year as a function of pumping from the basin. Groundwater elevations have ranged from approximately 215 to 295 feet msl since 1954, when measurements began in some of the wells in this area. The groundwater gradient is reportedly from northwest to southeast toward Mexico. Model simulations for 1995 by the USGS (1977) and Bookman-Edmonston (1996) estimated that the gradient northwest of Ocotillo is 0.006 feet per foot (feet/foot) and 0.001 feet/foot south of Ocotillo toward Mexico.

2.2.3 Additional Laws, Ordinances, Regulations and Standards

2.2.3.1 Safe Drinking Water Act

The OCWGB is designated as a sole source aquifer. The following information was provided in Section 3.3.2 of the USG DEIR/EIS:

> There are several communities in the Ocotillo/Coyote Wells Groundwater Basin, including Ocotillo, Coyote Wells, Nomirage, and Yuha Estates. These communities, USG and several other commercial/industrial and agricultural users, depend on the Ocotillo/Coyote Wells Groundwater Basin as their source of potable water. Surface water is not present in the Basin and there are no water imports into the Basin. The Ocotillo/Coyote Wells Groundwater Basin was designated as a "sole source aquifer" by the Environmental Protection Agency (EPA) in 1996 (61 FR 47752, September 10, 1996) and is, thus, part of the Sole Source Aquifer Protection Program, authorized by Section 14245(e) of the Safe Drinking Water Act. The sole source aquifer designation requires U.S. EPA review of proposed federally assisted projects.

Under the Sole Source Aquifer program of the Safe Drinking Water Act, no commitment for federal funds may be made for any project which the EPA regional "administrator determines may contaminate [a designated] aquifer through a recharge zone so as to create a significant hazard to public health." Safe Drinking Water Act § 14224(e).

The Imperial Valley Solar Project is in compliance with the Sole Source Aquifer program because it would not contaminate the aquifer. First, the Project construction footprint lies entirely outside of the designated recharge zone of the aquifer. Second, although the project would use water from State Well No. 16S/9E-36G4 located in the basin, this activity also would introduce no contaminants into the aquifer, and there is no evidence of existing contamination and so no plumes State Well No. 16S/9E-36G4 could affect.

2.2.4 Imperial County Groundwater Ordinance

Imperial County has enacted a Groundwater Ordinance (Title 9 of the Imperial County Land Use Ordinance) which regulates the extraction and export of groundwater within Imperial County. County Code section 92203.01 generally prohibits export of water outside the basin without a permit. A permit would issue only upon a showing that "there is an excess supply of water that can be withdrawn without resulting in or aggravating conditions of overdraft." County Code §§ 92203.03 & 99201.04.

As noted above, State Well No. 16S/9E-36G4 operates under an existing Conditional Use Permit and is permitted for the extraction of water. Water from that well would be delivered to a point inside the basin and used for a project that lies primarily over the basin, so that no export permit is required. Moreover, even if the small portion along the eastern edge of Phase II of the project, which overlies the neighboring groundwater basin, were deemed to constitute s separate location that required an export permit, the permit should issue. The incremental amount of water demanded for that portion is so small as to provide no reasonable scientific basis for concluding that it would cause or exacerbate any overdraft. The temporary nature of the use, which would last only until water is made available from the Seeley Waste Water Treatment Facility, confirms this conclusion

SECTION 3 FIELD PROCEDURES

3.1 PUMP REMOVAL AND REPLACEMENT

On April 5, 2010 URS personnel conducted a site reconnaissance to identify the current well and piping configuration so that the well could be prepared for the performance of a constant-rate aquifer test. The proposed water supply well is plumbed to two aboveground water tanks. According to the property owner, the capacity of the two tanks is approximately 70,000 gallons. When water is dispensed from the tanks, a float is activated that turns on the well pump and the tanks are automatically refilled.

The pump at the wellhead is a turbine-type. The base of the pump and the pump pad were observed for the presence of a port that could be used to measure water levels during the pump test. There was one port; however, there was no drop tube, and a measuring device remained lodged in the well, so that the port could not be used. Because the pump cycles on and off to fill the storage tanks, it operates at its maximum flow rate which is on the order of 400 gpm, based on information provided by the owner. It was found that flow using the turbine pump could not be regulated at a lower flow rate consistent with the average daily rate specified in the CUP. Therefore, at Tessera Solar's request, URS retained the services of a well service and drilling contractor to remove the turbine pump and install a submersible pump that could pump the well during the pump test at rates consistent with the CUP. On April 16 and 19, 2010, Southwest Pump and Drilling of Coachella, California removed the turbine pump and replaced it with a submersible pump with the capacity to be regulated between 50 and 200 gpm. Prior to pump removal, water was emptied from the tanks and provided to water users so that the tanks could be used to store water generated during the aquifer pump test. Photographs documenting the removal the pump and its condition are provided in Appendix E.

3.2 AQUIFER TESTING

The scope of work consisted of a short-term stress test followed by a pumping test and recovery monitoring. Water level data collected during the tests were used to assess hydraulic properties of the well, including short-term specific capacity (*Sp*), transmissivity (*T*), long-term drawdown effects, and long-term zone of pumping influence (*ZOI*).

For this investigation, the constant-rate pumping test lasted approximately eight hours. An initial stress test was performed on April 15, 2010 to assess initial drawdown in the well and to select a pumping rate for the constant-rate pumping test. Pumping began on April 19, 2010 and recovery monitoring began April 20, 2010. The test was conducted so that the volume of water extracted on each day complies with the CUP. An electronic pressure transducer and data-logger was used during the test. The initial depth to groundwater prior to testing was measured with an electronic water-level probe at approximately 132.00 feet below grade. Field monitoring activities were conducted in accordance with general guidelines in American Society for Testing Materials standard D4050-91 (ASTM, 1994).

Based on results of the stress test, a target pumping rate of 150 gpm was used. A summary of the pumping and drawdown measurements are shown on Figure 1. During the eight-hour constant-rate pumping test, approximately 69,500 gallons of water was pumped from the well with a measured drawdown of about 52.9 feet prior to shutting off the pump (the maximum daily discharge limit of

approximately 41,000 gpd was not exceeded during the testing). During recovery, the water level rose to within 2.98 feet (94% recovery) of the initial water level after 17 hours.

SECTION 4 LABORATORY ANALYSES AND RESULTS

4.1 LABORATORY ANALYSES

The water samples form Well 16S/9E-36G4 were submitted to Calscience Analytical Laboratories, Inc. (Calscience), a state-accredited laboratory located in Garden Grove, California for analyses. The analyses were conducted on a 24-hour turnaround, with the exception of radionuclides. Radionuclides analyses were conducted on a 5-day rush turnaround. The following analyses will be conducted using U.S. EPA methods and/or Standard Methods within the U.S. EPA-recommended holding times:

- Anions (sulfate, chloride, nitrate, orthophosphate and fluoride)
- Dissolved and total metals (base cations, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, iron, manganese, aluminum, and silicon
- Turbidity
- Alkalinity (Total, Bicarbonate and Hydroxide)
- Specific conductance
- TDS
- Total Suspended Solids
- pH
- Total phosphorus
- Carbon dioxide
- Radionuclides
- Volatile organic compounds (VOCs)
- Semivolatile organic compounds (SVOCs)
- Organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs)
- Asbestos
- Cyanide

4.2 LABORATORY ANALYTICAL RESULTS

Laboratory analytical results for the groundwater sample collected and analyzed from the well are provided in Table 1. A copy of the laboratory analytical report and chain-of-custody form is provided in Appendix F. A brief discussion of the results is provided below.

Title 22 Metals: Dissolved metals concentrations are reported in Table 1. These appear in the report as “filt.” (filtered) under the preparation method appearing on the metals results sheet in the laboratory analytical report provided in Appendix F. Total metals analytical results appear in the laboratory report provided in the appendix. Of the 17 Title 22 metals, only two were detected in the groundwater sample from well 16S/9E-36G4. These metals included barium (0.0365 mg/l) and molybdenum (0.0121 mg/l).

None of the detected metals were present above their respective primary or secondary maximum contaminant level (MCL) for drinking water.

Base Cations: Dissolved concentrations of calcium, magnesium, sodium and potassium were 3.43, 0.526, 133 and 0.767 mg/l, respectively. Total concentrations are provided in the laboratory analytical report.

Other Metals: Aluminum, iron and manganese were not detected at concentrations above the laboratory reporting limit. Silicon was detected at a concentration of 8.99 mg/l and silica was present at a concentration of 19.2 mg/l.

Anions: Fluoride was detected at a concentration of 2.7 mg/l, which is above the Primary MCL of 2.0 mg/l. Nitrate (as Nitrogen) was not detected above the detection limit of 0.10 mg/l. Chloride and sulfate were present at concentrations of 75 and 34 mg/l, considerably below the secondary MCL. Total alkalinity and bicarbonate (as $CaCO_3$) were present at a concentration of 152 mg/l.

General Water Quality Parameters: Turbidity, electrical conductivity (EC), TDS, and pH present in the groundwater sample from the well were 0.08 NTU, 610 umhos/cm, 380 mg/l and 8.29 respectively.

Other Priority Pollutants: TPH, VOCs, SVOCs, OCPs, PCBs, total cyanide and asbestos were not present at detectable concentrations.

Radionuclides: Radionuclides were not present at concentrations above their respective MCLs.

The data collected following the aquifer test were also compared to the historical water quality data for 1974 and 1975 that appear in the USGS NWIS web interface. These data are also included in Table 1. The historical data were limited to standard general water quality parameters, such as base cations, anions, TDS, specific conductance and pH. The quality of the water sample collected following the aquifer test was identical to the samples collected in 1974 and 1975.

SECTION 5 AQUIFER TESTING RESULTS

Pumping drawdown charts and projections are shown on Figures G-1 and G-2; and aquifer test analytical plots are included as Appendix G. A summary of the data analysis is provided below.

5.1 SPECIFIC CAPACITY

The short-term specific capacity for the well was calculated based on groundwater drawdown near the end of pumping (at 455 minutes) based on the following formula:

$$Sp = \frac{Q}{(h_o - h)} \tag{1}$$

Where: Sp = Short-term specific capacity (gpm/ft)

Q = Pumping rate (gpm)

$(h_o\text{-}h)$ = Total drawdown at 455 minutes of pumping (ft)

Results of the analysis, as shown on Figure G-1, indicates that the specific capacity (*Sp*) of the well is approximately 2.81gpm/ft at 150 gpm.

Typically, the maximum recommended well pumping rate should not result in long-term drawdown that exceeds 20 percent of the aquifer thickness (i.e. the maximum recommended continuous well pumping rate should retain at least 80 percent of the aquifer's water column thickness). Assuming a saturated aquifer thickness of 428 ft, then a short-term peak drawdown of 85.6 ft should not be exceeded. Therefore, based on a *Sp* of 2.81 gpm/ft, short-term pumping operations for peak demand can be as high as 240 gpm. This is well above the anticipated peak demand of about 25 gpm (40.3 afy) for construction activities.

5.2 TRANSMISSIVITY

Using the constant-rate drawdown pumping and recovery data, transmissivity (T) was estimated using the Cooper & Jacob (1946) Drawdown and Theis (1935) Recovery Test methods applied by the AQTESOLV® program (Windows Version 3.01, Duffield—2000). Output plots of the analyses are included in Appendix G. Results of the analyses estimate the T of the aquifer to be approximately 2,500 gallons per day per foot (gpd/ft).

5.3 DRAWDOWN ANALYSIS

Using the short term *Sp* of 2.81 gpm/ft, initial drawdown for the pumping rate of 25gpm were estimated based on the time ending with the pumping step using the following formula:

$$s_w = \frac{Q}{Sp} \tag{2}$$

Where: s_w = Initial drawdown in ft.

Theoretical pumping curves were then developed to predict total drawdown after one log cycle (80 hours) of pumping at a specified *Q* using the following modified Cooper-Jacob (1946) equation:

$$\Delta s_w = \frac{264\,Q}{T} \tag{3}$$

Where: T = Transmissivity in gpd/ft

Δs_w = Drawdown over one log cycle for pumping rate Q (ft/log cycle)

The resultant drawdown after one log cycle of pumping for each target rate were estimated from the following modified Cooper and Jacob (1946) equation:

$$s_w' = \frac{264\,Q}{T} + s_w \tag{4}$$

Where: s_w' = Predicted drawdown, in ft, after one log cycle (at 80 hrs) of pumping at *Q*

Theoretical pumping curve was then derived by fitting a straight line with a slope Δs_w through the predicted points of drawdown, s_w and s_w', for the target value of 25 gpm as shown on Figure G-3.

For the anticipated average Q of 25 gpm during planned construction activities, the total projected drawdown is estimated to be approximately 22 ft after 1 year.

5.4 ZONE OF INFLUENCE (ZOI)

In accordance with guidance provided by the California Drinking Water Source Assessment and Protection (DWSAP) program (California Department of Health Services, 1999), the groundwater pumping ZOI was calculated to assess the potential capture of groundwater after one, two and three years of pumping activities at the long-term projected rate of 40 afy (about 25 gpm of continuous pumping). ZOI calculations are based on the fixed radius delineation method using the following formula:

$$r = \sqrt{\frac{Q't}{\pi \eta H}} \tag{5}$$

Where:

r	=	Radius of pumping ZOI (ft)
Q'	=	Pumping capacity of the well (1,756,000 ft^3/yr at 25 gpm)
t	=	Travel time to wells (1, 2 and 3 yrs)
η	=	Effective porosity (unitless; 0.2 is the default value)
H	=	Length of perforated well screen (estimated as aquifer thickness of 220 ft)

Results of the analysis indicate a ZOI of approximately 85 ft after one year of pumping at 25 gpm. Continuous pumping at this rate for a period of two and three years results in estimated ZOIs of approximately 120 and 140 feet, respectively. The results indicate that the planned pumping activities will not affect groundwater conditions at the nearest production well, which is over 500 feet east of the proposed water supply well. A summary of the test results are tabulated below.

Annual Construction Use (gpd)		36,000
Annual Production Use (afy)		40.3
Daily Ave. Use (gpm)		25
Short-Term *Sp* (gpm/ft)		2.81
Transmissivity (gpd/ft)		2,500
Construction Drawdown (ft)	1 yrs	17
ZOI (ft)	1 yr	85
	2 yrs	120
	3 yrs	140

SECTION 6 CONCLUSIONS

6.1 WATER QUALITY

Based on the results of groundwater analyses for samples collected during this evaluation, URS concludes the following:

- None of the constituents detected were present above its respective primary or secondary MCL for drinking water, with the exception of fluoride.
- Comparison of the water quality data collected following our aquifer test is identical to that observed in well 16S/9E-36G4 in 1974 and 1975.
- According to the USG DEIR/EIS, groundwater extraction from the basin since 1975 has ranged from approximately 500 to 850 afy, and there has been no change in water quality in the proposed water supply well. Because the well will provide water for the Project for approximately 10 months at a rate of approximately 40 afy, pumping at this rate is not expected to result in a change in water quality.

6.2 WATER QUANTITY

Based on the results of the pumping test, URS concludes the following:

- The aquifer penetrated by the well can support water demands for the Imperial Valley Solar Project during construction and the lifespan of its operations (as needed).
- Continuous pumping of the well at the rate specified in the CUP for a period of one, two or three years will have no significant impact on water levels in the area, as the ZOI is considerably less than the distance to the closest well, which is approximately 500 feet away.
- This analysis regarding the amount of supply and pumping indicates that the incremental amount of water demanded by the project is so small as to provide no reasonable scientific basis for concluding that it would cause or exacerbate any overdraft. The pumping required for the Project would continue for a relatively short duration that is generally accepted as not having any substantial effects on basin levels.

SECTION 7 REFERENCES

American Society for Testing Materials, 1994, Standard Test Method (field procedure) for Withdrawal and Injection Tests for Determining Hydraulic Properties of Aquifer Systems, ASTM Designation D4050-91, in ASTM Standards on Groundwater and Vadose Zone Investigations, ASTM Committee D-18 on Soil and Rock, Second Edition, p. 432.

Cooper, H. H., Jr. and Jacob, C.E., 1946, A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History; Am. Geophys. Union Trans., v. 27, p.526-534.

California Department of Health Services, 1999, Drinking Water Source Assessment and Protection (DWSAP) Program. January 1999.

Duffield, G.M., 2000, AQTESOLV7, Aquifer Test Solver, Version 1.17; Geraghty and Miller, Inc. Modeling Group, Reston Virginia.

Theis, C.V. 1935. Relation between Lowering of the Piezometric Surface and Rate and Duration of Discharge of a Well: Amer. Geophys. Union Trans., v. 16, p. 519-524.

United States Gypsum Company, April 2006, Expansion/Modernization Project Draft Environmental Impact, Report Environmental Impact Statement, State Clearinghouse No. 2001121133.

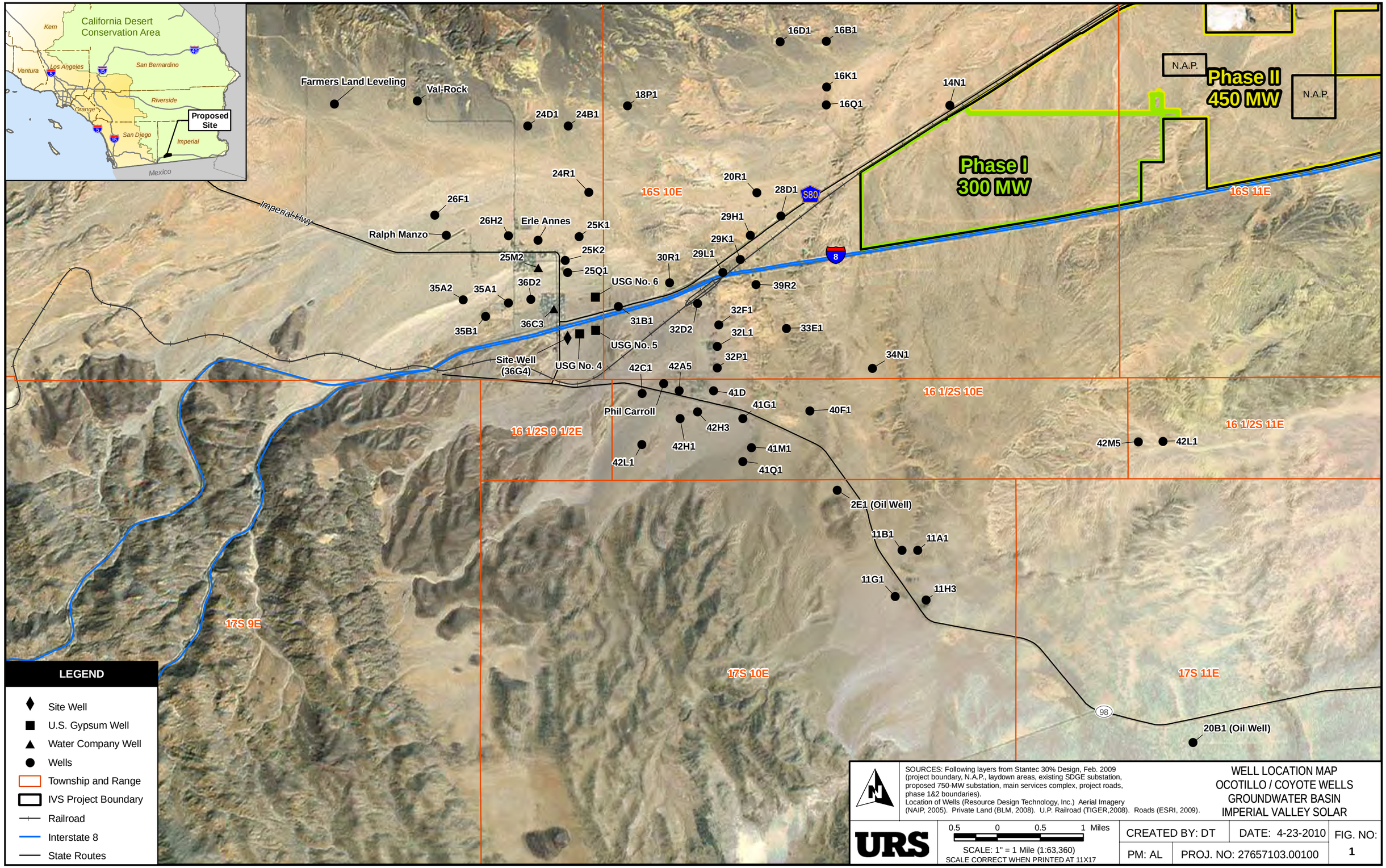
Table 1
Groundwater Analytical Results - State Well No. 16S/9E-36G4
(analytes reported in mg/l, unless noted otherwise)

Analyte	Date Sampled			Primary/ Secondary MCL
	4/20/2010	1/10/1974	6/28/1974	
General Water Quality Parameters:				
Turbidity (NTU)	0.08	NA	NA	NE
SC (umhos/cm)	610	NA	580	900*
TDS	380	380	NA	500*
TSS	<1.0	NA	NA	NE
pH (unitless)	8.29	8.9	8.9	NE
Total P	0.015	NA	NA	NE
Carbon Dioxide	<1.0	14	1.0	NE
Other Priority Pollutants:				
Cyanide	<0.050	NA	NA	0.15
VOCs (ug/l):Toluene	5.0	NA	NA	150
OCPs	ND	NA	NA	various
PCBs	ND	NA	NA	0.0005
SVOCs	ND	NA	NA	various
TPH (C6-C44) (ug/l)	<500	NA	NA	NE
Asbestos (MFL)	<0.19	NA	NA	7
Radionuclides (pCi/L):				
Gross Alpha	1.93	NA	NA	15
Gross Beta	0.425	NA	NA	50
Strontium 90	1.10	NA	NA	8
Radium 226	0.000	NA	NA	5
Tritium	17.2	NA	NA	20000
Uranium	0.000	NA	NA	20
Radium 228	0.000	NA	NA	5

Notes:
---: Not Analyzed
NE: None Established
ND: None detected; see lab report for detection limits for specific compounds.
MCL: Maximum Containant Level
MCL is primary, unless indicated with an asterisk (*).
BOLD indicates concentration is above MCL.
The symbol "<" (less than) indicates the constituent was not detected above the analytical detection limit specified.

Table 1
Groundwater Analytical Results - State Well No. 16S/9E-36G4
(analytes reported in mg/l, unless noted otherwise)

Analyte	Date Sampled			Primary/ Secondary MCL
	4/20/2010	1/10/1974	6/28/1974	
Title 22 Metals:				
Antimony	<0.0150	NA	NA	0.006
Arsenic	<0.0100	NA	NA	0.01
Barium	0.034	NA	NA	1.0
Beryllium	<0.0100	NA	NA	0.004
Cadmium	<0.0100	NA	NA	0.005
Chromium	<0.0100	NA	NA	0.05
Cobalt	<0.0100	NA	NA	NE
Copper	<0.0100	NA	NA	1.0*
Lead	<0.0100	NA	NA	0.015
Mercury	<0.000500	NA	<0.00050	0.002
Molybdenum	0.0121	NA	NA	NE
Nickel	<0.0100	NA	NA	0.1
Selenium	<0.0150	NA	NA	0.05
Silver	<0.00500	NA	NA	0.1*
Thallium	<0.0150	NA	NA	0.002
Vanadium	<0.0100	NA	NA	NE
Zinc	<0.0100	NA	NA	5.0
Base Cations:				
Calcium	3.43	4.00	3.60	NE
Magnesium	0.526	240	0.60	NE
Sodium	134	120	130	NE
Potassium	0.786	0.80	0.70	NE
Other Metals:				
Aluminum	<0.0500	NA	NA	0.2*
Iron	<0.100	NA	NA	0.3*
Manganese	<0.00500	NA	NA	0.05*
Silicon	8.99	NA	NA	NE
Silica	19.2	NA	22.0	NE
Anions:				
Fluoride	2.7	1.20	2.70	2.0
Chloride	75	70.0	70.0	250*
Nitrate (as N)	<0.10	0.2	NA	10
o-Phosphate (as P)	<0.10	NA	NA	NE
Total Alkalinity (as CaCO3)	152	NA	NA	NE
Bicarbonate (as $CaCO_3$)	152	140	185	NE
Carbonate (as $CaCO_3$)	<1.0	14	NA	NE
Hydroxide (as $CaCO_3$)	<1.0	NA	NA	NE
Sulfate	34	29.0	30.0	250*



SOURCES: Following layers from Stantec 30% Design, Feb. 2009 (project boundary, N.A.P., laydown areas, existing SDGE substation, proposed 750-MW substation, main services complex, project roads, phase 1&2 boundaries).
Location of Wells (Resource Design Technology, Inc.) Aerial Imagery (NAIP, 2005). Private Land (BLM, 2008). U.P. Railroad (TIGER,2008). Roads (ESRI, 2009).

WELL LOCATION MAP
OCOTILLO / COYOTE WELLS GROUNDWATER BASIN
IMPERIAL VALLEY SOLAR

URS

0.5 0 0.5 1 Miles
SCALE: 1" = 1 Mile (1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: DT	DATE: 4-23-2010	FIG. NO:
PM: AL	PROJ. NO: 27657103.00100	1

Path: G:\gis\projects\1577\22238980\mxd\Wells\Well_Location_Map_IVS.mxd, 04/26/10, david_trzeciak

March 26, 2010

Richard Knox
Project Manager
Tessera Solar
4800 N. Scottsdale Road, Suite 5500
Scottsdale, AZ 85251

Dear Mr. Knox:

It is my understanding that Tessera Solar is in the process of developing a solar facility known as Imperial Valley Solar (formerly known as SES Solar Two). The project is located approximately five miles east of Ocotillo, California.

This letter is to confirm that Dan Boyer Water Company will temporarily furnish well water to Imperial Valley Solar upon execution of an agreement. Well water will be used temporarily until the time that the project's permanent primary source of reclaimed water from the Seeley Wastewater Treatment Facility (SWWTF) is available. The project would be expected to require the alternate water source for approximately six to 11 months.

Dan Boyer Water Company is a private water purveyor located at 1108 Imperial Avenue, Ocotillo, California 92259. It operates state well #16S/9E-36G4 with a current permitted pumping rate of 40 acre-feet per year (afy). The well is permitted to extract water for construction and personal usage. Historically, the well has typically extracted between 120 and 132 afy for uses such as construction, dust control, and personal use.

This will serve letter is contingent upon the execution of a formal agreement between Dan Boyer Water Company and Imperial Valley Solar, LLC. We look forward to working with the Imperial Valley Solar project.

Sincerely,

Dan Boyer 3-26-10

Dan Boyer
Owner, Dan Boyer Water Company

Westwind Water Sales History

Year	Month	Gallons	Acre Feet
1990			
	5	16,000	
	7	1,741,350	
	12	126,000	
	1990	**1,883,350**	**5.8**
1991			
	1	178,250	
	2	57,250	
	3	191,000	
	4	738,250	
	5	1,041,250	
	6	891,750	
	7	949,500	
	8	829,500	
	9	1,706,000	
	10	1,167,000	
	11	823,250	
	12	264,500	
	1991	**8,837,499**	**27.1**
1992			
	1	162,500	
	2	94,750	
	3	196,500	
	4	335,250	
	5	351,750	
	6	417,750	
	7	276,500	
	8	252,750	
	9	607,000	
	10	179,750	
	11	108,667	

25.1

#F

Year	Month	Gallons	Acre Feet
	12	293,250	
	1992	**3,276,416**	**10.1**
1993			
	1	53,500	
	2	52,167	
	3	47,408	
	4	133,995	
	5	83,988	
	6	90,448	
	7	124,799	
	8	90,282	
	9	68,641	
	10	80,597	
	11	57,468	
	12	47,730	
	1993	**930,933**	**2.9**
1994			
	1	30,003	
	2	48,761	
	3	42,432	
	4	163,401	
	5	159,901	
	6	422,829	
	7	488,324	
	8	250,239	
	9	490,426	
	10	114,121	
	11	59,923	
	12	164,691	
	1994	**2,435,050**	**7.5**
1995			
	1	2,000	
	2	29,000	

Year	Month	Gallons	Acre Feet
	3	59,667	
	4	24,500	
	5	62,833	
	6	439,750	
	7	145,250	
	8	50,667	
	9	38,833	
	10	38,750	
	11	278,350	
	12	350,967	
	1995	**1,520,566**	**4.7**
1996			
	1	39,200	
	2	28,383	
	3	44,400	
	4	42,800	
	5	59,601	
	6	244,333	
	7	133,333	
	8	312,400	
	9	604,400	
	10	486,067	
	11	302,000	
	12	86,941	
	1996	**2,383,859**	**7.3**
1997			
	1	250,667	
	2	432,897	
	3	291,667	
	4	176,667	
	5	686,274	
	6	1,091,333	
	7	1,001,667	
	8	359,067	

Year	Month	Gallons	Acre Feet
	9	467,733	
	10	26,000	
	11	133,473	
	12	184,000	
	1997	**5,103,444**	**15.7**
1998			
	1	122,885	
	2	10,000	
	3	1,000	
	6	746,000	
	7	488,000	
	8	339,567	
	9	79,000	
	10	428,500	
	11	400,000	
	12	74,300	
	1998	**2,689,252**	**8.3**
1999			
	1	108,127	
	2	74,500	
	3	113,000	
	4	90,500	
	5	684,300	
	6	808,000	
	7	634,333	
	8	491,000	
	9	600,500	
	10	865,667	
	11	627,833	
	12	593,417	
	1999	**5,691,177**	**17.5**
2000			
	1	375,167	

Year	Month	Gallons	Acre Feet
	2	487,500	
	3	590,333	
	4	477,333	
	5	831,000	
	6	789,833	
	7	570,567	
	8	563,667	
	9	400,167	
	10	478,500	
	11	367,833	
	12	555,500	
	2000	**6,407,400**	**19.7**
2001			
	1	757,117	
	2	1,202,267	
	3	998,433	
	4	1,210,673	
	5	1,449,500	
	6	1,018,000	
	7	732,333	
	8	423,300	
	9	753,751	
	10	970,500	
	11	945,500	
	12	814,500	
	2001	**11,275,875**	**34.6**
2002			
	1	492,500	
	2	733,000	
	3	757,764	
	4	623,833	
	5	581,000	
	6	675,500	
	7	753,000	

Year	Month	Gallons	Acre Feet
	8	825,333	
	9	843,500	
	10	264,000	
	11	486,500	
	12	310,000	
	2002	**7,350,931**	**22.6**
2003			
	1	285,500	
	2	405,367	
	3	505,000	
	5	178,667	
	6	241,667	
	7	571,000	
	8	609,000	
	10	1,859,251	
	11	1,756,500	
	12	1,842,000	
	2003	**8,253,951**	**25.3**
2004			
	1	3,150,000	
	2	3,630,000	
	3	3,638,000	
	4	597,401	
	5	1,848,000	
	6	849,133	
	2004	**13,712,535**	**42.1**

033-564-02-01

July 23, 2004

RECEIVED
JUL 27 2004
IMPERIAL COUNTY
PLANNING. BUILDING

Mr. Jurg Heuberger
Director of Planning
Imperial County Planning Department
939 Main Street
El Centro, CA 92243

RE: Westwind Water Co.

Dear Mr. Heuberger,

Recently, it came to our attention that we needed to obtain a permit for our well in Ocotillo, California. I understood, until recent research, that the well was fully permitted. Throughout the years, water sales have been consistently made to both residential and commercial accounts. I was told that conditional use permit # 10273 was issued for the wells, but I have never seen a copy of the permit. I spoke with Mr. Jim Minnick with the Imperial County Planning Department last week and he suggested that we provide all of the documentation of the existence of, and water usage from, the well to the County in order to prove a pre-existing condition and allow the sale of water to continue at the current rate of usage. The following is a description of our situation and the information that I gathered during my research.

My research took me back to 1954. In March of 1954 (see attachment A) Ameda E and Lillian A Smith purchased, from Coyote Valley Co. Inc., the property that the well in question is located on. The earliest written documentation that I could find of water being sold is December, 1958 (Attachment B). I have written records, from 1958 through 1967, (attachment C) of water being sold to 40 different trucks that hauled water to Mexicali. The trucks from Mexico were 3 axle and held 6,000 gallons of water. A rough estimate, based on 40 trucks per day X five days X 4.5 weeks per month, averages out to 16.56 acre feet per month. At this time it was known as A & L Development Co.

In November, 1972 the property was purchased by William A and Marie E. Elfring (attachment D). Marie was the daughter of Mr. & Mrs. Smith. William (Aka Bill) came into the picture about 1959, he worked for A & L Development Co. I have written records of notes to Bill from Ameda on how to measure the size of a tanker truck. I have verbal information from Mrs. Elfring that the trucks from Mexico continued to purchase water from Westwind Water Co., until 1982. From 1983 through 1997 the Elfring's continued to sell water to other companies, Val-Rock, Havens, Cal-Trans, Granite etc. and residents of Painted Gorge, not at the same volume, but the well was continuously in operation.

The well has been tested annually by the Department of the Interior, U.S. Geological Survey since June, 1975 (attachment E). The well is mentioned on page 6 of the draft Ocotillo/Nomirage Community Area Plan, dated 2/16/94, and on page 4 of the Ocotillo/Nomirage Community Area Plan, approved by the Board of Supervisors on April 26, 1994.

My husband, Ed Brammer, and I leased the property in January, 1998 then purchased it in October, 2000.

I have compiled the written record of sales that Mr. Elfring provided to us at the time of our lease in 1998. A monthly summary of the sales report is attached (attachment F). The sales vary considerably, with the largest monthly sales at approximately 11 acre feet per month. Other records of sales can be provided, if necessary, but are not readily available.

We request that the operation of Westwind Water Co. and the sale of water be grandfathered based on pre-existing conditions so that the sale of water can continue in the same quantities (17acre ft. per month).

If you feel it's necessary to meet with me, I'll need at least a weeks notice to arrange for a day off from work. Otherwise, if you have any questions, or need more information, I can be reached at (760) 358-7751 between the hours of 8:00 AM - 4:00 PM Monday through Friday, or at (760) 358-7559 any time or day. If you prefer, you can e-mail me at, coyotevalleynews@hotmail.com

Sincerely,

Michele Brammer

Michele Brammer
14 E Agate Rd.
Ocotillo, Ca. 92259
(760) 358-7559
Coyotevalleynews@hotmail.com

CERTIFIED MAIL NO. 7000 0520 0023 7702 7268

August 22, 2000

William Elfring
239 N. Mountain View Drive
Chula Vista, CA 91910

FINAL NOTICE/ORDER REGARDING ZONING VIOLATION

The Planning/Building Department sent you the attached Notice of Violation on February 1, 2000. Based on a recent inspection of your property, it appears that little or no progress has been made in removing the wrecked vehicles, trailers, and cleaning up the property. The Planning/Building Department has determined that conditions continue to exist at the property at **1008 Imperial Highway, Ocotillo,** Assessor's Parcel Number **033-564-01-01**, which violate Sections **90513.01** and **90513.12** of the Imperial County Land Use Ordinance. The County of Imperial's Latest Assessor's "Tax Role" identifies the above party as the owner of record.

This letter is an Official Notice to correct all violations within thirty (30) days following receipt of this letter. Failure to comply within the specified time period will result in further action being taken which may include the imposition of a lien on the property for costs related to enforcement and civil penalties of up to $1,000 for each day the violation continues to exist.

You have the right to appeal the Notice of Violation/Non-Compliance or to object to these charges by filing a Request for Hearing with the Planning Commission within ten (10) days of receipt of the summary of charges.

DAN BOYER
760.554.8881

SPECIFIC TERMS FOR GROUND WATER WELL REGISTATION

APN: 033-564-02-01, State well # 16S/9E-36G4, on 1108 Imperial Highway, Ocotillo, CA.

T-1 Any new or existing well that is not under an Imperial County CUP shall be registered with (Planning Dept) and the State pursuant to California Water Code Section 13750. **(Pursuant to Title 9, Division 21: Registration of Well Section 92103.00)**

T-2 40 acre feet (AC FT) of groundwater per year is the maximum amount of groundwater extraction & exportation registration for the well. (41,775 gallons per day/250,654 per week; Based on 6 days per week/ 52 weeks per year calculation), exportation is limited to tanker trucks from the premises in Ocotillo.

T-3 A flow meter shall be installed and sealed by a California State Licensed Water Well Drilling Contractor. Registered user shall submit an annual report to the Planning/Building Department indicating the yearly amount of water extracted from the well. A photograph (dated and signed) of the flow meter readings shall be included in the annual report. The report shall be received within thirty (30) days following the anniversary date of the issuance of this registration. In the event of a flow meter failure, the registered user shall be required to cease the water well operation and notify the Planning/Building Department. The registered user may be allowed to temporarily substitute the flow meter for an alternative measuring device, at the approval of the Planning/Building Department. In this case two (2) separate reports shall be submitted as stipulated herein. **(Pursuant to Title 9, Division 22: Groundwater Ordinance 92202.04 Extraction Facility Water Flow Measurements**

T-4 Where a facility requires large vehicles (semi- truck/trailer) deliveries, designated loading and unloading provisions shall be made and reviewed and approved by the Planning/Building Department. Off-street parking areas required to be provided by this Chapter shall be designed and developed in accordance with the following standards: **(Pursuant to Title 9, Division 4: 90402.10 & 90402.13 Off-Street Loading Space; Parking Area and Development Standards ;)**

A. All off-street parking areas, as well as, ingress and egress areas shall be surfaced with

1. Two- inch (2") of asphaltic concrete
2. Three and one-half inch (3 ½") Portland cement concrete.

T-5 Should the water well be "abandoned" at any time for more than 360 consecutive days, registered well owner shall seal/cap the well according to

standards set by the State and in a manner acceptable to the County Building Official. (Abandonment shall mean as follows :)

ABANDONMENT: A well is deemed "abandoned" when it has not been used for one (1) year. An owner may have the well deemed "inactive" by filling a written notice with the Department stating his/her intentions to use the well under specific conditions and/or time frames. As evidence of his/her intentions, the conditions contained in **Bulletin 74-81 (Sec. 21)** shall be met. Any well that is open or whose services/operating equipment (e.g. pumps/motors/pipes, etc.) has been removed shall be deemed abandoned.

T-6 Registered user shall properly destroy any well on the property if abandoned. The well shall be destroyed according to State standards and in a manner acceptable to the County Building Official. A copy of the well driller's report by a California State Licensed Water Well Drilling Contractor shall be sent to the Department of Public Works and the Planning/Building Department within thirty days following the destruction of the water well.

T-7 Prior to utilizing the water well for domestic purposes, registered user shall provide written evidence to the Planning/Building Department that the water meets California Safe Drinking Water Standards. This evidence must be provided by Environmental Health Services, Health Department, to the Planning/Building Department after all appropriate testing has been done by the registered user.

T-8 An encroachment permit shall be secured from the Department of Public Works for any and all new, altered, or unauthorized existing driveways to access the lot.

T-9 Prior to approval of Groundwater well registration by Planning/Building Department, all previous and existing Land-Use violations on the property of water well # 16S/9E-36G4 must be abated.

T-10 The County reserves the right to enter the premises to make the appropriate inspections and to determine if the terms of this registration are complied with. Access to authorize enforcement agency personal shall not be denied.

T-11 Registered owner of well # 16S/9E-36G4, APN 033-564-02-01, shall defend, indemnify and hold harmless County and its agents, including consultants, officers and employees from any claim, action or proceeding against the County or its agents, including consultants, officers or employees to attack, set aside, void, or annul the approval of this application or adoption of the environmental documents which accompanies it. This indemnification obligation shall include, but not be limited to, damages, costs, expenses, attorney's fees, or expert witness costs that may be asserted by any person or entity, including any claim for private attorney general fees claimed by or awarded to any party from the County.

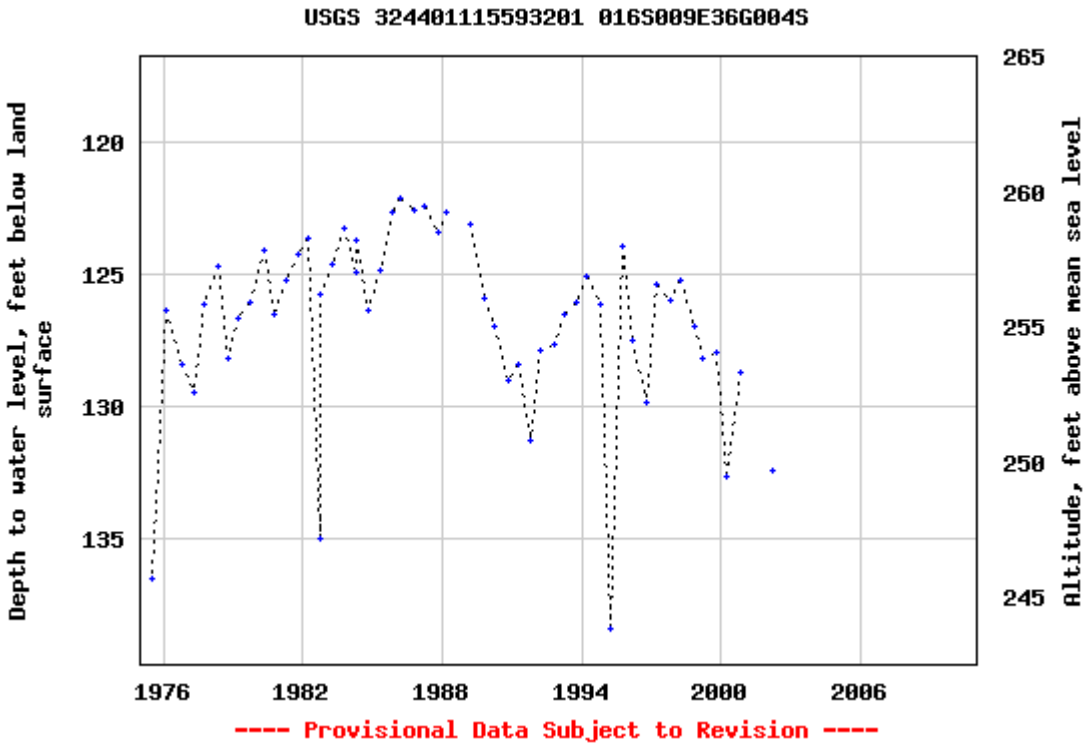
T-12 In the event of a dispute the meaning(s) or the intent of any word(s), phrase(s) and/or conditions or sections herein shall be determined by the Planning of the County of Imperial. Their determination shall be final unless an appeal is made to the Board of Supervisors within ten (10) days from the date of the Commission's decision.

T-13 Should any condition(s) of this registration be determined by a Court or other agency with property jurisdiction to be invalid for any reason, such determination shall not invalidate the remaining provision(s) of this permit.

T-**14** Registered applicant of ground water well can request an amendment for increased usage by showing competent proof that the commercial ground water well located at 033-564-02-01, further identified as State Well # 16S/9E-36G4 had a historic use greater than 40 acre feet of ground water within a period of 30 years prior to the adoption of Imperial County's Water Ordinance.

JH/DG/JM/DB/S: / APN/033/564/02/GENERAL CONDITIONSFORGROUNDWATERWELLREGISTRTION

USGS Hydrograph: State Well No. 16S/9E-36G4


USGS 324401115593201 016S009E36G004S
Depth to water level, feet below land surface
120
125
130
135
Altitude, feet above mean sea level
265
260
255
250
245
1976
1982
1988
1994
2000
2006
---- Provisional Data Subject to Revision ----

Photograph #1

Date: 4/13/10

Comments:
Dan Boyer Water Company.; Water truck arrives at site for filling prior to disassembling well pump.

Photograph #2

Date: 4/13/10

Comments:
Southwest Pump and Drilling personnel disconnect pumping equipment at the well head.

Photograph #3

Date: 4/13/10

Comments: Southwest Pump and Drilling personnel disassembling pump equipment.

Photograph #4

Date: 4/13/10

Comments: Southwest Pump and Drilling personnel disassembling pump equipment

Photograph #5

Date: 4/13/10

Comments:
Removal of pipe string from well.

Photograph #6

Date: 4/13/10

Comments:
Photograph showing condition of pump intake.

Calscience Environmental Laboratories, Inc.

April 29, 2010

Bob Scott
URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Subject: **Calscience Work Order No.: 10-04-1452**
Client Reference: Tessera-Ocotillo / 27657106.00807

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 4/20/2010 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Vikas Patel

Calscience Environmental
Laboratories, Inc.
Vikas Patel
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received:	04/20/10
Work Order No:	10-04-1452
Preparation:	EPA 3005A Filt. / EPA 7470A Filt.
Method:	EPA 6010B / EPA 7470A
Units:	mg/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date /Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-F**	**04/20/10 04:20**	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10 20:12**	**100420LA1F**

Comment(s): -Mercury analysis was performed on 04/21/10 12:21 with batch 100421L02.

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.0150	1		Mercury	ND	0.000500	1	
Thallium	ND	0.0150	1		Arsenic	ND	0.0100	1	
Vanadium	ND	0.0100	1		Barium	0.0340	0.0100	1	
Aluminum	ND	0.0500	1		Beryllium	ND	0.0100	1	
Calcium	3.43	0.100	1		Cadmium	ND	0.0100	1	
Iron	ND	0.100	1		Chromium	ND	0.0100	1	
Magnesium	0.526	0.100	1		Cobalt	ND	0.0100	1	
Manganese	ND	0.00500	1		Copper	ND	0.0100	1	
Potassium	0.767	0.500	1		Lead	ND	0.0100	1	
Sodium	133	0.500	1		Molybdenum	0.0121	0.0100	1	
Silicon	8.99	0.0500	1		Nickel	ND	0.0100	1	
Zinc	ND	0.0100	1		Selenium	ND	0.0150	1	
Silver	ND	0.00500	1						

Method Blank	**097-01-003-10,470**	**N/A**	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10 20:01**	**100420LA1F**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.0150	1		Silver	ND	0.00500	1	
Arsenic	ND	0.0100	1		Thallium	ND	0.0150	1	
Barium	ND	0.0100	1		Vanadium	ND	0.0100	1	
Beryllium	ND	0.0100	1		Aluminum	ND	0.0500	1	
Cadmium	ND	0.0100	1		Calcium	ND	0.100	1	
Chromium	ND	0.0100	1		Iron	ND	0.100	1	
Cobalt	ND	0.0100	1		Magnesium	ND	0.100	1	
Copper	ND	0.0100	1		Manganese	ND	0.00500	1	
Lead	ND	0.0100	1		Potassium	ND	0.500	1	
Molybdenum	ND	0.0100	1		Sodium	ND	0.500	1	
Nickel	ND	0.0100	1		Silicon	ND	0.0500	1	
Selenium	ND	0.0150	1		Zinc	ND	0.0100	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 04/20/10
Work Order No: 10-04-1452
Preparation: EPA 3010A Total / EPA 7470A Total
Method: EPA 6010B / EPA 7470A
Units: mg/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date /Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-E**	**04/20/10 04:20**	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10 20:14**	**100420LA1**

Comment(s): -Mercury analysis was performed on 04/21/10 12:19 with batch 100421L02.

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.0150	1		Mercury	ND	0.000500	1	
Thallium	ND	0.0150	1		Arsenic	ND	0.0100	1	
Vanadium	ND	0.0100	1		Barium	0.0365	0.0100	1	
Aluminum	ND	0.0500	1		Beryllium	ND	0.0100	1	
Calcium	3.46	0.100	1		Cadmium	ND	0.0100	1	
Iron	ND	0.100	1		Chromium	ND	0.0100	1	
Magnesium	0.519	0.100	1		Cobalt	ND	0.0100	1	
Manganese	ND	0.00500	1		Copper	ND	0.0100	1	
Potassium	0.786	0.500	1		Lead	ND	0.0100	1	
Sodium	134	0.500	1		Molybdenum	0.0110	0.0100	1	
Silicon	8.25	0.0500	1		Nickel	ND	0.0100	1	
Zinc	ND	0.0100	1		Selenium	ND	0.0150	1	
Silver	ND	0.00500	1						

Method Blank	**099-04-008-4,715**	**N/A**	**Aqueous**	**Mercury**	**04/21/10**	**04/21/10 12:07**	**100421L02**

Comment(s): -Preparation/analysis for Mercury was performed by EPA 7470A.

Parameter	Result	RL	DF	Qual
Mercury	ND	0.000500	1	

Method Blank	**097-01-003-10,469**	**N/A**	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10 20:03**	**100420LA1**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Antimony	ND	0.0150	1		Silver	ND	0.00500	1	
Arsenic	ND	0.0100	1		Thallium	ND	0.0150	1	
Barium	ND	0.0100	1		Vanadium	ND	0.0100	1	
Beryllium	ND	0.0100	1		Aluminum	ND	0.0500	1	
Cadmium	ND	0.0100	1		Calcium	ND	0.100	1	
Chromium	ND	0.0100	1		Iron	ND	0.100	1	
Cobalt	ND	0.0100	1		Magnesium	ND	0.100	1	
Copper	ND	0.0100	1		Manganese	ND	0.00500	1	
Lead	ND	0.0100	1		Potassium	ND	0.500	1	
Molybdenum	ND	0.0100	1		Sodium	ND	0.500	1	
Nickel	ND	0.0100	1		Silicon	ND	0.0500	1	
Selenium	ND	0.0150	1		Zinc	ND	0.0100	1	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

URS Corporation		Date Sampled:	04/20/10
1615 Murray Canyon Road, Suite 1000		Date Received:	04/20/10
San Diego, CA 92108-4319		Date Extracted:	04/20/10
		Date Analyzed:	04/20/10
		Work Order No.:	10-04-1452
Attn:	Bob Scott	Method:	EPA 6010B Total
RE:	Tessera-Ocotillo / 27657106.00807	Page 1 of 1	

All concentrations are reported in mg/L (ppm).

Sample Number	SiO_2 Concentration	Reporting Limit
16S9E 36G4	17.7	0.107
Method Blank	ND	0.107

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

URS Corporation		Date Sampled:	04/20/10
1615 Murray Canyon Road, Suite 1000		Date Received:	04/20/10
San Diego, CA 92108-4319		Date Extracted:	04/20/10
		Date Analyzed:	04/20/10
		Work Order No.:	10-04-1452
Attn:	Bob Scott	Method:	EPA 6010B Filter
RE:	Tessera-Ocotillo / 27657106.00807	Page 1 of 1	

All concentrations are reported in mg/L (ppm).

Sample Number	SiO_2 Concentration	Reporting Limit
16S9E 36G4	19.2	0.107
Method Blank	ND	0.107

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-G**	**04/20/10 04:20**	**Aqueous**	**GC 48**	**04/20/10**	**04/20/10 23:54**	**100420B13**

Comment(s): -The Total concentration includes individual carbon range concentrations (estimated), if any, below the RL reported as ND.

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
C6	ND	500	1		C21-C22	ND	500	1	
C7	ND	500	1		C23-C24	ND	500	1	
C8	ND	500	1		C25-C28	ND	500	1	
C9-C10	ND	500	1		C29-C32	ND	500	1	
C11-C12	ND	500	1		C33-C36	ND	500	1	
C13-C14	ND	500	1		C37-C40	ND	500	1	
C15-C16	ND	500	1		C41-C44	ND	500	1	
C17-C18	ND	500	1		C6-C44 Total	ND	500	1	
C19-C20	ND	500	1						

Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	81	68-140	

Method Blank	**099-12-308-1,311**	**N/A**	**Aqueous**	**GC 48**	**04/20/10**	**04/20/10 22:38**	**100420B13**

Parameter	Result	RL	DF	Qual
TPH as Diesel	ND	500	1	

Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	114	68-140	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-H**	**04/20/10 04:20**	**Aqueous**	**GC/MS SS**	**04/20/10**	**04/21/10 12:10**	**100420L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
N-Nitrosodimethylamine	ND	10	1		4-Nitrophenol	ND	10	1	
Aniline	ND	10	1		Dibenzofuran	ND	10	1	
Phenol	ND	10	1		2,4-Dinitrotoluene	ND	10	1	
Bis(2-Chloroethyl) Ether	ND	25	1		2,6-Dinitrotoluene	ND	10	1	
2-Chlorophenol	ND	10	1		Diethyl Phthalate	ND	10	1	
1,3-Dichlorobenzene	ND	10	1		4-Chlorophenyl-Phenyl Ether	ND	10	1	
1,4-Dichlorobenzene	ND	10	1		Fluorene	ND	10	1	
Benzyl Alcohol	ND	10	1		4-Nitroaniline	ND	10	1	
1,2-Dichlorobenzene	ND	10	1		Azobenzene	ND	10	1	
2-Methylphenol	ND	10	1		4,6-Dinitro-2-Methylphenol	ND	50	1	
Bis(2-Chloroisopropyl) Ether	ND	10	1		N-Nitrosodiphenylamine	ND	10	1	
3/4-Methylphenol	ND	10	1		4-Bromophenyl-Phenyl Ether	ND	10	1	
N-Nitroso-di-n-propylamine	ND	10	1		Hexachlorobenzene	ND	10	1	
Hexachloroethane	ND	10	1		Pentachlorophenol	ND	10	1	
Nitrobenzene	ND	25	1		Phenanthrene	ND	10	1	
Isophorone	ND	10	1		Anthracene	ND	10	1	
2-Nitrophenol	ND	10	1		Di-n-Butyl Phthalate	ND	10	1	
2,4-Dimethylphenol	ND	10	1		Fluoranthene	ND	10	1	
Benzoic Acid	ND	50	1		Benzidine	ND	50	1	
Bis(2-Chloroethoxy) Methane	ND	10	1		Pyrene	ND	10	1	
2,4-Dichlorophenol	ND	10	1		Pyridine	ND	10	1	
Naphthalene	ND	10	1		Butyl Benzyl Phthalate	ND	10	1	
4-Chloroaniline	ND	10	1		3,3'-Dichlorobenzidine	ND	25	1	
Hexachloro-1,3-Butadiene	ND	10	1		Benzo (a) Anthracene	ND	10	1	
4-Chloro-3-Methylphenol	ND	10	1		Bis(2-Ethylhexyl) Phthalate	ND	10	1	
2-Methylnaphthalene	ND	10	1		Chrysene	ND	10	1	
Hexachlorocyclopentadiene	ND	25	1		Di-n-Octyl Phthalate	ND	10	1	
2,4,6-Trichlorophenol	ND	10	1		Benzo (k) Fluoranthene	ND	10	1	
2,4,5-Trichlorophenol	ND	10	1		Benzo (b) Fluoranthene	ND	10	1	
2-Chloronaphthalene	ND	10	1		Benzo (a) Pyrene	ND	10	1	
2-Nitroaniline	ND	10	1		Benzo (g,h,i) Perylene	ND	10	1	
Dimethyl Phthalate	ND	10	1		Indeno (1,2,3-c,d) Pyrene	ND	10	1	
Acenaphthylene	ND	10	1		Dibenz (a,h) Anthracene	ND	10	1	
3-Nitroaniline	ND	10	1		1-Methylnaphthalene	ND	10	1	
Acenaphthene	ND	10	1		1,2,4-Trichlorobenzene	ND	10	1	
2,4-Dinitrophenol	ND	50	1						

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorophenol	48	7-121		Phenol-d6	31	1-127	
Nitrobenzene-d5	92	50-146		2-Fluorobiphenyl	84	42-138	
2,4,6-Tribromophenol	84	41-137		p-Terphenyl-d14	87	47-173	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**095-01-003-2,885**	**N/A**	**Aqueous**	**GC/MS SS**	**04/20/10**	**04/20/10 17:27**	**100420L04**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
N-Nitrosodimethylamine	ND	10	1		4-Nitrophenol	ND	10	1	
Aniline	ND	10	1		Dibenzofuran	ND	10	1	
Phenol	ND	10	1		2,4-Dinitrotoluene	ND	10	1	
Bis(2-Chloroethyl) Ether	ND	25	1		2,6-Dinitrotoluene	ND	10	1	
2-Chlorophenol	ND	10	1		Diethyl Phthalate	ND	10	1	
1,3-Dichlorobenzene	ND	10	1		4-Chlorophenyl-Phenyl Ether	ND	10	1	
1,4-Dichlorobenzene	ND	10	1		Fluorene	ND	10	1	
Benzyl Alcohol	ND	10	1		4-Nitroaniline	ND	10	1	
1,2-Dichlorobenzene	ND	10	1		Azobenzene	ND	10	1	
2-Methylphenol	ND	10	1		4,6-Dinitro-2-Methylphenol	ND	50	1	
Bis(2-Chloroisopropyl) Ether	ND	10	1		N-Nitrosodiphenylamine	ND	10	1	
3/4-Methylphenol	ND	10	1		4-Bromophenyl-Phenyl Ether	ND	10	1	
N-Nitroso-di-n-propylamine	ND	10	1		Hexachlorobenzene	ND	10	1	
Hexachloroethane	ND	10	1		Pentachlorophenol	ND	10	1	
Nitrobenzene	ND	25	1		Phenanthrene	ND	10	1	
Isophorone	ND	10	1		Anthracene	ND	10	1	
2-Nitrophenol	ND	10	1		Di-n-Butyl Phthalate	ND	10	1	
2,4-Dimethylphenol	ND	10	1		Fluoranthene	ND	10	1	
Benzoic Acid	ND	50	1		Benzidine	ND	50	1	
Bis(2-Chloroethoxy) Methane	ND	10	1		Pyrene	ND	10	1	
2,4-Dichlorophenol	ND	10	1		Pyridine	ND	10	1	
Naphthalene	ND	10	1		Butyl Benzyl Phthalate	ND	10	1	
4-Chloroaniline	ND	10	1		3,3'-Dichlorobenzidine	ND	25	1	
Hexachloro-1,3-Butadiene	ND	10	1		Benzo (a) Anthracene	ND	10	1	
4-Chloro-3-Methylphenol	ND	10	1		Bis(2-Ethylhexyl) Phthalate	ND	10	1	
2-Methylnaphthalene	ND	10	1		Chrysene	ND	10	1	
Hexachlorocyclopentadiene	ND	25	1		Di-n-Octyl Phthalate	ND	10	1	
2,4,6-Trichlorophenol	ND	10	1		Benzo (k) Fluoranthene	ND	10	1	
2,4,5-Trichlorophenol	ND	10	1		Benzo (b) Fluoranthene	ND	10	1	
2-Chloronaphthalene	ND	10	1		Benzo (a) Pyrene	ND	10	1	
2-Nitroaniline	ND	10	1		Benzo (g,h,i) Perylene	ND	10	1	
Dimethyl Phthalate	ND	10	1		Indeno (1,2,3-c,d) Pyrene	ND	10	1	
Acenaphthylene	ND	10	1		Dibenz (a,h) Anthracene	ND	10	1	
3-Nitroaniline	ND	10	1		1-Methylnaphthalene	ND	10	1	
Acenaphthene	ND	10	1		1,2,4-Trichlorobenzene	ND	10	1	
2,4-Dinitrophenol	ND	50	1						

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorophenol	42	7-121		Phenol-d6	32	1-127	
Nitrobenzene-d5	86	50-146		2-Fluorobiphenyl	113	42-138	
2,4,6-Tribromophenol	63	41-137		p-Terphenyl-d14	79	47-173	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8081A
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-J**	**04/20/10 04:20**	**Aqueous**	**GC 44**	**04/20/10**	**04/21/10 14:46**	**100420L10**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	0.10	1		Endrin	ND	0.10	1	
Gamma-BHC	ND	0.10	1		Endrin Aldehyde	ND	0.10	1	
Beta-BHC	ND	0.10	1		4,4'-DDD	ND	0.10	1	
Heptachlor	ND	0.10	1		Endosulfan II	ND	0.10	1	
Delta-BHC	ND	0.10	1		4,4'-DDT	ND	0.10	1	
Aldrin	ND	0.10	1		Endosulfan Sulfate	ND	0.10	1	
Heptachlor Epoxide	ND	0.10	1		Methoxychlor	ND	0.10	1	
Endosulfan I	ND	0.10	1		Chlordane	ND	1.0	1	
Dieldrin	ND	0.10	1		Toxaphene	ND	2.0	1	
4,4'-DDE	ND	0.10	1		Endrin Ketone	ND	0.10	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	94	50-135		2,4,5,6-Tetrachloro-m-Xylene	91	50-135	

Method Blank	**099-12-529-354**	**N/A**	**Aqueous**	**GC 44**	**04/20/10**	**04/21/10 12:30**	**100420L10**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	0.10	1		Endrin	ND	0.10	1	
Gamma-BHC	ND	0.10	1		Endrin Aldehyde	ND	0.10	1	
Beta-BHC	ND	0.10	1		4,4'-DDD	ND	0.10	1	
Heptachlor	ND	0.10	1		Endosulfan II	ND	0.10	1	
Delta-BHC	ND	0.10	1		4,4'-DDT	ND	0.10	1	
Aldrin	ND	0.10	1		Endosulfan Sulfate	ND	0.10	1	
Heptachlor Epoxide	ND	0.10	1		Methoxychlor	ND	0.10	1	
Endosulfan I	ND	0.10	1		Chlordane	ND	1.0	1	
Dieldrin	ND	0.10	1		Toxaphene	ND	2.0	1	
4,4'-DDE	ND	0.10	1		Endrin Ketone	ND	0.10	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	91	50-135		2,4,5,6-Tetrachloro-m-Xylene	92	50-135	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8082
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-J**	**04/20/10 04:20**	**Aqueous**	**GC 58**	**04/20/10**	**04/21/10 12:36**	**100420L05**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Aroclor-1016	ND	1.0	1		Aroclor-1248	ND	1.0	1	
Aroclor-1221	ND	1.0	1		Aroclor-1254	ND	1.0	1	
Aroclor-1232	ND	1.0	1		Aroclor-1260	ND	1.0	1	
Aroclor-1242	ND	1.0	1		Aroclor-1262	ND	1.0	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	109	50-135		2,4,5,6-Tetrachloro-m-Xylene	100	50-135	

Method Blank	**099-12-533-419**	**N/A**	**Aqueous**	**GC 58**	**04/20/10**	**04/20/10 17:28**	**100420L05**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Aroclor-1016	ND	1.0	1		Aroclor-1248	ND	1.0	1	
Aroclor-1221	ND	1.0	1		Aroclor-1254	ND	1.0	1	
Aroclor-1232	ND	1.0	1		Aroclor-1260	ND	1.0	1	
Aroclor-1242	ND	1.0	1		Aroclor-1262	ND	1.0	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	100	50-135		2,4,5,6-Tetrachloro-m-Xylene	101	50-135	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 5030B
		Method:	EPA 8260B
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
16S9E 36G4	**10-04-1452-1-A**	**04/20/10 04:20**	**Aqueous**	**GC/MS S**	**04/20/10**	**04/20/10 19:07**	**100420L01**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		c-1,3-Dichloropropene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromobenzene	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		2-Hexanone	ND	10	1	
Bromodichloromethane	ND	1.0	1		Isopropylbenzene	ND	1.0	1	
Bromoform	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
Bromomethane	ND	10	1		Methylene Chloride	ND	10	1	
2-Butanone	ND	10	1		4-Methyl-2-Pentanone	ND	10	1	
n-Butylbenzene	ND	1.0	1		Naphthalene	ND	10	1	
sec-Butylbenzene	ND	1.0	1		n-Propylbenzene	ND	1.0	1	
tert-Butylbenzene	ND	1.0	1		Styrene	ND	1.0	1	
Carbon Disulfide	ND	10	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Carbon Tetrachloride	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Tetrachloroethene	ND	1.0	1	
Chloroethane	ND	5.0	1		Toluene	5.0	1.0	1	
Chloroform	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Chloromethane	ND	10	1		1,2,4-Trichlorobenzene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		1,1,1-Trichloroethane	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromochloromethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		Trichloroethene	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
1,2-Dichlorobenzene	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	1.0	1		Vinyl Acetate	ND	10	1	
Dichlorodifluoromethane	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
1,1-Dichloroethane	ND	1.0	1		p/m-Xylene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		o-Xylene	ND	1.0	1	
1,1-Dichloroethene	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
c-1,2-Dichloroethene	ND	1.0	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
t-1,2-Dichloroethene	ND	1.0	1		Diisopropyl Ether (DIPE)	ND	2.0	1	
1,2-Dichloropropane	ND	1.0	1		Ethyl-t-Butyl Ether (ETBE)	ND	2.0	1	
1,3-Dichloropropane	ND	1.0	1		Tert-Amyl-Methyl Ether (TAME)	ND	2.0	1	
2,2-Dichloropropane	ND	1.0	1		Ethanol	ND	100	1	
1,1-Dichloropropene	ND	1.0	1						

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Dibromofluoromethane	104	80-132		1,2-Dichloroethane-d4	103	80-141	
Toluene-d8	98	80-120		1,4-Bromofluorobenzene	90	76-120	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	04/20/10
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 5030B
		Method:	EPA 8260B
		Units:	ug/L

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-001-499**	**N/A**	**Aqueous**	**GC/MS S**	**04/20/10**	**04/20/10 14:24**	**100420L01**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		c-1,3-Dichloropropene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromobenzene	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		2-Hexanone	ND	10	1	
Bromodichloromethane	ND	1.0	1		Isopropylbenzene	ND	1.0	1	
Bromoform	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
Bromomethane	ND	10	1		Methylene Chloride	ND	10	1	
2-Butanone	ND	10	1		4-Methyl-2-Pentanone	ND	10	1	
n-Butylbenzene	ND	1.0	1		Naphthalene	ND	10	1	
sec-Butylbenzene	ND	1.0	1		n-Propylbenzene	ND	1.0	1	
tert-Butylbenzene	ND	1.0	1		Styrene	ND	1.0	1	
Carbon Disulfide	ND	10	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Carbon Tetrachloride	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Tetrachloroethene	ND	1.0	1	
Chloroethane	ND	5.0	1		Toluene	ND	1.0	1	
Chloroform	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Chloromethane	ND	10	1		1,2,4-Trichlorobenzene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		1,1,1-Trichloroethane	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromochloromethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		Trichloroethene	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
1,2-Dichlorobenzene	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	1.0	1		Vinyl Acetate	ND	10	1	
Dichlorodifluoromethane	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
1,1-Dichloroethane	ND	1.0	1		p/m-Xylene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		o-Xylene	ND	1.0	1	
1,1-Dichloroethene	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
c-1,2-Dichloroethene	ND	1.0	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
t-1,2-Dichloroethene	ND	1.0	1		Diisopropyl Ether (DIPE)	ND	2.0	1	
1,2-Dichloropropane	ND	1.0	1		Ethyl-t-Butyl Ether (ETBE)	ND	2.0	1	
1,3-Dichloropropane	ND	1.0	1		Tert-Amyl-Methyl Ether (TAME)	ND	2.0	1	
2,2-Dichloropropane	ND	1.0	1		Ethanol	ND	100	1	
1,1-Dichloropropene	ND	1.0	1						

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Dibromofluoromethane	102	80-132		1,2-Dichloroethane-d4	98	80-141	
Toluene-d8	97	80-120		1,4-Bromofluorobenzene	89	76-120	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 04/20/10
Work Order No: 10-04-1452

Project: Tessera-Ocotillo / 27657106.00807

Client Sample Number	Lab Sample Number	Date Collected	Matrix
16S9E 36G4	**10-04-1452-1**	**04/20/10**	**Aqueous**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Fluoride	2.7	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
Chloride	75	1.0	1		mg/L	N/A	04/20/10	EPA 300.0
Nitrate (as N)	ND	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
o-Phosphate (as P)	ND	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
Sulfate	34	1.0	1		mg/L	N/A	04/20/10	EPA 300.0
Turbidity	0.080	0.050	1		NTU	N/A	04/20/10	SM 2130 B
Alkalinity, Total (as CaCO3)	152	5.0	1		mg/L	N/A	04/20/10	SM 2320B
Bicarbonate (as CaCO3)	152	5.0	1		mg/L	N/A	04/20/10	SM 2320B
Carbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Hydroxide (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Specific Conductance	610	1.0	1		umhos/cm	N/A	04/20/10	SM 2510 B
Solids, Total Dissolved	380	1.0	1		mg/L	04/21/10	04/21/10	SM 2540 C
Solids, Total Suspended	ND	1.0	1		mg/L	04/21/10	04/21/10	SM 2540 D
pH	8.29	0.01	1		pH units	N/A	04/20/10	SM 4500 H+ B
Phosphorus, Total	0.15	0.10	1		mg/L	04/21/10	04/21/10	SM 4500 P B/E
Cyanide, Total	ND	0.050	1		mg/L	04/20/10	04/20/10	SM 4500-CN E
Carbon Dioxide	ND	1.0	1		mg/L	N/A	04/20/10	SM4500-CO2D

Method Blank	**N/A**	**Aqueous**

Parameter	Result	RL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Fluoride	ND	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
Chloride	ND	1.0	1		mg/L	N/A	04/20/10	EPA 300.0
Nitrate (as N)	ND	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
o-Phosphate (as P)	ND	0.10	1		mg/L	N/A	04/20/10	EPA 300.0
Sulfate	ND	1.0	1		mg/L	N/A	04/20/10	EPA 300.0
Alkalinity, Total (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Bicarbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Carbonate (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Hydroxide (as CaCO3)	ND	1.0	1		mg/L	N/A	04/20/10	SM 2320B
Solids, Total Dissolved	ND	1.0	1		mg/L	04/21/10	04/21/10	SM 2540 C
Solids, Total Suspended	ND	1.0	1		mg/L	04/21/10	04/21/10	SM 2540 D
Phosphorus, Total	ND	0.10	1		mg/L	04/21/10	04/21/10	SM 4500 P B/E
Cyanide, Total	ND	0.050	1		mg/L	04/20/10	04/20/10	SM 4500-CN E

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 04/20/10
Work Order No: 10-04-1452
Preparation: EPA 3010A Total
Method: EPA 6010B

Project Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
10-04-1404-1	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10**	**100420SA1**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Antimony	95	93	72-132	2	0-10	
Arsenic	111	108	80-140	3	0-11	
Barium	277	233	87-123	15	0-6	3,4
Beryllium	108	106	89-119	2	0-8	
Cadmium	103	100	82-124	4	0-7	
Chromium	106	103	86-122	3	0-8	
Cobalt	107	103	83-125	4	0-7	
Copper	111	107	78-126	3	0-7	
Lead	106	102	84-120	3	0-7	
Molybdenum	105	101	78-126	4	0-7	
Nickel	102	100	84-120	2	0-7	
Selenium	107	103	79-127	4	0-9	
Silver	110	108	86-128	1	0-7	
Thallium	48	97	79-121	68	0-8	3,4
Vanadium	111	108	88-118	2	0-7	
Aluminum	4X	4X	73-145	3	0-16	Q
Calcium	4X	4X	77-113	2	0-11	Q
Iron	4X	4X	65-149	5	0-21	Q
Magnesium	4X	4X	56-140	2	0-11	Q
Manganese	113	108	86-116	4	0-7	
Potassium	152	129	83-131	11	0-7	3,4
Sodium	4X	78	73-127	7	0-9	Q
Silicon	4X	4X	24-180	3	0-15	Q
Zinc	175	129	89-131	28	0-8	3,4

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received:	04/20/10
Work Order No:	10-04-1452
Preparation:	EPA 7470A Total
Method:	EPA 7470A

Project Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16S9E 36G4	**Aqueous**	**Mercury**	**04/21/10**	**04/21/10**	**100421S02**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	97	98	57-141	1	0-10	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received:	04/20/10
Work Order No:	10-04-1452
Preparation:	EPA 5030B
Method:	EPA 8260B

Project Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
10-04-1311-2	**Aqueous**	**GC/MS S**	**04/20/10**	**04/20/10**	**100420S01**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	104	103	72-120	1	0-20	
Carbon Tetrachloride	112	115	63-135	3	0-20	
Chlorobenzene	114	114	80-120	1	0-20	
1,2-Dibromoethane	112	113	80-120	0	0-20	
1,2-Dichlorobenzene	108	105	80-120	3	0-20	
1,1-Dichloroethene	87	90	60-132	3	0-24	
Ethylbenzene	120	119	78-120	1	0-20	
Toluene	102	103	74-122	1	0-20	
Trichloroethene	101	101	69-120	0	0-20	
Vinyl Chloride	94	86	58-130	9	0-20	
Methyl-t-Butyl Ether (MTBE)	83	86	72-126	4	0-21	
Tert-Butyl Alcohol (TBA)	94	94	72-126	0	0-20	
Diisopropyl Ether (DIPE)	91	90	71-137	2	0-23	
Ethyl-t-Butyl Ether (ETBE)	85	85	74-128	0	0-20	
Tert-Amyl-Methyl Ether (TAME)	96	98	76-124	2	0-20	
Ethanol	102	85	35-167	18	0-48	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452

Project: Tessera-Ocotillo / 27657106.00807

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	MS% REC	MSD % REC	%REC CL	RPD	RPD CL	Qualifiers
Phosphorus, Total	SM 4500 P B/E	16S9E 36G4	04/21/10	4/21/10	92	92	70-130	0	0-25	
Fluoride	EPA 300.0	10-04-1404-2	04/20/10	N/A	105	105	80-120	1	0-20	
Chloride	EPA 300.0	10-04-1404-2	04/20/10	N/A	104	104	80-120	0	0-20	
Nitrate (as N)	EPA 300.0	10-04-1404-2	04/20/10	N/A	100	100	80-120	0	0-20	
o-Phosphate (as P)	EPA 300.0	10-04-1404-2	04/20/10	N/A	109	111	80-120	3	0-20	
Sulfate	EPA 300.0	10-04-1404-2	04/20/10	N/A	107	107	80-120	0	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452

Project: Tessera-Ocotillo / 27657106.00807

Matrix: Aqueous or Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
pH	SM 4500 H+ B	16S9E 36G4	04/20/10	8.29	8.34	1	0-25	
Specific Conductance	SM 2510 B	10-04-1441-1	04/20/10	130	130	0	0-25	
Turbidity	SM 2130 B	10-04-1341-1	04/20/10	0.33	0.34	3	0-25	
Carbon Dioxide	SM4500-CO2D	16S9E 36G4	04/20/10	ND	ND	NA	0-25	
Alkalinity, Total (as CaCO3)	SM 2320B	16S9E 36G4	04/20/10	152	152	0	0-25	
Bicarbonate (as CaCO3)	SM 2320B	16S9E 36G4	04/20/10	152	152	0	0-25	
Carbonate (as CaCO3)	SM 2320B	16S9E 36G4	04/20/10	ND	ND	NA	0-25	
Hydroxide (as CaCO3)	SM 2320B	16S9E 36G4	04/20/10	ND	ND	NA	0-25	
Solids, Total Suspended	SM 2540 D	10-04-1480-1	04/21/10	19	20	5	0-20	
Solids, Total Dissolved	SM 2540 C	16S9E 36G4	04/21/10	380	394	4	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452
Preparation: EPA 3010A Total
Method: EPA 6010B

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
097-01-003-10,469	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10**	**100420LA1**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Antimony	100	101	80-120	73-127	1	0-20	
Arsenic	98	101	80-120	73-127	2	0-20	
Barium	110	111	80-120	73-127	1	0-20	
Beryllium	96	100	80-120	73-127	4	0-20	
Cadmium	101	103	80-120	73-127	2	0-20	
Chromium	100	102	80-120	73-127	2	0-20	
Cobalt	111	114	80-120	73-127	2	0-20	
Copper	105	106	80-120	73-127	1	0-20	
Lead	106	108	80-120	73-127	2	0-20	
Molybdenum	102	103	80-120	73-127	1	0-20	
Nickel	108	110	80-120	73-127	2	0-20	
Selenium	97	97	80-120	73-127	1	0-20	
Silver	102	103	80-120	73-127	1	0-20	
Thallium	105	106	80-120	73-127	2	0-20	
Vanadium	102	103	80-120	73-127	2	0-20	
Aluminum	100	102	80-120	73-127	2	0-20	
Calcium	106	108	80-120	73-127	2	0-20	
Iron	109	110	80-120	73-127	1	0-20	
Magnesium	105	107	80-120	73-127	2	0-20	
Manganese	103	105	80-120	73-127	2	0-20	
Potassium	101	101	80-120	73-127	1	0-20	
Sodium	101	101	80-120	73-127	0	0-20	
Silicon	119	123	80-120	73-127	3	0-20	ME
Zinc	106	108	80-120	73-127	2	0-20	

Total number of LCS compounds : 24
Total number of ME compounds : 1
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452
Preparation: EPA 3005A Filt.
Method: EPA 6010B

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
097-01-003-10,470	**Aqueous**	**ICP 5300**	**04/20/10**	**04/20/10**	**100420LA1F**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Antimony	100	101	80-120	73-127	1	0-20	
Arsenic	98	101	80-120	73-127	2	0-20	
Barium	110	111	80-120	73-127	1	0-20	
Beryllium	96	100	80-120	73-127	4	0-20	
Cadmium	101	103	80-120	73-127	2	0-20	
Chromium	100	102	80-120	73-127	2	0-20	
Cobalt	111	114	80-120	73-127	2	0-20	
Copper	105	106	80-120	73-127	1	0-20	
Lead	106	108	80-120	73-127	2	0-20	
Molybdenum	102	103	80-120	73-127	1	0-20	
Nickel	108	110	80-120	73-127	2	0-20	
Selenium	97	97	80-120	73-127	1	0-20	
Silver	102	103	80-120	73-127	1	0-20	
Thallium	105	106	80-120	73-127	2	0-20	
Vanadium	102	103	80-120	73-127	2	0-20	
Aluminum	100	102	80-120	73-127	2	0-20	
Calcium	106	108	80-120	73-127	2	0-20	
Iron	109	110	80-120	73-127	1	0-20	
Magnesium	105	107	80-120	73-127	2	0-20	
Manganese	103	105	80-120	73-127	2	0-20	
Potassium	101	101	80-120	73-127	1	0-20	
Sodium	101	101	80-120	73-127	0	0-20	
Silicon	119	123	80-120	73-127	3	0-20	ME
Zinc	106	108	80-120	73-127	2	0-20	

Total number of LCS compounds : 24
Total number of ME compounds : 1
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-308-1,311	**Aqueous**	**GC 48**	**04/20/10**	**04/20/10**	**100420B13**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	98	97	75-117	1	0-13	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 7470A Total
		Method:	EPA 7470A

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-04-008-4,715	**Aqueous**	**Mercury**	**04/21/10**	**04/21/10**	**100421L02**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	96	95	85-121	0	0-10	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8270C

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-003-2,885	**Aqueous**	**GC/MS SS**	**04/20/10**	**04/20/10**	**100420L04**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Phenol	43	43	4-142	0-165	1	0-24	
2-Chlorophenol	85	86	53-113	43-123	1	0-17	
1,4-Dichlorobenzene	75	75	50-122	38-134	1	0-19	
N-Nitroso-di-n-propylamine	67	68	56-146	41-161	1	0-22	
Naphthalene	84	84	21-133	2-152	0	0-20	
4-Chloro-3-Methylphenol	87	87	55-121	44-132	0	0-18	
Dimethyl Phthalate	90	90	0-112	0-131	0	0-20	
Acenaphthylene	79	79	33-145	14-164	1	0-20	
Acenaphthene	88	88	55-139	41-153	0	0-17	
4-Nitrophenol	40	41	1-145	0-169	3	0-29	
2,4-Dinitrotoluene	110	110	41-161	21-181	0	0-22	
Fluorene	97	97	59-121	49-131	0	0-20	
Pentachlorophenol	73	74	34-130	18-146	1	0-23	
Pyrene	88	90	38-170	16-192	2	0-27	
Butyl Benzyl Phthalate	92	92	0-152	0-177	0	0-20	
1,2,4-Trichlorobenzene	83	83	49-121	37-133	0	0-19	

Total number of LCS compounds : 16
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452
Preparation: EPA 3510C
Method: EPA 8081A

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-529-354	**Aqueous**	**GC 44**	**04/20/10**	**04/21/10**	**100420L10**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Alpha-BHC	71	70	50-135	36-149	1	0-25	
Gamma-BHC	71	70	50-135	36-149	2	0-25	
Beta-BHC	70	70	50-135	36-149	0	0-25	
Heptachlor	76	75	50-135	36-149	1	0-25	
Delta-BHC	70	70	50-135	36-149	0	0-25	
Aldrin	69	68	50-135	36-149	1	0-25	
Heptachlor Epoxide	72	71	50-135	36-149	2	0-25	
Endosulfan I	72	70	50-135	36-149	3	0-25	
Dieldrin	62	61	50-135	36-149	2	0-25	
4,4'-DDE	73	73	50-135	36-149	0	0-25	
Endrin	76	75	50-135	36-149	2	0-25	
Endrin Aldehyde	78	76	50-135	36-149	2	0-25	
4,4'-DDD	75	75	50-135	36-149	1	0-25	
Endosulfan II	73	71	50-135	36-149	2	0-25	
4,4'-DDT	82	81	50-135	36-149	1	0-25	
Endosulfan Sulfate	72	71	50-135	36-149	1	0-25	
Methoxychlor	81	81	50-135	36-149	0	0-25	

Total number of LCS compounds : 17
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
1615 Murray Canyon Road, Suite 1000		Work Order No:	10-04-1452
San Diego, CA 92108-4319		Preparation:	EPA 3510C
		Method:	EPA 8082

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-533-419	**Aqueous**	**GC 58**	**04/20/10**	**04/20/10**	**100420L05**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Aroclor-1016	89	92	50-135	3	0-25	
Aroclor-1260	104	106	50-135	2	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452
Preparation: EPA 5030B
Method: EPA 8260B

Project: Tessera-Ocotillo / 27657106.00807

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-001-499	**Aqueous**	**GC/MS S**	**04/20/10**	**04/20/10**	**100420L01**

Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Benzene	99	100	80-122	73-129	1	0-20	
Carbon Tetrachloride	109	110	68-140	56-152	1	0-20	
Chlorobenzene	110	109	80-120	73-127	1	0-20	
1,2-Dibromoethane	110	109	80-121	73-128	1	0-20	
1,2-Dichlorobenzene	102	102	80-120	73-127	0	0-20	
1,1-Dichloroethene	83	85	72-132	62-142	3	0-25	
Ethylbenzene	116	115	80-126	72-134	1	0-20	
Toluene	97	99	80-121	73-128	2	0-20	
Trichloroethene	95	96	80-123	73-130	1	0-20	
Vinyl Chloride	94	95	67-133	56-144	1	0-20	
Methyl-t-Butyl Ether (MTBE)	80	84	75-123	67-131	4	0-20	
Tert-Butyl Alcohol (TBA)	94	97	75-123	67-131	3	0-20	
Diisopropyl Ether (DIPE)	87	89	71-131	61-141	2	0-20	
Ethyl-t-Butyl Ether (ETBE)	81	85	76-124	68-132	4	0-20	
Tert-Amyl-Methyl Ether (TAME)	93	93	80-123	73-130	1	0-20	
Ethanol	111	105	61-139	48-152	6	0-27	

Total number of LCS compounds : 16
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452

Project: Tessera-Ocotillo / 27657106.00807

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Extracted	Date Analyzed	LCS % REC	LCSD % REC	%REC CL	RPD	RPD CL	Qual
Fluoride	EPA 300.0	099-12-906-922	N/A	04/20/10	102	104	90-110	1	0-15	
Chloride	EPA 300.0	099-12-906-922	N/A	04/20/10	106	105	90-110	0	0-15	
Nitrate (as N)	EPA 300.0	099-12-906-922	N/A	04/20/10	103	103	90-110	0	0-15	
o-Phosphate (as P)	EPA 300.0	099-12-906-922	N/A	04/20/10	103	105	90-110	1	0-15	
Sulfate	EPA 300.0	099-12-906-922	N/A	04/20/10	103	104	90-110	0	0-15	
Cyanide, Total	SM 4500-CN E	099-05-061-2,837	04/20/10	04/20/10	83	82	80-120	1	0-20	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 10-04-1452

Project: Tessera-Ocotillo / 27657106.00807

Matrix: Aqueous or Solid

Parameter	Method	Quality Control Sample ID	Date Analyzed	Date Extracted	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Phosphorus, Total	SM 4500 P B/E	099-05-098-2,128	04/21/10	04/21/10	0.400	0.425	106	80-120	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 10-04-1452

Qualifier	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported without further clarification.
B	Analyte was present in the associated method blank.
E	Concentration exceeds the calibration range.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS Recovery Percentage is within LCS ME Control Limit range.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture.

URS CORPORATION
2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

1452

Date: 4 / 20 / 10

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE
URS Project/PO Number: 27657106.00807
Client Name/Project Name/Location: TESSERA-OCOTILLO
Geo Tracker Information:
URS Project Manager: BOB SCOTT
EDF Reporting: Y N Global ID:
Sampler Name and Signature: J.ESPINOSA
COELT Log Number:

Requested Analyses:

	Sample Name	Sample Date:	Sample Time:	Preserved:	Matrix:	Container type:	# of Cont.:	Wet Chemistry-Anions Turb., Alk., Sp.Cond., pH	TDS	TSS	Asbestos	Gross Alpha & Beta	Metals	Metals (lab filtered)	Total Phosphorus	CO_2	8260B-VOCs	SVOCs	Organochlorine Pesticides	PCBs	HOLD	Special Instructions:
1	BOYER WELL	4/20/10	0420	Y (N)	S (L) G	Acetate SS. Brass Jar Encore 1000 ml Amb. (Plas.) Glass VOA	5	X	X	X	X	X										
2	BOYER WELL	4/20/10	0420	(Y) HNO_3 N	S (L) G	Acetate SS. Brass Jar Encore 250 ml Amb. (Plas.) Glass VOA	1						X									
3	BOYER WELL	4/20/10	0420	Y (N)	S (L) G	Acetate SS. Brass Jar Encore 250 ml Amb. (Plas.) Glass VOA	1							X								
4	BOYER WELL	4/20/10	0420	(Y) H_2SO_4 N	S (L) G	Acetate SS. Brass Jar Encore 250 ml Amb. Plas. (Glass) VOA	1								X	(X) *						
5	BOYER WELL	4/20/10	0420	Y (N)	S (L) G	Acetate SS. Brass Jar Encore 250 ml (Amb.) Plas. Glass VOA	1									X						
6	BOYER WELL	4/20/10	0420	(Y) HCl N	S (L) G	Acetate SS. Brass Jar Encore 40 ml Amb. Plas. Glass (VOA)	3										X					
7	BOYER WELL	4/20/10	0420	(Y) $Na_2S_2O_3$ N	S (L) G	Acetate SS. Brass Jar Encore 1000 ml (Amb.) Plas. Glass VOA	3											X	X	X		
8				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA																
9				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA																
10				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA																

Relinquished By:	Date:	Received By:	Date/Time:
Samuel A. Hahn	4/20/10	CEL	4/20/10 1214
	4/20/10		4/20/10 1720

Turnaround Time: (Check)
Same Day: ____ 72 Hour: ____
24 Hour: ✓ 5 Day: ____
48 Hour: ____ Standard: ____

Lab Use Only
Cooler Temperature*: ____
*Record upon arrival

URS

S=Solid L=Liquid G=Gas

White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

(1452)

URS CORPORATION

2020 East First Street, Suite 400
Santa Ana, CA 92705
(714) 835-6886
FAX (714) 667-7147

CHAIN OF CUSTODY RECORD

Date: 4 / 20 / 10

Page 2 of 2

☐ Data Requested in GISKey Format

Lab Name: CALSCIENCE

URS Project/PO Number: 27657106.00807

Client Name/Project Name/Location: TESSERA-OCOTILLO

Geo Tracker Information:

URS Project Manager: BOB SCOTT

EDF Reporting: Y N Global ID:

Sampler Name and Signature: J. ESPINOSA

COELT Log Number:

Requested Analyses: CYANIDE; TPH-diesel/motor oil carbon chain; Radium 226; Radium 228; Strontium 90; Uranium; Tritium; HOLD

Special Instructions:

	Sample Name	Sample Date:	Sample Time:	Preserved:	Matrix:	Container type:	# of Cont.:	CYANIDE	TPH-diesel/motor oil carbon chain	Radium 226	Radium 228	Strontium 90	Uranium	Tritium	HOLD	Special Instructions:
1	BOYER WELL	4/20/10	0420	Y (NaOH) N	S L G	Acetate SS. Brass Jar Encore 500 ml Amb. Plas. Glass VOA	1	X								
2	BOYER WELL	4/20/10	0420	Y N	S L G	Acetate SS. Brass Jar Encore 500 ml Amb. Plas. Glass VOA	1		X							
3	BOYER WELL	4/20/10	0420	Y (HNO_3) N	S L G	Acetate SS. Brass Jar Encore 1000 ml Amb. Plas. Glass VOA	5			X	X	X	X			
4	BOYER WELL	4/20/10	0420	Y N	S L G	Acetate SS. Brass Jar Encore 125 ml Amb. Plas. Glass VOA	2							X		
5				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										
6				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										
7				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										
8				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										
9				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										
10				Y N	S L G	Acetate SS. Brass Jar Encore ____ml Amb. Plas. Glass VOA										

Relinquished By:	Date:	Received By:	Date/Time:
Samuel A. Hulsey	4/20/10	R. Wolff CEL	4/20/10 1214
R. Wolff	4/20/10		
			4/20/10 1710

Turnaround Time: (Check)

Same Day: ____ 72 Hour: ____

24 Hour: ✓ 5 Day: ____

48 Hour: ____ Standard: ____

Lab Use Only

Cooler Temperature*: ____

*Record upon arrival

URS

S=Solid L=Liquid G=Gas

White Copy in Final Report, Yellow to File, Pink to URS at Dropoff

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 10-04-1 ~~7~~ 4 ~~2~~ 5 ~~0~~ 2 8

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: VRS

DATE: 04/20/10

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 2.1 °C + 0.5 °C (CF) = 2.6 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter ☐ Metals Only ☐ PCBs Only Initial: RM

CUSTODY SEALS INTACT:

☐ Cooler ☐_____ ☐ No (Not Intact) ☑ Not Present ☐ N/A Initial: RM

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present Initial: [illegible]

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☑	☐	☐
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Water: ☐VOA ☑3 VOA**h** ☐VOA**na$_2$** ☑2 125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☑3 1AGB**na$_2$** ~~☑3 1AGBs~~ WSC 4-20-10

☐500AGB ☑500AGJ ☐500AGJ**s** ☑250AGB ☐250CGB ☑250CGB**s** ☑5 1PB ☐500PB ☑500PB**na**

☑250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☑5 1PBn ☐_____ ☐_____

Air: ☐Tedlar® ☐Summa® **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** [illegible]

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope **Reviewed by:** WSC

Preservative: h: HCL n: HNO_3 na$_2$: $Na_2S_2O_3$ na: NaOH p: H_3PO_4 s: H_2SO_4 znna: $ZnAc_2$+NaOH f: Field-filtered **Scanned by:** [illegible]

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone: (323) 254-9960 Fax: (323) 254-9982 Email: pasadenalab@latesting.com

Attn: **Vik Patel**
Calscience Environmental Labs, Inc.
7440 Lincoln Way
Garden Grove, CA 92841

Fax: (714) 894-7501 Phone: (714) 895-5494
Project: **10-04-1452**

Customer ID: 32CALS51
Customer PO:
Received: 04/21/10 11:00 AM
LA Testing Order: 321004697

LA Testing Proj:
Analysis Date: 4/22/2010

Test Report: Determination of Asbestos Structures in Water Performed by the 100.2 Method (EPA/600/R-94/134)

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
16S9E 36G4 *321004697-0001*	04/21/10 11:35	0	0		0.19	0.00-0.69	<0.19	Total area of filter examined = 0.069 mm2.

Effective filtration area = 1288 mm2.

Report Amended: 4/23/2010 10:54:14 AM Replaces the Inital Report . Reason Code: Client-Change to ProjectID

Analyst(s)
Sherrie Ahmad (1)

Derrick Tanner, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as <=0.01MFL>10um. ND=None Detected. This report relates only to those items tested.
This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.
Samples analyzed by LA Testing 520 Mission Street, South PasadenaCA CA ELAP 2283

THIS IS THE LAST PAGE OF THE REPORT.

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: LA TESTING

321004697

CHAIN OF CUSTODY RECORD

DATE: 04/20/10

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.	CLIENT PROJECT NAME / NUMBER: 10-04-1452	P.O. NO.:
ADDRESS: 7440 Lincoln Way	PROJECT CONTACT: Vik Patel	QUOTE NO.:
CITY: Garden Grove, CA 92841-1427	SAMPLER(S) (SIGNATURE):	LAB USE ONLY: ☐☐-☐☐☐☐
TEL: 714/895-5494 / FAX: 714/894-7501	E-MAIL: vipatel@calscience.com	

TURNAROUND TIME: ☐ SAME DAY ☒ 24 HR ☐ 48HR ☐ 72 HR ☐ 4 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS: **24 Hour TAT**

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Asbestos (100.2) or equivalent
	BOYER WELL		04/20/10	0420	W	1	X

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
[signature] CFL	[signature]	4/01/10	11am
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received by: (Signature)	Date	Time

ENVIRONMENTAL

Analytical Chemists

April 29, 2010

Calscience Environmental Laboratories
7440 Lincoln Way
Garden Grove, CA 92841-1432

Lab ID : SP 1003776
Customer : 2-17756

Laboratory Report

Introduction: This report package contains total of 5 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(1 page)	: Results for each sample submitted.
Quality Control	(2 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
16S9E 36G4	04/20/2010	04/22/2010	SP 1003776-001	DW

Sampling and Receipt Information: The sample was received, prepared and analyzed within the method specified holding times. All samples arrived at 2 °C. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Radio QC

900.0	04/27/2010:204905 All analysis quality controls are within established criteria
	04/28/2010:204948 All analysis quality controls are within established criteria
	04/23/2010:204045 All preparation quality controls are within established criteria
903.0	04/27/2010:204895 All analysis quality controls are within established criteria
	04/26/2010:204147 All preparation quality controls are within established criteria
905.0	04/29/2010:204955 All analysis quality controls are within established criteria
	04/27/2010:204165 All preparation quality controls are within established criteria
906.0	04/29/2010:204949 All analysis quality controls are within established criteria

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FAX: 559/734-8435

April 29, 2010 Lab ID : SP 1003776
Calscience Environmental Laboratories Customer : 2-17756

Radio QC

906.0	04/27/2010:204164 All preparation quality controls are within established criteria
908.0	04/26/2010:204796 All analysis quality controls are within established criteria
	04/24/2010:204078 All preparation quality controls are within established criteria
Ra - 05	04/25/2010:204717 All analysis quality controls are within established criteria
	04/22/2010:204024 All preparation quality controls are within established criteria

Certification:: I certify that this data package is in compliance with NELAC standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

KD:DMB

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2010-04-29

ENVIRONMENTAL
Analytical Chemists

April 29, 2010

Lab ID : SP 1003776-001
Customer ID : 2-17756

Calscience Environmental Laboratories
7440 Lincoln Way
Garden Grove, CA 92841-1432

Sampled On : April 20, 2010-04:20
Sampled By : Not Available
Received On : April 22, 2010-10:30
Matrix : Drinking Water

Description : 16S9E 36G4
Project : 10-04-1452

Sample Result - Radio

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Radio Chemistry[P:1'5]								
Gross Alpha	1.93 ± 1.83	2.08	pCi/L	15/5	900.0	04/23/10:204045	900.0	04/27/10:204905
Gross Beta	0.425 ± 0.996	1.18	pCi/L	50	900.0	04/23/10:204045	900.0	04/28/10:204948
Strontium 90	1.10 ± 0.600	0.861	pCi/L	8	905.0	04/27/10:204165	905.0	04/29/10:204955
Total Alpha Radium (226)	0.000 ± 0.227	0.353	pCi/L	3	903.0	04/26/10:204147	903.0	04/27/10:204895
Tritium	17.2 ± 229	381	pCi/L	20000	906.0	04/27/10:204164	906.0	04/29/10:204949
Uranium	0.000 ± 0.463	0.267	pCi/L	20	908.0	04/24/10:204078	908.0	04/26/10:204796
Ra 228	0.000 ± 2.14	0.294	pCi/L	2	Ra - 05	04/22/10:204024	Ra - 05	04/25/10:204717

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (P) Plastic Preservatives: HNO3 pH < 2

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.
MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).
AV = (Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following
If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:
Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L
Uranium is less than or equal to 20 pCi/L
Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.

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ENVIRONMENTAL

Analytical Chemists

April 29, 2010 | Lab ID : SP 1003776
Calscience Environmental Laboratories | Customer : 2-17756

Quality Control - Radio

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Radio								
Alpha	900.0	04/27/2010:204905	CCV	cpm	10470	40.5 %	38 - 47	
			CCB	cpm		0.0600	0.15	
Beta	900.0	04/28/2010:204948	CCV	cpm	10940	92.0 %	83 - 102	
			CCB	cpm		0.4000	0.61	
Gross Alpha	900.0	04/23/2010:204045	Blank	pCi/L		0.96	3	
			LCS	pCi/L	150.4	80.2 %	75-125	
			MS	pCi/L	150.4	98.9 %	60-140	
		(SP 1003758-003)	MSD	pCi/L	150.4	93.5 %	60-140	
			MSRPD	pCi/L	150.4	5.6%	≤30	
Gross Beta	900.0	04/23/2010:204045	Blank	pCi/L		2.39	4	
			LCS	pCi/L	47.80	105 %	75-125	
			MS	pCi/L	47.80	90.6 %	80-130	
		(SP 1003758-003)	MSD	pCi/L	47.80	101 %	80-130	
			MSRPD	pCi/L	150.4	11.0%	≤30	
Alpha	903.0	04/27/2010:204895	CCV	cpm	10470	42.7 %	37 - 45	
			CCB	cpm		0.0500	0.14	
Total Alpha Radium (226)	903.0	04/26/2010:204147	RgBlk	pCi/L		0.09	2	
			LCS	pCi/L	18.17	71.6 %	52-89	
			BS	pCi/L	18.17	49.9 %	43-92	
			BSD	pCi/L	18.17	61.1 %	43-92	
			BSRPD	pCi/L	18.17	20.3%	≤35.5	
Beta	905.0	04/29/2010:204955	CCV	cpm	10940	88.8 %	82 - 101	
			CCB	cpm		0.9600	1.38	
Total Strontium	905.0	04/27/2010:204165	RgBlk	pCi/L		0.37	2	
			LRS	pCi/L	19.97	129 %	53-133	
			BS	pCi/L	19.97	108 %	75-125	
			BSD	pCi/L	19.97	106 %	75-125	
			BSRPD	pCi/L	19.97	2.0%	≤20	
Tritium	906.0	04/27/2010:204164	Blank	pCi/L		160	1000	
			LCS	pCi/L	2024	97.1 %	75-125	
			BS	pCi/L	2024	96.9 %	75-125	
			BSD	pCi/L	2024	92.0 %	75-125	
			BSRPD	pCi/L	2024	4.8%	≤25	
	906.0	04/29/2010:204949	CCV	pCi/L	42960	95.1 %	90-110	
			CCB	pCi/L		28	500	
Alpha	908.0	04/26/2010:204796	CCV	cpm	10470	40.3 %	38 - 46	
			CCB	cpm		0.0500	0.15	
Uranium	908.0	04/24/2010:204078	RgBlk	pCi/L		0.41	1	
			LRS	pCi/L	20.86	78.2 %	54-105	
			BS	pCi/L	20.86	109 %	75-125	
			BSD	pCi/L	20.86	104 %	75-125	
			BSRPD	pCi/L	20.86	4.4%	≤20	
Beta	Ra - 05	04/25/2010:204717	CCV	cpm	10940	89.0 %	82 - 101	
			CCB	cpm		0.8800	1.38	
Ra 228	Ra - 05	04/22/2010:204024	RgBlk	pCi/L		-0.08	3	
			LRS	pCi/L	79.83	36.1 %	27-59	
			BS	pCi/L	79.83	90.0 %	75-125	
			BSD	pCi/L	79.83	76.9 %	75-125	
			BSRPD	pCi/L	79.83	15.7%	≤25	

Definition

CCV	: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
CCB	: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
Blank	: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
RgBlk	: Method Reagent Blank - Prepared to correct for any reagent contributions to sample result.
LCS	: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.

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Field Office
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Mobile: 559/737-2399
FAX: 559/734-8435

April 29, 2010 | Lab ID : SP 1003776
Calscience Environmental Laboratories | Customer : 2-17756

Quality Control - Radio

Definition	
MS	: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
BS	: Blank Spikes - A blank is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
BSD	: Blank Spike Duplicate of BS/BSD pair - A blank duplicate is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
MSRPD	: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
BSRPD	: BS/BSD Relative Percent Difference (RPD) - The BS relative percent difference is an indication of precision for the preparation and analysis.
DQO	: Data Quality Objective - This is the criteria against which the quality control data is compared.

RUSH

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: FGL

10037776

CHAIN OF CUSTODY RECORD

DATE: 04/21/10

PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.

ADDRESS: 7440 Lincoln Way

CITY: Garden Grove, CA 92841-1427

TEL: 714/895-5494 | FAX: 714/894-7501 | E-MAIL: vipatel@calscience.com

CLIENT PROJECT NAME / NUMBER: 10-04-1452

PROJECT CONTACT: Vik Patel

SAMPLER(S): (SIGNATURE)

P.O. NO.:

QUOTE NO.:

LAB USE ONLY

TURNAROUND TIME

☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☒ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)

☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____ / ____ / ____

SPECIAL INSTRUCTIONS

5 DAY TAT (OK per Michele Franco)

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Radium 226	Radium 228	Gross Alpha & Beta	Strontium 90	Uranium (900.8)	Tritium
	~~BOYER WELL~~		04/20/10	0420	W	8	X	X	X	X	X	X
	1659E 3664											

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature] ca	G&O 513997906	4/21/10	1600
Relinquished by: (Signature) Golden State Overnight	Received by: (Signature) [signature]	Date: 4.22.10	Time: 1030
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

2°

Santa Paula - Condition Upon Receipt (Attach to COC)

Sample Receipt:

1. Number of ice chests/packages received: 1
   Note as OTC if received over the counter unpackaged.
2. Were samples received in a chilled condition? Temps: 2 / ____ / ____ / ____ / ____
   Acceptable is 2° to 6° C. Also acceptable is received on ice (ROI) for the same day of sampling or received at room temperature (RRT) if sampled within one hour of receipt. Client contact for temperature failures must be documented below. If many packages are received at one time check for tests/H.T.'s/rushes/Bacti's to prioritize further review. Please notify Microbiology personnel immediately of bacti samples received.
3. Do the number of bottles received agree with the COC? Yes No N/A
4. Were samples received intact? (i.e. no broken bottles, leaks etc.) Yes No
5. Were sample custody seals intact? N/A Yes No

Sign and date the COC, obtain LIMS sample numbers, select methods/tests and print labels.

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable? Yes No
2. Did bottle labels correspond with the client's ID's? Yes No
3. Were all bottles requiring sample preservation properly preserved? Yes No N/A FGL
4. VOAs checked for Headspace? Yes No N/A
5. Were all analyses within holding times at time of receipt? Yes No
6. Have rush or project due dates been checked and accepted? N/A Yes No

Attach labels to the containers and include a copy of the COC for lab delivery.

Sample Receipt, Login and Verification completed by (initials): SB

Discrepancy Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted:_____ Phone Number:_____
   Initiated By:_____ Date:_____
   Problem:

   Resolution:

2. Person Contacted:_____ Phone Number:_____
   Initiated By:_____ Date:_____
   Problem:

   Resolution:

(2-17756)
Calscience Environmental Laboratories
SP 1003776
NMB-04/22/2010-10:36:28

Figure G-1
Pumping and Drawdown Effects
Imperial Valley Solar
Well 16S/9E-36G4 Constant Rate

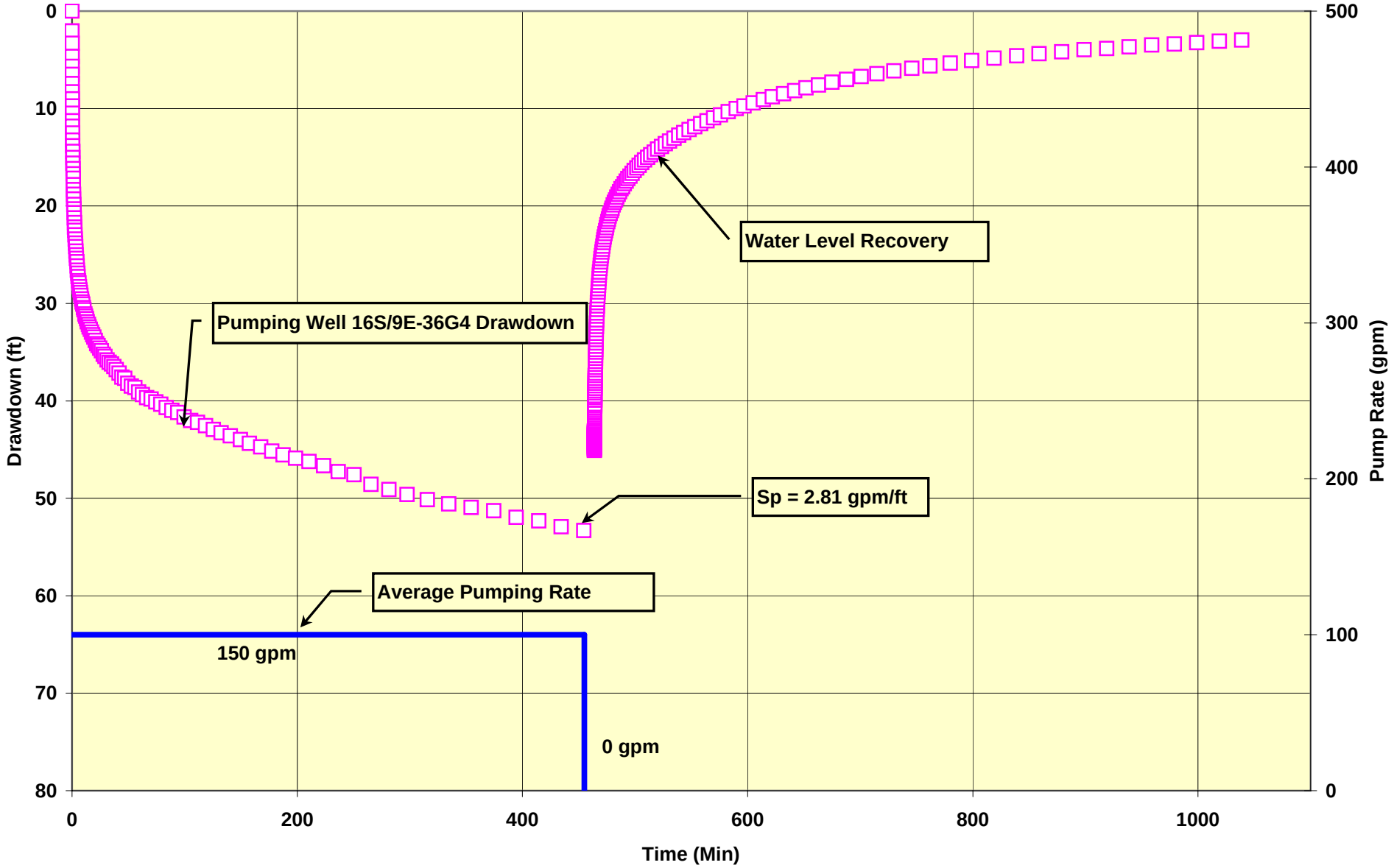
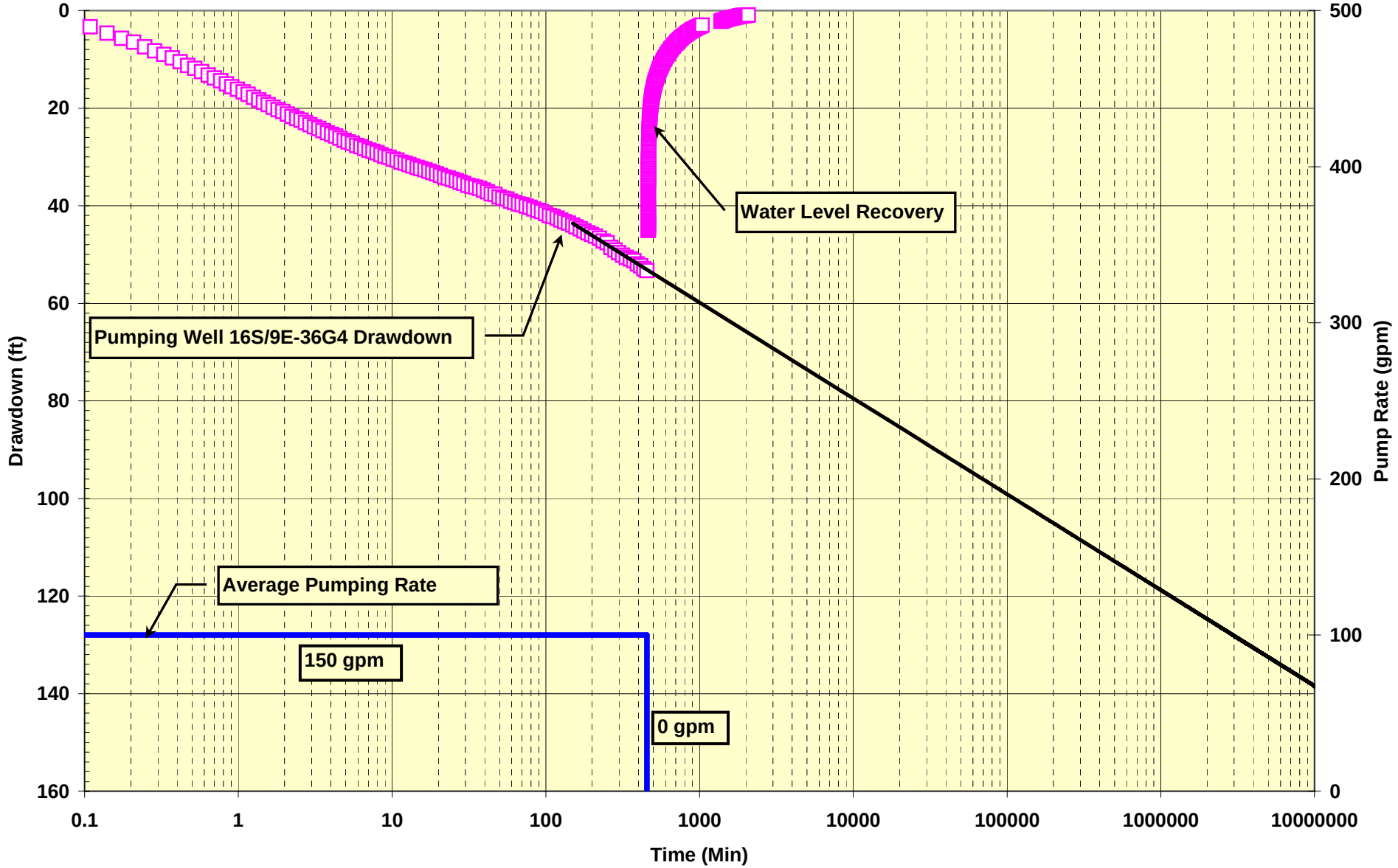
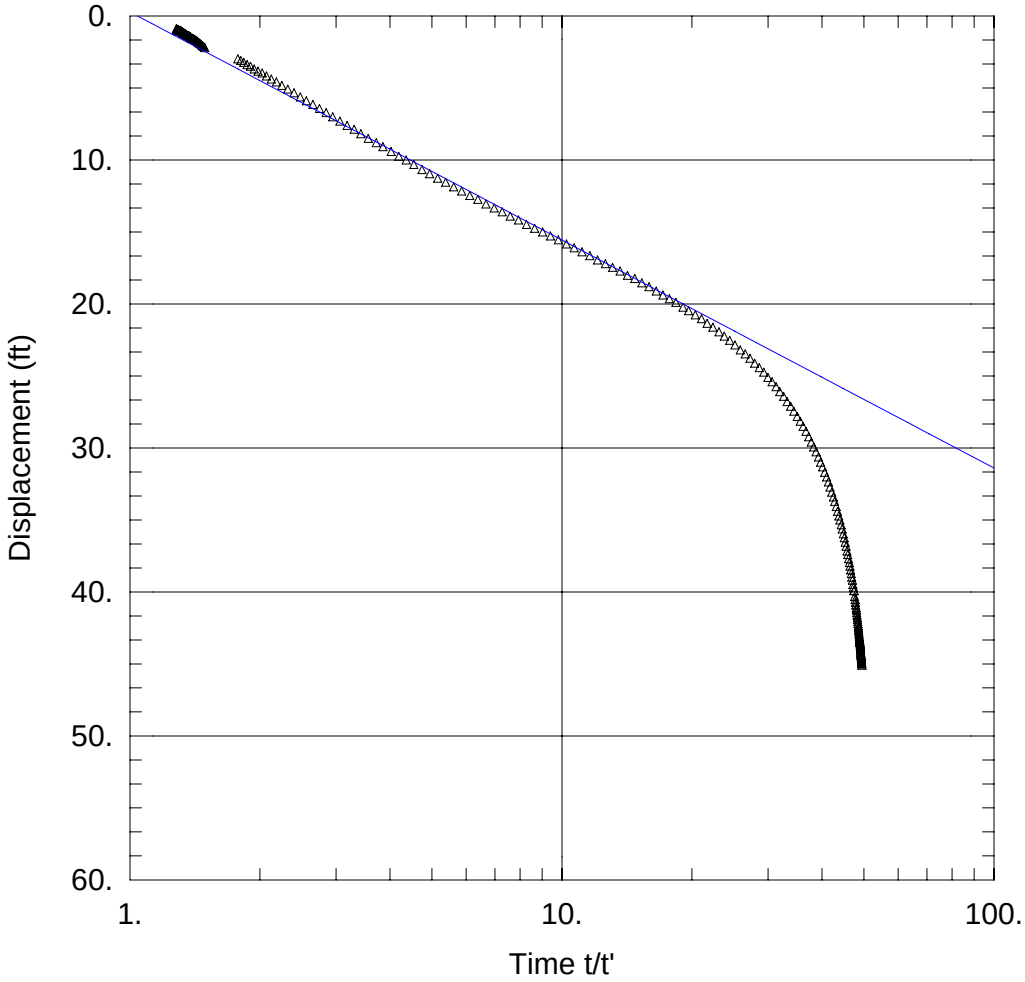


Figure G-2
Pumping and Drawdown Effects
Imperial Valley Solar
Well 16S/9E-36G4 Constant Rate





16S/9E-36G4 PUMPING TEST

Data Set: T:\2010\Imperial Valley Solar\16S.9E.36G4 Pumping Test\Well 16S.9E.36G4 Recovery.aqt
Date: 04/29/10 Time: 12:23:28

PROJECT INFORMATION

Company: URS
Client: Tessera
Test Location: Ocotillo, Ca
Test Well: 16S/9E-36G4
Test Date: 4/19/2010

AQUIFER DATA

Saturated Thickness: 428. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
16S/9E-36G4	0	0

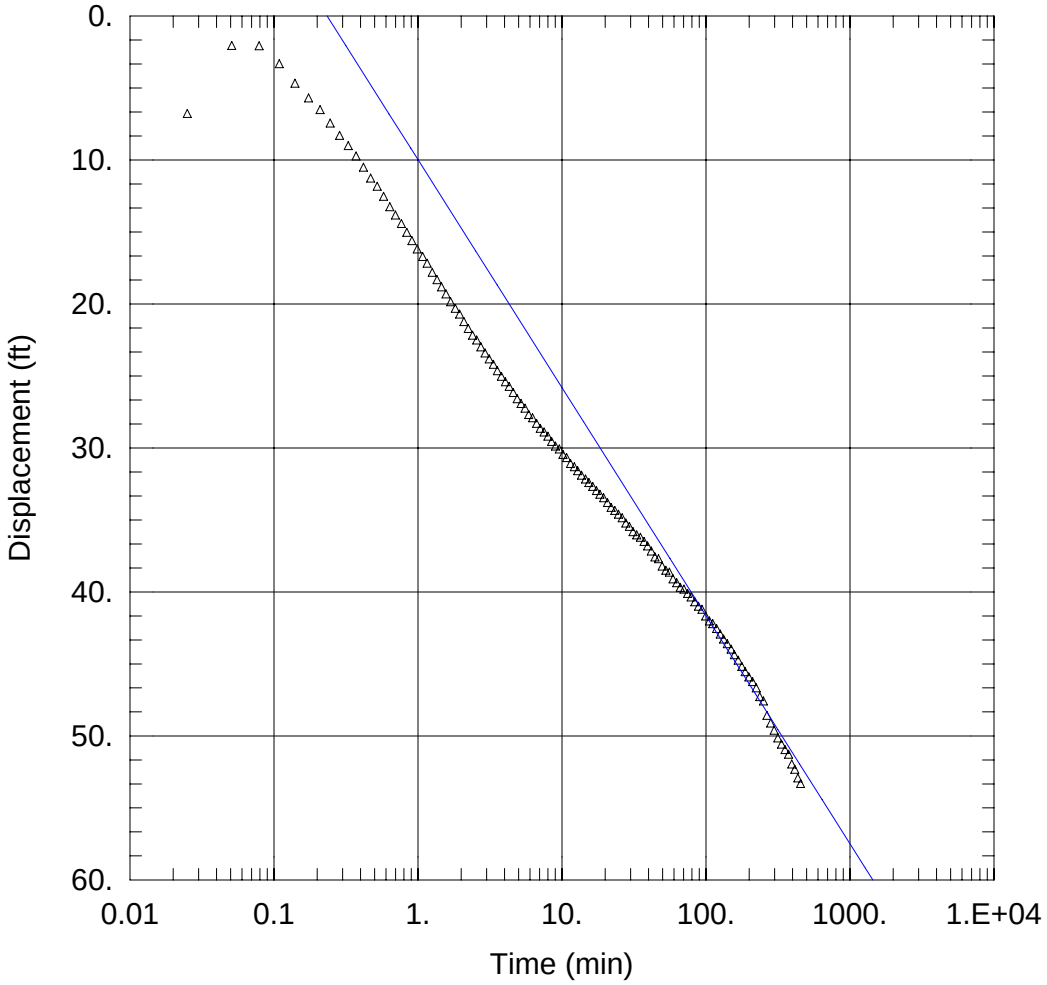
Observation Wells

Well Name	X (ft)	Y (ft)
▵ 16S/9E-36G4	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 2500. gal/day/ft S' = 1.04



16S/9E-36G4 PUMPING TEST

Data Set: T:\...\Well 16S.9E.36G4 C-J Late Drwdn Anal.aqt
Date: 04/29/10 Time: 12:23:52

PROJECT INFORMATION

Company: URS
Client: Tessera
Test Location: Ocotillo, Ca
Test Well: 16S/9E-36G4
Test Date: 4/19/2010

AQUIFER DATA

Saturated Thickness: 428. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
16S/9E-36G4	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
△ 16S/9E-36G4	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 2500. gal/day/ft

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April 26, 2010

Andrew Trouette
Bureau of Land Management
El Centro Field Office
1661 S. Fourth Street
El Centro, CA 92243

Joy Nishida
California Energy Commission
1516 Ninth Street, MS-4
Sacramento, CA 95814

Subject: Early Spring 2010 Botanical Surveys for Imperial Valley Solar
URS Project No. 27657106

INTRODUCTION

Botanical surveys were conducted for the Imperial Valley Solar (IVS) Project Site in 2007 and 2008. During these relatively dry years, no special status plant species were detected. In response to above average rainfall events that have occurred within Imperial County during 2010 to date, additional botanical surveys were conducted by URS Corporation (URS) for the IVS Project Site. These surveys incorporated survey protocols published by the Bureau of Land Management (BLM) (BLM 1996a, BLM 1996b, BLM 2001, and BLM 2009) and reviewed by the California Department of Fish and Game (CDFG), California Energy Commission (CEC) and BLM (BLM 2010, CDFG 2010, and CEC 2010) prior to the commencement of botanical surveys on the site.

METHODS

The site was divided into 110 approximately 95-acre survey plot cells (Figure 1). A pair of botanists (Table 1) visited two of these units each day and conducted sensitive plant surveys for specific target species and a general floristic inventory of plant species occurring on the IVS site (Tables 2 - 5). A complete and comprehensive survey for each unit was accomplished by walking transects with 100 ft spacing throughout the unit. The survey corridor width for the waterline survey was 150 feet from either side of Evan Hewes Highway. The transmission line survey corridor was 500-feet wide (250 feet from the centerline).

Surveyors used GPS units to orient themselves on site and walked transects either north to south or east to west. Each pair spent a minimum of three hours in a 95-acre grid cell to ensure that observers never surveyed more than 15 acres per hour. Typical rate of coverage was 12 acres per person per hour. Resumes for all surveyors are provided as Appendix A.

On February 21, 2010, URS botanist Lee Ripma visited reference populations to confirm the blooming periods and timing for two sensitive species with a moderate to high potential to occur within the Project site, Harwood's milk-vetch (*Astragalus insularis var. harwoodii*) and brown

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turbans (*Malperia tenuis*). In addition, other botanists working on the Project also visited these reference populations to ensure they had a good search image while conducting surveys on site. A full botanical survey of the proposed Project site [excluding "not a part parcels" (N.A.P.)] and associated proposed transmission line and waterline were conducted from February 22 to March 2, 2010.

RESULTS

Floristic surveys in 2010 resulted in the detection of 14 plant species on the IVS site that were not detected during the 2007 and 2008 surveys. Of these taxa, none are considered special status plant species. Two of the species detected on the site during the early spring surveys are on the California Native Plant Society (CNPS) "watch list" (List 4). These species were Thurber's pilostyles (*Pilostyles thurberi*) and Utah vine milkweed (*Cynanchum utahense*).

Thurber's pilostyles is a stem parasite on dye plant (*Psorothamnus emoryi*) that was found in two locations within the proposed transmission line corridor. Utah vine milkweed was recorded at 58 locations on the IVS site (Figure 2).

ADDITIONAL BOTANICAL SURVEYS AND SCHEDULE

A second round of botanical surveys of the entire Project site is tentatively scheduled for the week of April 5, 2010 to ensure a comprehensive and complete survey for potential sensitive plant species. All sensitive target species (see Table 5) with blooming periods outside of spring survey timelines are considered to have a low potential to occur within the Project boundary; however, CEC and BLM have requested late season (fall) surveys to be conducted to verify that impacts to state and federally listed Threatened, Endangered, Proposed, Petitioned, and Candidate or California Native Plant Society List 1A, 1B, or 2 plants will be minimized and mitigated.

Sincerely,

URS CORPORATION

Patrick Mock, PhD
Principal Scientist
PM:mv

cc: Daniel Stewart, BLM
Larry LaPre, BLM
Jim Stobaugh, BLM
Rick York, CEC
Christopher Meyer, CEC
Richard Knox, TSNA
Angela Leiba, URS

Attachments:

References
Table 1: Survey Effort by Grid Cell
Table 2: Botanical Species Detected to Date on IVS Site
Table 3: Botanical Species Detected on IVS Waterline
Table 4: Botanical Species Detected on IVS Transmission Line
Table 5: Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
Figure 1: Botany Survey Grid
Figure 2: Special Status Species Locations Recorded in Early Spring Survey 2010
Appendix A: Resumes of Surveyors

REFERENCES:

BLM 1996a. Bureau of Land Management. Special Status Plant Management. BLM Manual Handbook 6840-1.

BLM 1996b. Bureau of Land Management. Special Status Plant Management. BLM Manual Supplement 6840-06.

BLM 2001. Bureau of Land Management. Special Status Species Management. BLM Manual 6840 Revision.

BLM 2009. Bureau of Land Management. Survey Protocols for NEPA/ESA Compliance for BLM Special Status Plant Species.

BLM 2010. Personal communication between Patrick Mock and Andrew Trouette (BLM) in February 2010 regarding the botanical survey effort for the Imperial Valley Solar site.

CDFG 2010. Personal communication between Patrick Mock and Magdalena Rodriguez (CDFG) in February 2010 regarding the botanical survey effort for the Imperial Valley Solar site.

CEC 2010. Personal communication between Patrick Mock and Joy Nishida (CEC) in February 2010 regarding the botanical survey effort for the Imperial Valley Solar site.

Table 1
Survey Effort by Grid Cell

Cell Number	Surveyors	Date
1	LR, JB, AK	2/22/2010
2	LR, MB, JN	2/24/2010
3	NK, JLE	2/26/2010
4	LN, CT	2/22/2010
5	CB, CaSn	2/22/2010
6	MW, CeSh	2/22/2010
7	MB, SA	2/22/2010
8	MB, CaSn	2/26/2010
9	MB, CaSn	2/26/2010
10	LN, CT	2/26/2010
11	LN, CT	2/26/2010
12	NK, JLE, AK	2/23/2010
13	NK, JLE	2/22/2010
14	NK, JLE, AK	2/23/2010
15	MB, CaSn	2/23/2010
16	MW, CeSh	2/26/2010
17	MW, CeSh	2/26/2010
18	LR, AK	2/26/2010
19	LR, AK	2/26/2010
20	CaSn, MB, CeSh, LN, LR	2/27/2010
21	CaSn, MB, CeSh, LN, LR	2/27/2010
22	CaSn, MB, CeSh, LN, LR	2/27/2010
23	LR, MB, MW, CeSh	2/28/2010
24	CaSn, MB, CeSh, LN, LR	2/27/2010
25	CaSn, MB, CeSh, LN, LR	2/27/2010
26	MW, CeSh	2/24/2010
27	MW, CeSh	2/24/2010
28	CB, SA, AK	2/24/2010
29	CB, SA, AK	2/24/2010
30	LN, CT	2/24/2010
31	LN, CT	2/24/2010
32	JLE, CT, AK, MW, NK	2/27/2010
33	JLE, CT, AK, MW, NK	2/27/2010
34	JLE, CT, AK, MW, NK	2/27/2010
35	JLE, CT, AK, MW, NK	2/27/2010
36	JLE, CT, AK, MW, NK	2/27/2010
37	CaSn, JB	2/24/2010
38	CaSn, JB	2/24/2010
39	NK, JLE	2/24/2010

Table 1
Survey Effort by Grid Cell
(Continued)

Cell Number	Surveyors	Date
40	NK, JLE	2/25/2010
41	LR, MB, JN	2/24/2010
42	NK, JLE	2/24/2010
43	LN, JLE	2/28/2010
44	CaSn, AK	2/28/2010
45	LR, MB	3/1/2010
46	LR, MB	3/1/2010
47	NK, CT	2/28/2010
48	CT, MW, LN, CeSh, JLE, NK	3/2/2010
49	NK, CT	3/1/2010
50	NK, CT	3/1/2010
51	MW, CeSh	3/1/2010
52	MW, CeSh	3/1/2010
53	NK, JLE	2/25/2010
54	NK, JLE	2/25/2010
55	MW, CT, JN	2/25/2010
56	MW, CT, JN	2/25/2010
57	CaSn, AK	3/1/2010
58	LN, JLE	3/1/2010
59	LN, JLE	3/1/2010
60	LN, CT	2/23/2010
61	MW, CeSh	2/23/2010
62	MW, CeSh	2/23/2010
63	CB, SA	2/23/2010
64	LN, CT	2/23/2010
65	JB, LR	2/23/2010
66	CaSn, AK	3/1/2010
67	JB, LR	2/23/2010
68	CB, SA	2/23/2010
69	SA, CB, JB	2/26/2010
Transmission Line	SA, CaSn, JB, CB, LN	2/25/2010
Water Line	LR, MB, AK, CeSh	2/25/2010
Reference Pop Checks	LR, MB	2/21/2010

Notes:
Surveyor Acronyms: AK = Aaron Keller, CaSn – Cara Suellen, CB = Caesara Brungraber , CeSh = Cecile Shohet, CT = Chris Thayer, JB = Jessica Birnbaum, JLE = Jolie Lonner Egert, LN = Lech Naumovich, LR = Lee Ripma, MB = Michelle Balk, MW = Michael Wood, NK = Neal Kramer, SA = Sundeep Amin

Table 2
Botanical Species Detected to Date on IVS Site

Scientific Name	Common Name
GYMNOSPERMS	
Ephedraceae	Ephedra Family
Ephedra trifurca	long-leaved ephedra
ANGIOSPERMS: MONOCOTS	
Agavaceae	Agave Family
Hesperocallis undulata	desert lily
Poaceae	Grass Family
Aristida adscensionis	six-weeks three-awn
Bouteloua aristidoides	needle grama
Bouteloua barbata var. *barbata*	six weeks grama
*Bromus madritensis**	foxtail chess
*Cynodon dactylon**	Bermuda grass
Eragrostis sp.	lovegrass
*Phalaris minor**	Mediterranean canary grass
Pleuraphis rigida	galleta grass
*Schismus barbatus**	Mediterranean schismus
ANGIOSPERMS: EUDICOTS	
Aizoaceae	Fig-Marigold Family
*Mesembryanthemum crystallinum**	crystalline iceplant
*Mesembryanthemum nodiflorum**	slender-leaved iceplant
Tetragonia tetragonioides	New Zealand spinach
Amaranthaceae	Amaranth Family
Atriplex canescens	four-wing saltbush
Atriplex hymenelytra	desert holly
Atriplex polycarpa	allscale
*Chenopodium murale**	nettle-leaf goosefoot
Suaeda nigra (=S. moquinii)	seepweed
Tidestromia oblongifolia	honeysweet
Asclepiadaceae	Milkweed Family
Asclepias albicans	white-stem milkweed
Asclepias subulata	rush milkweed
Funastrum utahense (CNPS List 4.2)	Utah vine milkweed
Asteraceae	Sunflower Family
Ambrosia dumosa	bursage
Baileya pauciradiata	desert marigold

Table 2
Botanical Species Detected to Date on IVS Site
(Continued)

Scientific Name	Common Name
Bebbia juncea	rush sweetbush
Calycoseris wrightii	white tackstem
Chaenactis carphoclinia var. *carphoclinia*	pebble pincushion
Chaenactis fremontii	pincushion
Chaenactis stevioides	desert pincushion
Encelia farinosa	brittlebrush
Encelia frutescens	rayless encelia
Geraea canescens	desert sunflower
Gutierrezia sarothrae	matchweed
Hymenoclea salsola	burrobrush
Isocoma acradenia var. *acradenia*	alkali goldenbush
Isocoma acradenia var. *eremophila*	alkali goldenbush
*Lactuca serriola**	prickly lettuce
Malacothrix glabrata	desert dandelion
Monoptilon bellioides	desert star
Palafoxia arida var. *arida*	desert Spanish-needle
Pectis papposa	cinchweed
Perityle emoryi	rock daisy
Pluchea sericea	arrow weed
Psathyrotes ramosissima	turtleback
Rafinesquia neomexicana	desert chicory
Senecio mohavensis	mojave groundsel
*Sonchus asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria pauciflora	wire lettuce
Tetradymia stenolepis	cotton-thorn
Boraginaceae	Borage Family
Cryptantha angustifolia	narrow-leaf cryptantha
Cryptantha maritima	cryptantha
Cryptantha micrantha	cryptantha
Pectocarya heterocarpa	pectocarya
Pectocarya peninsularis	peninsular pectocarya
Pectocarya platycarpa	pectocarya
Brassicaceae	Mustard Family
*Brassica tournefortii**	wild turnip

Table 2
Botanical Species Detected to Date on IVS Site
(Continued)

Scientific Name	Common Name
Lepidium lasiocarpum var. *lasiocarpum*	hariy podded pepper grass
*Sisymbrium altissimum**	tumble mustard
Streptanthella longirostris	streptanthella
Cactaceae	Cactus family
Cylindropuntia echinocarpa	silver cholla
Caryophyllaceae	Pink Family
Achyronychia cooperi	frost-mat
Ehretiaceae	Ehretia Family
Tiquilia palmeri	Palmer's tiquilia
Tiquilia plicata	plicate coldenia
Euphorbiaceae	Spurge Family
Chamaesyce micromera	prostrate spurge
Chamaesyce polycarpa	sand mat
Chamaesyce setiloba	Yuma sand mat
Ditaxis neomexicana	common ditaxis
Ditaxis serrata	Yuma silverbush
Stillingia linearifolia	stillingia
Stillingia spinulosa	annual stillingia
Fabaceae	Legume Family
Astragalus palmeri	milkvetch
Dalea mollis	dalea
Dalea mollissima	hairy dalea
*Parkinsonia aculeate**	Mexican palo verde
Parkinsonia floridum	palo verde
Prosopis glandulosa	mesquite
Prosopis strombulifera	Argentine screwbean
Psorothamnus emoryi	dye plant
Psorothamnus schottii	indigobush
Psorothamnus spinosus	smoke tree
Fouquieriaceae	Ocotillo Family
Fouquieria splendens ssp. *splendens*	ocotillo
Geraniaceae	Geranium Family
*Erodium cicutarium**	red-stemmed filaree
Erodium texanum	filaree
Hydrophyllaceae	Waterleaf Family

Table 2
Botanical Species Detected to Date on IVS Site
(Continued)

Scientific Name	Common Name
Phacelia crenulata var. *minutiflora*	notch-leaved phacelia
Krameriaceae	Rhatany Family
Krameria erecta	pima rhatany
Krameria grayi	white rhatany
Loasaceae	Loasa Family
Mentzelia albicaulis	white-stemmed blazing star
Petalonyx thurberi ssp. *thurberi*	sandpaper plant
Malvaceae	Mallow Family
Eremalche rotundifolia	desert five-spot
*Malva parviflora**	Cheeseweed
Sphaeralcea ambigua	desert mallow
Nyctaginaceae	Four O-clock Family
Abronia villosa var. *villosa*	hairy sand-verbena
Allionia incarnata	trailing windmills
Onagraceae	Evening-Primrose Family
Camissonia boothii	bottlebrush primrose
Camissonia brevipes var. *brevipes*	golden sun cup
Camissonia californica	California evening primrose
Camissonia claviformis ssp. *claviformis*	brown-eyed evening primrose
Camissonia claviformis spp. *peirsonii*	brown-eyed evening primrose
Oenothera deltoides ssp. *deltoides*	devil's lantern
Orobanchaceae	Broom-Rape Family
Orobanche cooperi	pine broom-rape
Papaveraceae	Poppy Family
Eschscholzia minutiflora	pygmy goldenpoppy
Plantaginaceae	Plantain Family
Plantago ovata	wooly plantain
Polemoniaceae	Phlox Family
Gilia latifolia	broad-leaved gilia
Langloisia setosissima	langlosia
Polygonaceae	Buckwheat Family
Chorizanthe brevicornu	brittle spineflower
Chorizanthe corrugata	wrinkled spineflower
Chorizanthe rigida	rigid spineflower
Eriogonum deflexum	skeleton weed

Table 2
Botanical Species Detected to Date on IVS Site
(Continued)

Scientific Name	Common Name
Eriogonum inflatum	desert trumpet
Eriogonum reniforme	buckwheat
Eriogonum thomasii	Thomas buckwheat
Portulacaceae	Purselane Family
Calyptridium monandrum	pussypaws
Rafflesiaceae	
Pilostyles thurberi (CNPS List 4.3)	Thurber's pilostyles
Resdaceae	Mignonette Family
Oligomeris linifolia	narrow-leaved oligomeris
Solanaceae	Nightshade Family
Datura discolor	desert thornapple
Lycium brevipes var. *brevipes*	desert-thorn
Lycium fremontii	Fremont desert-thorn
Tamaricaceae	Tamarisk Family
*Tamarix aphylla**	Athel tamarisk
*Tamarix parviflora**	smallflower tamarisk
*Tamarix ramosissima**	Mediterranean tamarisk
Viscaceae	Mistletoe Family
Phoradendron californicum	desert mistletoe
Zygophyllaceae	Caltrop Family
Fagonia pachyacantha	sticky fagonia
Kallstroemia grandiflora	Arizona caltrop
Larrea tridentata	creosote
*Tribulus terrestris**	puncture vine

*non-native

Table 3
Botanical Species Detected in the IVS Waterline Corridor

Scientific Name	Common Name
ANGIOSPERMS: MONOCOTS	
Arecaeae	Palm Family
*Phoenix dactylifera**	date palm
*Washingtonia robusta**	Mexican fan palm
Agavaceae	Agave Family
Hesperocallis undulata	desert lily
Poaceae	Grass Family
Aristida adscensionis	six-weeks three-awn
*Arundo donax**	giant reed
*Avena sativa**	cultivated oats
*Cynodon dactylon**	Bermuda grass
Distichlis spicata	saltgrass
*Phalaris minor**	Mediterranean canary grass
Phragmites australis	common reed
Pleuraphis rigida	galleta grass
*Schismus barbatus**	Mediterranean schismus
Typhaceae	Cattail Family
Typha latifolia	broad-leaved cattail
ANGIOSPERMS: EUDICOTS	
Aizoaceae	Fig-Marigold Family
Sesuvium verrucosum	western sea-purslane
Amaranthaceae	Amaranth Family
Allenrolfea occidentalis	iodinebush
Atriplex canescens	four-wing saltbush
Atriplex hymenelytra	desert holly
Atriplex lentiformis ssp. torreyi	Torrey's saltbush
Atriplex polycarpa	allscale
*Atriplex semibaccata**	Australian saltbush
*Chenopodium murale**	nettle-leaf goosefoot
Suaeda nigra (=S. moquinii)	seepweed
Tidestromia oblongifolia	honeysweet
Apocynaceae	Dogbane Family
*Nerium oleander**	oleander
Asteraceae	Sunflower Family
Ambrosia dumosa	bursage

Table 3
Botanical Species Detected in the IVS Waterline Corridor
(Continued)

Scientific Name	Common Name
Baccharis sergiloides	squaw waterweed baccharis
Encelia frutescens	rayless encelia
Geraea canescens	desert sunflower
Isocoma acradenia var. *acradenia*	alkali goldenbush
Palafoxia arida var. *arida*	desert Spanish-needle
Pectis papposa	cinchweed
Pluchea sericea	arrow weed
ANGIOSPERMS: MONOCOTS	
*Sonchus asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria pauciflora	wire lettuce
Boraginaceae	Borage Family
Cryptantha angustifolia	narrow-leaf cryptantha
Heliotropium curassavicum	salt heliotrope
Brassicaceae	Mustard Family
*Sisymbrium altissimum**	tumble mustard
Ehretiaceae	Ehretia Family
Tiquilia palmeri	Palmer's tiquilia
Tiquilia plicata	plicate coldenia
Euphorbiaceae	Spurge Family
Chamaesyce polycarpa	sand mat
Croton californicus	California croton
Croton wigginsii (CNPS List 2.2)	Wiggins' croton
Ditaxis neomexicana	common ditaxis
Fabaceae	Legume Family
*Medicago sativa**	alfalfa
*Parkinsonia aculeate**	Mexican palo verde
Prosopis glandulosa	mesquite
Prosopis strombulifera	Argentine screwbean
Psorothamnus emoryi	dye plant
Geraniaceae	Geranium Family
*Erodium cicutarium**	red-stemmed filaree
Erodium texanum	Filaree
Malvaceae	Mallow Family

Table 3
Botanical Species Detected in the IVS Waterline Corridor
(Continued)

Scientific Name	Common Name
*Malva parviflora**	cheeseweed
Malvella leprosa	alkali mallow
Sphaeralcea ambigua	desert mallow
Myrtaceae	Myrtle Family
*Eucalyptus sideroxylon**	red ironbark
Nyctaginaceae	Four O-clock Family
Allionia incarnata	trailing windmills
Onagraceae	Evening-Primrose Family
Camissonia boothii	bottlebrush primrose
Oxalidaeae	Oxalis Family
*Oxalis corniculata**	creeping wood-sorrel
Plantaginaceae	Plantain Family
Plantago ovata	wooly plantain
Polygonaceae	Buckwheat Family
Chorizanthe rigida	rigid spineflower
Persicaria hydropiperoides (=Polygonum h.)	water pepper
ANGIOSPERMS: MONOCOTS	
Rafflesiaceae	
Pilostyles thurberi (CNPS List 4.3)	Thurber's pilostyles
Resdaceae	Mignonette Family
Oligomeris linifolia	narrow-leaved oligomeris
Rutaceae	Rue Family
*Citrus sinensis**	orange
Salicaeae	Willow Family
Salix exigua	narrow-leaved willow
Solanaceae	Nightshade Family
Datura discolor	desert thornapple
Lycium brevipes var. *brevipes*	desert-thorn
Tamaricaceae	Tamarisk Family
*Tamarix aphylla**	Athel
*Tamarix ramosissima**	Mediterranean tamarisk

*non-native

Table 4
Botanical Species Detected in the IVS Transmission Line Corridor

Scientific Name	Common Name
GYMNOSPERMS	
Ephedraceae	Ephedra Family
Ephedra trifurca	long-leaved ephedra
ANGIOSPERMS: MONOCOTS	
Agavaceae	Agave Family
Hesperocallis undulata	desert lily
Poaceae	Grass Family
Aristida adscensionis	six-weeks three-awn
Pleuraphis rigida	galleta grass
*Schismus barbatus**	Mediterranean schismus
ANGIOSPERMS: EUDICOTS	
Amaranthaceae	Amaranth Family
Atriplex canescens	four-wing saltbush
Atriplex hymenelytra	desert holly
Asteraceae	Sunflower Family
Ambrosia dumosa	bursage
Bebbia juncea	rush sweetbush
Chaenactis carphoclinia var. *carphoclinia*	pebble pincushion
Encelia frutescens	rayless encelia
Geraea canescens	desert sunflower
Hymenoclea salsola	burrobrush
Isocoma acradenia var. *eremophila*	alkali goldenbush
Palafoxia arida var. *arida*	desert Spanish-needle
Pluchea sericea	arrow weed
Psathyrotes ramosissima	turtleback
Stephanomeria pauciflora	wire lettuce
Boraginaceae	Borage Family
Cryptantha angustifolia	narrow-leaf cryptantha
Cryptantha maritima	cryptantha
Brassicaceae	Mustard Family
*Brassica tournefortii**	wild turnip
Lepidium lasiocarpum var. *lasiocarpum*	hariy podded pepper grass
Caryophyllaceae	Pink Family
Achyronychia cooperi	frost-mat
Ehretiaceae	Ehretia Family

Table 4
Botanical Species Detected in the IVS Transmission Line Corridor
(Continued)

Scientific Name	Common Name
Tiquilia palmeri	Palmer's tiquilia
Tiquilia plicata	plicate coldenia
Euphorbiaceae	Spurge Family
Chamaesyce polycarpa	sand mat
Ditaxis neomexicana	common ditaxis
Fabaceae	Legume Family
Dalea mollissima	hairy dalea
Prosopis glandulosa	mesquite
Psorothamnus emoryi	dye plant
Psorothamnus schottii	indigobush
Psorothamnus spinosus	smoke tree
Rafinesquia neomexicana	desert chicory
Stephanomeria pauciflora	wire lettuce
Fouquieriaceae	Ocotillo Family
Fouquieria splendens ssp. *splendens*	ocotillo
Hydrophyllaceae	Waterleaf Family
Phacelia crenulata var. *minutiflora*	notch-leaved phacelia
Krameriaceae	Rhatany Family
Krameria grayi	white rhatany
Nyctaginaceae	Four O-clock Family
Abronia villosa var. *villosa*	hairy sand-verbena
Allionia incarnata	trailing windmills
Onagraceae	Evening-Primrose Family
Camissonia boothii	bottlebrush primrose
Camissonia brevipes var. *brevipes*	golden sun cup
Camissonia claviformis spp. *peirsonii*	brown-eyed evening primrose
Oenothera deltoides ssp. *deltoides*	devil's lantern
Orobanchaceae	Broom-Rape Family
Orobanche cooperi	pine broom-rape
Plantaginaceae	Plantain Family
Plantago ovata	wooly plantain
Polygonaceae	Buckwheat Family
Chorizanthe brevicornu	brittle spineflower
Chorizanthe rigida	rigid spineflower

Table 4
Botanical Species Detected in the IVS Transmission Line Corridor
(Continued)

Scientific Name	Common Name
Eriogonum deserticola	dune buckwheat
Eriogonum inflatum	desert trumpet
Portulacaceae	Purselane Family
Calandrinia ambigua	calandrinia
Rafflesiaceae	
Pilostyles thurberi (CNPS List 4.3)	Thurber's pilostyles
Solanaceae	Nightshade Family
Lycium brevipes var. *brevipes*	desert-thorn
Tamaricaceae	Tamarisk Family
*Tamarix aphylla**	athel
*Tamarix ramosissima**	Mediterranean tamarisk
Viscaceae	Mistletoe Family
Phoradendron californicum	desert mistletoe
Zygophyllaceae	Caltrop Family
Larrea tridentata	creosote
*Tribulus terrestris**	puncture vine

*non-native

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Chaparral sand-verbena	*Abronia villosa var. aurita*	None	None	List 1B.1	This annual herb occurs in chaparral and coastal scrub in sandy areas from 80-1600m. Blooms January –September.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Jacumba milk-vetch	*Astragalus douglasii var. perstrictus*	BLM Sensitive	None	List 1B.2	This perennial herb occurs in chaparral, cismontane woodland and valley and foothill grassland. It is associated with stony hillsides and gravelly or sandy flats in open oak woodland from 900-1370m. Blooms April – June.	Low Potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Harwood's milk-vetch	*Astragalus insularis var. harwoodii*	None	None	List 2.2	This annual herb occurs in sand and gravelly desert dune areas from 0-710 m. Blooms January – May.	High potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Little-leaf elephant tree	*Bursera microphylla*	None	None	List 2.3	This tree occurs in Sonoran desert scrub, It occurs on hillsides, washes, canyon sides and rocky sites from 200-700m. Blooms June-July.	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Pink fairy-duster	*Calliandra eriophylla*	None	None	List 2.3	This perennial shrub occurs in Sonoran desert scrub in sandy or rocky sites from 120-1500m. Blooms January - March	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Emory's crucifixion-thorn	*Castela emoryi*	None	None	List 2.3	This shrub occurs in Sonoran desert scrub, playas, and on gravelly soils from 90-670 m. Blooms June - July	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Flat-seeded spurge	*Chamaesyce platysperma*	BLM Sensitive	None	List 1B.2	This annual herb occurs in desert dunes and Sonoran Desert scrub with sandy soil. Blooms February-September.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	USFWS Endangered	CDFG Endangered	List 1B.1	This annual or perennial herb occurs in vernal pools, coastal scrub, valley and foothill grasslands. Blooms April-June.	Very low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Utah vine milkweed	*Cynanchum utahense*	None	None	List 4.2	This perennial herb occurs in Mojave desert scrub and Sonoran desert scrub from 150-1435m. Blooms April –June.	Present	Species was detected during spring 2008 and 2010 surveys.
Annual rock-nettle	*Eucnide rupestris*	None	None	List 2.2	This annual herb occurs in Sonoran desert scrub on rock talus substrate from 500-600m. Blooms December-April.	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Curly herissantia	*Herissantis crispa*	None	None	List 2.3	This annual or perennial herb occurs in Sonoran Desert scrub from 700-725m. Blooms August-September.	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Mexican hulsea	*Hulsea mexicana*	None	None	List 2.3	This annual herb occurs in chaparral, Sonoran desert scrub (alluvial fan) in sandy substrates from 0-100m. Blooms March-May.	Low potential.	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Baja California ipomopsis	*Ipomopsis effusa*	None	None	List 2.1	This perennial herb occurs in chaparral, pinyon and juniper woodlands, and Sonoran desert scrub on rocky or gravelly soil from 100 to 1,200 m.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Slender-leaved ipomopsis	*Ipomopsis tenuifolia*	None	None	List 2.3	This perennial herb occurs in chaparral pinyon and juniper woodlands, and Sonoran desert scrub on rocky or gravelly soils from 100-1200m. Blooms March-May	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Pygmy lotus	*Lotus haydonii*	None	None	List 1B.3	This perennial herb occurs in Sonoran desert scrub, pinyon and juniper woodlands from 100-1200m. Blooms March-May.	Low potential;	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Mountain Springs bush lupine	*Lupinus excubitus* var. *medius*	None	None	List 1B.3	This perennial shrub occurs in coastal scrub and Sonoran desert scrub from 425 to 1370m. Blooms March-May	Low potential	This species was not detected within the Project area during the 2007, 2008, and currently not detected during the first round of spring surveys in 2010.
Parish's desert-thorn	*Lycium parishii*	None	None	List 2.3	This perennial shrub occurs in coastal scrub and Sonoran desert scrub from 300-1370m. Blooms March-April	Low potential	This species was not detected within the Project area during the 2007, 2008, and currently not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

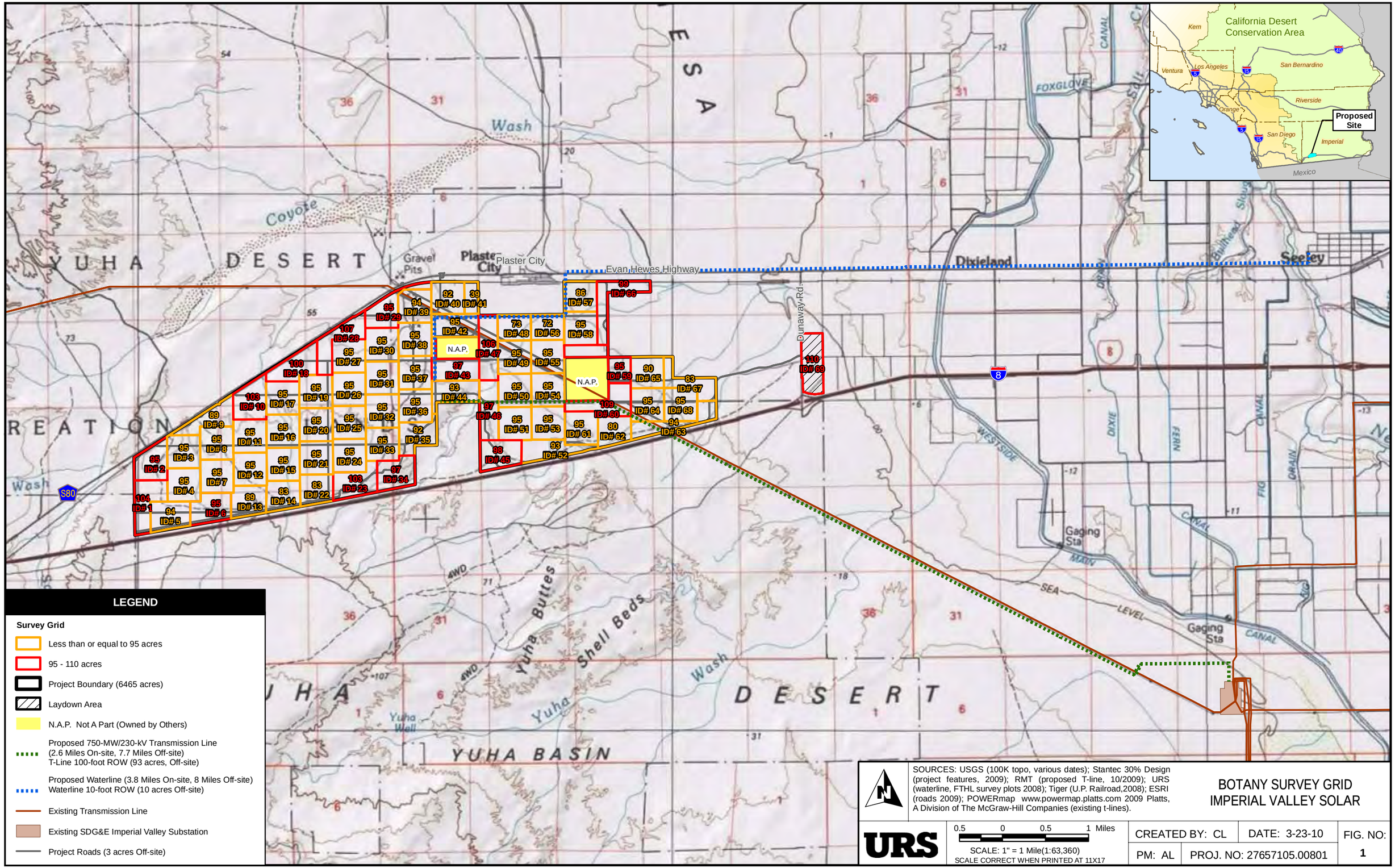
SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Brown turbans	*Malperia tenuis*	None	None	List 2.3	This annual herb occurs in Sonoran desert scrub with sandy soil from 15-335m. Blooms March-April.	High potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Hairy stickleaf	*Mentzelia hirsutissima*	None	None	List 2.3	This annual herb occurs in Mojavean desert scrub from 700-1160m. Blooms March-May.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Creamy blazing star	*Mentzelia tridentata*	None	None	List 1B.3	This annual herb occurs in Mojavean desert scrub from 700-1160m. Blooms March-May.	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Slender cottonheads	*Nemacaulis denudata var. gracilis*	None	None	List 2.2	This annual herb occurs in coastal dunes, desert dunes, Sonoran desert scrub form -50 to 400 meters. Blooms April-May.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Thurber's pilostyles	*Pilostyles thurberi*	None	None	List 2.2	This stem parasite on *Psorothamnus emoryi* occurs in Sonoran desert scrub on sandy alluvial plains and sandstone talus from -50 to 365m. Blooms January.	Present	Species was detected during spring 2010 surveys.

Table 5
Special Status Plant Species Occurring or Potentially Occurring on the IVS Site
(Continued)

SPECIES		SENSITIVITY STATUS			HABITAT ASSOCIATIONS AND BLOOMING PERIOD	POTENTIAL TO OCCUR	STATUS ON-SITE
COMMON NAME	SCIENTIFIC NAME	FEDERAL	STATE	CNPS			
Desert spike-moss	*Selaginella eremophila*	None	None	List 2.2	This rhizomatous perennial herb occurs in Sonoran desert scrub, shaded sites, gravelly soils and crevices or amoung rocks from 300-2425m. Blooms June (rarely May-July).	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Dwarf germander	*Teucrium cubense ssp. depressum*	None	None	List 2.2	This annual herb occurs in desert dunes, Sonoran desert scrub and playas form 45 to 400 meters.	Moderate potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.
Orcutt's woody-aster	*Xylorhiza orcuttii*	None	None	List 1B.2	This perennial herb occurs in Sonoran desert scrub from 20-365m. Blooms March-April.	Low potential	This species was not detected within the Project area during the 2007, 2008 rare plant surveys, and was not detected during the first round of spring surveys in 2010.



SOURCES: USGS (100K topo, various dates); Stantec 30% Design (project features, 2009); RMT (proposed T-line, 10/2009); URS (waterline, FTHL survey plots 2008); Tiger (U.P. Railroad,2008); ESRI (roads 2009); POWERmap www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (existing t-lines).

BOTANY SURVEY GRID
IMPERIAL VALLEY SOLAR

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Mile(1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 3-23-10	FIG. NO:
PM: AL	PROJ. NO: 27657105.00801	1

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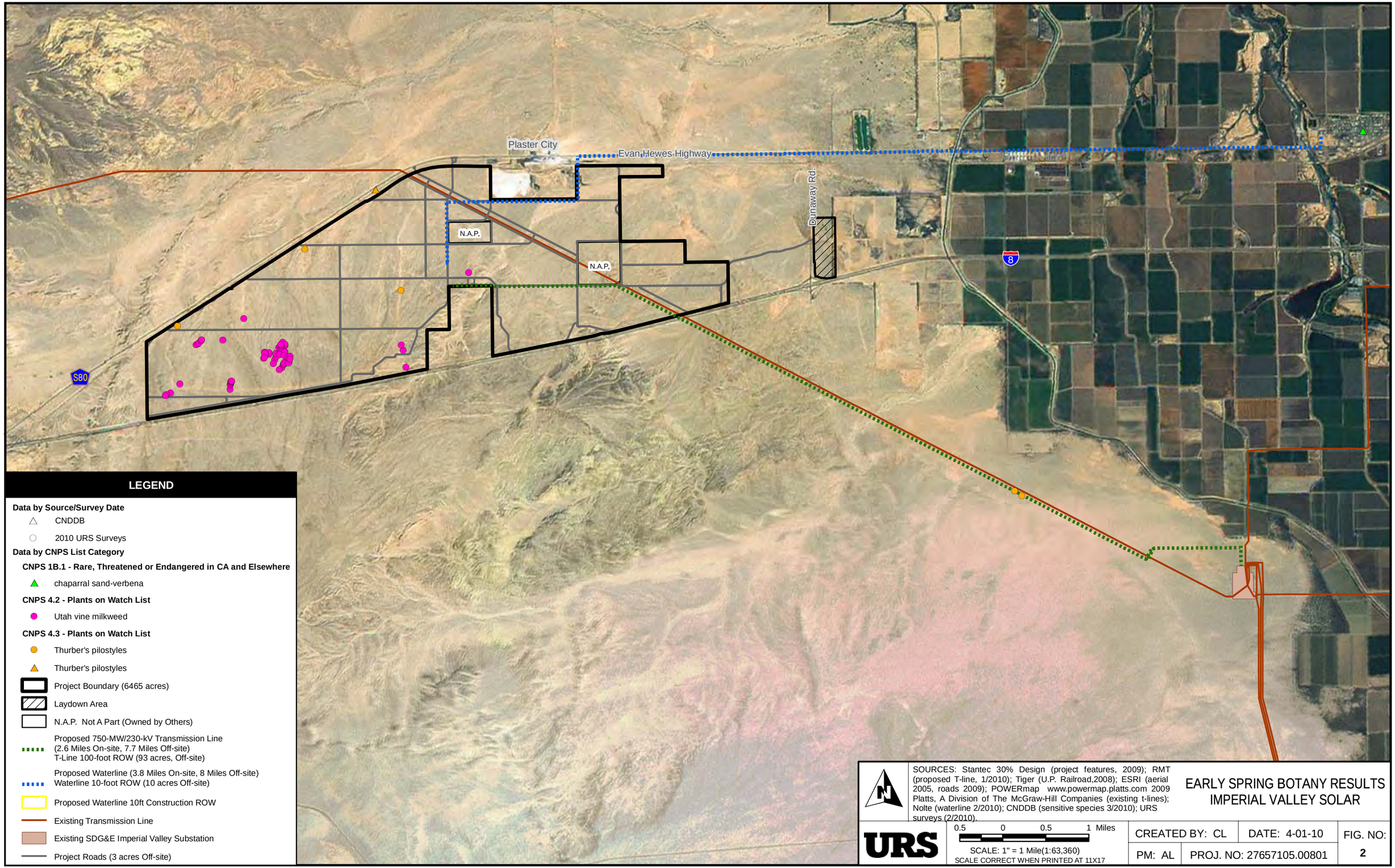

LEGEND

Data by Source/Survey Date

- CNDDB
- 2010 URS Surveys

Data by CNPS List Category

CNPS 1B.1 - Rare, Threatened or Endangered in CA and Elsewhere

- chaparral sand-verbena

CNPS 4.2 - Plants on Watch List

- Utah vine milkweed

CNPS 4.3 - Plants on Watch List

- Thurber's pilostyles
- Thurber's pilostyles
- Project Boundary (6465 acres)
- Laydown Area
- N.A.P. Not A Part (Owned by Others)
- Proposed 750-MW/230-kV Transmission Line (2.6 Miles On-site, 7.7 Miles Off-site) T-Line 100-foot ROW (93 acres, Off-site)
- Proposed Waterline (3.8 Miles On-site, 8 Miles Off-site) Waterline 10-foot ROW (10 acres Off-site)
- Proposed Waterline 10ft Construction ROW
- Existing Transmission Line
- Existing SDG&E Imperial Valley Substation
- Project Roads (3 acres Off-site)

SOURCES: Stantec 30% Design (project features, 2009); RMT (proposed T-line, 1/2010); Tiger (U.P. Railroad,2008); ESRI (aerial 2005, roads 2009); POWERmap www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (existing t-lines); Nolte (waterline 2/2010); CNDDB (sensitive species 3/2010); URS surveys (2/2010).

EARLY SPRING BOTANY RESULTS IMPERIAL VALLEY SOLAR

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 Mile(1:63,360)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CL	DATE: 4-01-10	FIG. NO:
PM: AL	PROJ. NO: 27657105.00801	2

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Consistent with the recently released California Desert District Special Permit Conditions Continuation Sheet for all BLM California State Permit for Archaeological Investigations Standard Permit Conditions, and BLM California supplemental State Permit Conditions, this section remains the sole property of the United States of America and will not be released without the written approval of the BLM. The Confidential Cultural Resources Technical Report associated with this Report will be provided to authorized individuals after receiving written approval from the BLM.

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Appendix

Imperial Valley Solar

Level of Service Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	2	0	22	4	35	0	0	66	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	2	0	24	4	38	0	0	72	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	149	125	78	125	132	38	85			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	149	125	78	125	132	38	85			38		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	98	100			100		
cM capacity (veh/h)	798	763	982	847	757	1034	1512			1572		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	2	24	42	85
Volume Left	2	0	4	0
Volume Right	0	24	0	13
cSH	847	1034	1512	1700
Volume to Capacity	0.00	0.02	0.00	0.05
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.3	8.6	0.8	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.6		0.8	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	0	4	0	0	0	0	13	7	50	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	0	4	0	0	0	0	14	8	54	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	143	147	16	147	143	18	16			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	143	147	16	147	143	18	16			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	100	100	100	100			97		
cM capacity (veh/h)	805	719	1063	796	723	1061	1601			1594		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	26	4	22	71
Volume Left	26	0	0	54
Volume Right	0	4	8	0
cSH	805	1063	1700	1594
Volume to Capacity	0.03	0.00	0.01	0.03
Queue Length 95th (ft)	3	0	0	3
Control Delay (s)	9.6	8.4	0.0	5.7
Lane LOS	A	A		A
Approach Delay (s)	9.4		0.0	5.7
Approach LOS	A			

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	34	43	14	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	37	47	15	9	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	62				93	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				93	54
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1541				906	1013

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	38	62	9	1
Volume Left	1	0	9	0
Volume Right	0	15	0	1
cSH	1541	1700	906	1013
Volume to Capacity	0.00	0.04	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.2	0.0	9.0	8.6
Lane LOS	A		A	A
Approach Delay (s)	0.2	0.0	9.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	21	1	20	0	0	14	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	0	23	1	22	0	0	15	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	71	48	24	48	58	22	34			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	71	48	24	48	58	22	34			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	98	100			100		
cM capacity (veh/h)	900	843	1052	952	833	1055	1578			1594		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	1	23	23	34
Volume Left	1	0	1	0
Volume Right	0	23	0	18
cSH	952	1055	1578	1700
Volume to Capacity	0.00	0.02	0.00	0.02
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	8.8	8.5	0.4	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.5		0.4	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	1	1	0	0	0	0	1	5	13	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	1	1	0	0	0	0	1	5	14	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	33	36	1	35	33	4	1			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33	36	1	35	33	4	1			7		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			99		
cM capacity (veh/h)	967	849	1083	963	852	1080	1622			1614		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	23	1	7	15
Volume Left	22	0	0	14
Volume Right	0	1	5	0
cSH	961	1083	1700	1614
Volume to Capacity	0.02	0.00	0.00	0.01
Queue Length 95th (ft)	2	0	0	1
Control Delay (s)	8.8	8.3	0.0	6.7
Lane LOS	A	A		A
Approach Delay (s)	8.8		0.0	6.7
Approach LOS	A			

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	9	2	15	11	30	0	0	17	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	10	2	16	12	33	0	0	18	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	98	80	24	80	86	33	29			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98	80	24	80	86	33	29			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	98	99			100		
cM capacity (veh/h)	864	804	1053	902	798	1041	1584			1579		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	12	16	45	29
Volume Left	10	0	12	0
Volume Right	0	16	0	11
cSH	881	1041	1584	1700
Volume to Capacity	0.01	0.02	0.01	0.02
Queue Length 95th (ft)	1	1	1	0
Control Delay (s)	9.1	8.5	2.0	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.8		2.0	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	2	3	0	0	0	0	17	5	6	24	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	2	3	0	0	0	0	18	5	7	26	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	60	63	26	65	60	21	26			24		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	60	63	26	65	60	21	26			24		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	932	824	1050	922	827	1056	1588			1591		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	21	3	24	33
Volume Left	18	0	0	7
Volume Right	0	3	5	0
cSH	920	1050	1700	1591
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.0	8.4	0.0	1.5
Lane LOS	A	A		A
Approach Delay (s)	8.9		0.0	1.5
Approach LOS	A			

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	16.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	87	31	8	10	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	95	34	9	11	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	42				135	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	42				135	38
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1567				858	1034

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	96	42	11	1
Volume Left	1	0	11	0
Volume Right	0	9	0	1
cSH	1567	1700	858	1034
Volume to Capacity	0.00	0.02	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.1	0.0	9.2	8.5
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	9.2	
Approach LOS			A	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	2	8	1	6	0	0	24	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	2	9	1	7	0	0	26	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	48	38	29	38	41	7	33			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	48	38	29	38	41	7	33			7		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			100		
cM capacity (veh/h)	943	854	1045	966	850	1076	1579			1614		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	3	9	8	33
Volume Left	1	0	1	0
Volume Right	0	9	0	7
cSH	886	1076	1579	1700
Volume to Capacity	0.00	0.01	0.00	0.02
Queue Length 95th (ft)	0	1	0	0
Control Delay (s)	9.1	8.4	1.0	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.6		1.0	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	1	1	0	0	0	0	1	1	23	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	1	0	0	0	0	1	1	25	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	53	53	1	54	53	2	1			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	53	53	1	54	53	2	1			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	100	100	100	100			98		
cM capacity (veh/h)	935	825	1083	931	826	1083	1622			1620		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	7	1	2	26
Volume Left	5	0	0	25
Volume Right	0	1	1	0
cSH	915	1083	1700	1620
Volume to Capacity	0.01	0.00	0.00	0.02
Queue Length 95th (ft)	1	0	0	1
Control Delay (s)	9.0	8.3	0.0	7.0
Lane LOS	A	A		A
Approach Delay (s)	8.9		0.0	7.0
Approach LOS	A			

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	2	0	22	4	35	0	0	73	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	2	0	24	4	38	0	0	79	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	157	133	86	133	139	38	92			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	157	133	86	133	139	38	92			38		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	98	100			100		
cM capacity (veh/h)	789	756	973	837	750	1034	1502			1572		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	2	24	42	92
Volume Left	2	0	4	0
Volume Right	0	24	0	13
cSH	837	1034	1502	1700
Volume to Capacity	0.00	0.02	0.00	0.05
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.3	8.6	0.8	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.6		0.8	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	0	4	0	0	0	0	13	46	57	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	0	4	0	0	0	0	14	50	62	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	179	204	16	184	179	39	16			64		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	179	204	16	184	179	39	16			64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	100	100	100	100			96		
cM capacity (veh/h)	758	664	1063	750	686	1032	1601			1538		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	26	4	64	78
Volume Left	26	0	0	62
Volume Right	0	4	50	0
cSH	758	1063	1700	1538
Volume to Capacity	0.03	0.00	0.04	0.04
Queue Length 95th (ft)	3	0	0	3
Control Delay (s)	9.9	8.4	0.0	6.0
Lane LOS	A	A		A
Approach Delay (s)	9.7		0.0	6.0
Approach LOS	A			

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	9	34	43	22	8	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	37	47	24	9	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	71				115	59
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71				115	59
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1530				875	1007

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	47	71	9	1
Volume Left	10	0	9	0
Volume Right	0	24	0	1
cSH	1530	1700	875	1007
Volume to Capacity	0.01	0.04	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	1.6	0.0	9.2	8.6
Lane LOS	A		A	A
Approach Delay (s)	1.6	0.0	9.1	
Approach LOS			A	

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	554	1	252	0	0	14	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	0	602	1	274	0	0	15	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	903	301	24	301	310	274	34			274		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	903	301	24	301	310	274	34			274		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	21	100			100		
cM capacity (veh/h)	55	612	1052	651	604	765	1578			1289		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	1	602	275	34
Volume Left	1	0	1	0
Volume Right	0	602	0	18
cSH	651	765	1578	1700
Volume to Capacity	0.00	0.79	0.00	0.02
Queue Length 95th (ft)	0	199	0	0
Control Delay (s)	10.5	24.8	0.0	0.0
Lane LOS	B	C	A	
Approach Delay (s)	24.7		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	16.4		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	252	1	1	0	0	0	0	1	5	13	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	274	1	1	0	0	0	0	1	5	14	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	33	36	1	35	33	4	1			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33	36	1	35	33	4	1			7		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	100	100	100	100	100			99		
cM capacity (veh/h)	967	849	1083	963	852	1080	1622			1614		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	275	1	7	15
Volume Left	274	0	0	14
Volume Right	0	1	5	0
cSH	967	1083	1700	1614
Volume to Capacity	0.28	0.00	0.00	0.01
Queue Length 95th (ft)	29	0	0	1
Control Delay (s)	10.2	8.3	0.0	6.7
Lane LOS	B	A		A
Approach Delay (s)	10.2		0.0	6.7
Approach LOS	B			

Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	33	2	15	11	30	0	0	32	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	36	2	16	12	33	0	0	35	212
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	215	197	141	197	303	33	247			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	215	197	141	197	303	33	247			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	100	98	99			100		
cM capacity (veh/h)	723	692	907	756	604	1041	1319			1579		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	38	16	45	247
Volume Left	36	0	12	0
Volume Right	0	16	0	212
cSH	746	1041	1319	1700
Volume to Capacity	0.05	0.02	0.01	0.15
Queue Length 95th (ft)	4	1	1	0
Control Delay (s)	10.1	8.5	2.1	0.0
Lane LOS	B	A	A	
Approach Delay (s)	9.6		2.1	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	2	3	0	0	0	0	17	5	6	63	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	2	3	0	0	0	0	18	5	7	68	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	103	105	68	107	103	21	68			24		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	103	105	68	107	103	21	68			24		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	875	781	995	865	784	1056	1533			1591		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	21	3	24	75
Volume Left	18	0	0	7
Volume Right	0	3	5	0
cSH	864	995	1700	1591
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.3	8.6	0.0	0.7
Lane LOS	A	A		A
Approach Delay (s)	9.2		0.0	0.7
Approach LOS	A			

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	87	31	8	18	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	95	34	9	20	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	42				135	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	42				135	38
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	99
cM capacity (veh/h)	1567				858	1034

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	96	42	20	10
Volume Left	1	0	20	0
Volume Right	0	9	0	10
cSH	1567	1700	858	1034
Volume to Capacity	0.00	0.02	0.02	0.01
Queue Length 95th (ft)	0	0	2	1
Control Delay (s)	0.1	0.0	9.3	8.5
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	9.0	
Approach LOS			A	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	2	8	1	6	0	0	557	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	2	9	1	7	0	0	605	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	640	630	622	630	647	7	638			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	640	630	622	630	647	7	638			7		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	99	99	100			100		
cM capacity (veh/h)	383	398	487	394	389	1076	946			1614		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	3	9	8	638
Volume Left	1	0	1	0
Volume Right	0	9	0	33
cSH	391	1076	946	1700
Volume to Capacity	0.01	0.01	0.00	0.38
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	14.3	8.4	1.3	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.0		1.3	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	1	1	0	0	0	0	1	1	556	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	1	1	0	0	0	0	1	1	604	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1211	1212	1	1213	1211	2	1			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1211	1212	1	1213	1211	2	1			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	100	100	100	100	100			63		
cM capacity (veh/h)	113	114	1083	112	114	1083	1622			1620		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	7	1	2	605
Volume Left	5	0	0	604
Volume Right	0	1	1	0
cSH	113	1083	1700	1620
Volume to Capacity	0.06	0.00	0.00	0.37
Queue Length 95th (ft)	5	0	0	44
Control Delay (s)	38.8	8.3	0.0	8.5
Lane LOS	E	A		A
Approach Delay (s)	34.4		0.0	8.5
Approach LOS	D			

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	2	0	26	4	40	0	0	76	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	2	0	28	4	43	0	0	83	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	171	142	90	142	150	43	98			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171	142	90	142	150	43	98			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	769	747	968	825	739	1027	1495			1565		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	2	28	48	98
Volume Left	2	0	4	0
Volume Right	0	28	0	15
cSH	825	1027	1495	1700
Volume to Capacity	0.00	0.03	0.00	0.06
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.4	8.6	0.7	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.7		0.7	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	28	0	4	0	0	0	0	15	8	58	18	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	4	0	0	0	0	16	9	63	20	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	166	171	20	171	166	21	20			25		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	166	171	20	171	166	21	20			25		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	100	100	100	100			96		
cM capacity (veh/h)	774	694	1058	766	698	1057	1597			1589		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	30	4	25	83
Volume Left	30	0	0	63
Volume Right	0	4	9	0
cSH	774	1058	1700	1589
Volume to Capacity	0.04	0.00	0.01	0.04
Queue Length 95th (ft)	3	0	0	3
Control Delay (s)	9.8	8.4	0.0	5.7
Lane LOS	A	A		A
Approach Delay (s)	9.7		0.0	5.7
Approach LOS	A			

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	39	50	16	9	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	42	54	17	10	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	72				108	63
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	72				108	63
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1528				889	1002

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	43	72	10	1
Volume Left	1	0	10	0
Volume Right	0	17	0	1
cSH	1528	1700	889	1002
Volume to Capacity	0.00	0.04	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.2	0.0	9.1	8.6
Lane LOS	A		A	A
Approach Delay (s)	0.2	0.0	9.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	13.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	25	1	89	0	0	16	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	0	27	1	97	0	0	17	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	206	179	80	179	241	97	142			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	206	179	80	179	241	97	142			97		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	730	714	980	783	660	960	1440			1497		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	1	27	98	142
Volume Left	1	0	1	0
Volume Right	0	27	0	125
cSH	783	960	1440	1700
Volume to Capacity	0.00	0.03	0.00	0.08
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.6	8.9	0.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.9		0.1	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	89	1	1	0	0	0	0	1	6	15	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	1	1	0	0	0	0	1	7	16	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	38	41	1	40	38	4	1			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38	41	1	40	38	4	1			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	100	100	100	100	100			99		
cM capacity (veh/h)	959	842	1083	955	846	1079	1622			1613		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	98	1	8	17
Volume Left	97	0	0	16
Volume Right	0	1	7	0
cSH	958	1083	1700	1613
Volume to Capacity	0.10	0.00	0.00	0.01
Queue Length 95th (ft)	9	0	0	1
Control Delay (s)	9.2	8.3	0.0	6.8
Lane LOS	A	A		A
Approach Delay (s)	9.2		0.0	6.8
Approach LOS	A			

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	10	2	18	13	34	0	0	20	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	11	2	20	14	37	0	0	22	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	114	93	28	93	100	37	35			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	114	93	28	93	100	37	35			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	98	99			100		
cM capacity (veh/h)	839	789	1047	884	783	1035	1577			1574		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	13	20	51	35
Volume Left	11	0	14	0
Volume Right	0	20	0	13
cSH	865	1035	1577	1700
Volume to Capacity	0.02	0.02	0.01	0.02
Queue Length 95th (ft)	1	1	1	0
Control Delay (s)	9.2	8.5	2.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.8		2.1	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	2	3	0	0	0	0	20	6	7	28	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	2	3	0	0	0	0	22	7	8	30	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	71	74	30	75	71	25	30			28		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	71	74	30	75	71	25	30			28		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	918	813	1044	907	816	1051	1582			1585		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	24	3	28	38
Volume Left	22	0	0	8
Volume Right	0	3	7	0
cSH	907	1044	1700	1585
Volume to Capacity	0.03	0.00	0.02	0.00
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.1	8.5	0.0	1.5
Lane LOS	A	A		A
Approach Delay (s)	9.0		0.0	1.5
Approach LOS	A			

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	100	36	9	12	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	109	39	10	13	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	49				155	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49				155	44
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1558				836	1026

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	110	49	13	1
Volume Left	1	0	13	0
Volume Right	0	10	0	1
cSH	1558	1700	836	1026
Volume to Capacity	0.00	0.03	0.02	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.1	0.0	9.4	8.5
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	9.3	
Approach LOS			A	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	2	9	1	189	0	0	28	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	2	10	1	205	0	0	30	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	316	305	98	305	373	205	165			205		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	316	305	98	305	373	205	165			205		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			100		
cM capacity (veh/h)	627	608	958	647	557	835	1413			1366		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	3	10	207	165
Volume Left	1	0	1	0
Volume Right	0	10	0	135
cSH	584	835	1413	1700
Volume to Capacity	0.01	0.01	0.00	0.10
Queue Length 95th (ft)	0	1	0	0
Control Delay (s)	11.2	9.4	0.0	0.0
Lane LOS	B	A	A	
Approach Delay (s)	9.8		0.0	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	188	1	1	0	0	0	0	1	1	27	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	204	1	1	0	0	0	0	1	1	29	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	61	62	1	63	61	2	1			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	61	62	1	63	61	2	1			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	100	100	100	100	100			98		
cM capacity (veh/h)	921	814	1083	917	814	1083	1622			1620		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	205	1	2	30
Volume Left	204	0	0	29
Volume Right	0	1	1	0
cSH	920	1083	1700	1620
Volume to Capacity	0.22	0.00	0.00	0.02
Queue Length 95th (ft)	21	0	0	1
Control Delay (s)	10.0	8.3	0.0	7.0
Lane LOS	B	A		A
Approach Delay (s)	10.0		0.0	7.0
Approach LOS	B			

Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	2	0	26	4	66	0	0	76	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	2	0	28	4	72	0	0	83	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	199	171	91	171	179	72	99			72		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199	171	91	171	179	72	99			72		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	97	100			100		
cM capacity (veh/h)	736	720	967	790	712	991	1494			1528		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	2	28	76	99
Volume Left	2	0	4	0
Volume Right	0	28	0	16
cSH	790	991	1494	1700
Volume to Capacity	0.00	0.03	0.00	0.06
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.6	8.7	0.4	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.8		0.4	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	46	0	4	0	0	0	0	24	8	58	18	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	0	4	0	0	0	0	26	9	63	20	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	176	180	20	180	176	30	20			35		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176	180	20	180	176	30	20			35		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	100	100	100	100	100			96		
cM capacity (veh/h)	762	685	1058	754	689	1044	1597			1577		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	50	4	35	83
Volume Left	50	0	0	63
Volume Right	0	4	9	0
cSH	762	1058	1700	1577
Volume to Capacity	0.07	0.00	0.02	0.04
Queue Length 95th (ft)	5	0	0	3
Control Delay (s)	10.1	8.4	0.0	5.7
Lane LOS	B	A		A
Approach Delay (s)	9.9		0.0	5.7
Approach LOS	A			

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	39	50	17	9	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	42	54	18	10	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	73				110	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	73				110	64
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1527				885	1001

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	45	73	10	1
Volume Left	2	0	10	0
Volume Right	0	18	0	1
cSH	1527	1700	885	1001
Volume to Capacity	0.00	0.04	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.4	0.0	9.1	8.6
Lane LOS	A		A	A
Approach Delay (s)	0.4	0.0	9.1	
Approach LOS			A	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	0	125	1	89	0	0	24	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	0	136	1	97	0	0	26	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	323	188	89	188	250	97	151			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323	188	89	188	250	97	151			97		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	86	100			100		
cM capacity (veh/h)	540	707	970	772	652	960	1430			1497		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	1	136	98	151
Volume Left	1	0	1	0
Volume Right	0	136	0	125
cSH	772	960	1430	1700
Volume to Capacity	0.00	0.14	0.00	0.09
Queue Length 95th (ft)	0	12	0	0
Control Delay (s)	9.7	9.4	0.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.4		0.1	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	89	1	1	0	0	0	0	1	6	23	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	1	1	0	0	0	0	1	7	25	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55	59	1	57	55	4	1			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55	59	1	57	55	4	1			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	100	100	100	100	100			98		
cM capacity (veh/h)	931	819	1083	927	823	1079	1622			1613		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	98	1	8	26
Volume Left	97	0	0	25
Volume Right	0	1	7	0
cSH	930	1083	1700	1613
Volume to Capacity	0.11	0.00	0.00	0.02
Queue Length 95th (ft)	9	0	0	1
Control Delay (s)	9.3	8.3	0.0	7.0
Lane LOS	A	A		A
Approach Delay (s)	9.3		0.0	7.0
Approach LOS	A			

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	10	2	18	13	35	0	0	28	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	11	2	20	14	38	0	0	30	32
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	133	112	46	112	128	38	62			38		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	133	112	46	112	128	38	62			38		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	98	99			100		
cM capacity (veh/h)	815	771	1023	859	755	1034	1541			1572		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	13	20	52	62
Volume Left	11	0	14	0
Volume Right	0	20	0	32
cSH	840	1034	1541	1700
Volume to Capacity	0.02	0.02	0.01	0.04
Queue Length 95th (ft)	1	1	1	0
Control Delay (s)	9.4	8.5	2.0	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.9		2.0	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	2	3	0	0	0	0	20	6	7	36	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	2	3	0	0	0	0	22	7	8	39	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	79	83	39	84	79	25	39			28		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79	83	39	84	79	25	39			28		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	100	100	100	100			100		
cM capacity (veh/h)	906	804	1032	895	807	1051	1571			1585		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	25	3	28	47
Volume Left	23	0	0	8
Volume Right	0	3	7	0
cSH	896	1032	1700	1585
Volume to Capacity	0.03	0.00	0.02	0.00
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	9.1	8.5	0.0	1.2
Lane LOS	A	A		A
Approach Delay (s)	9.1		0.0	1.2
Approach LOS	A			

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	1	100	36	9	13	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	109	39	10	14	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	49				155	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49				155	44
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1558				836	1026

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	110	49	14	2
Volume Left	1	0	14	0
Volume Right	0	10	0	2
cSH	1558	1700	836	1026
Volume to Capacity	0.00	0.03	0.02	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.1	0.0	9.4	8.5
Lane LOS	A		A	A
Approach Delay (s)	0.1	0.0	9.3	
Approach LOS			A	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1	2	13	1	189	0	0	124	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1	2	14	1	205	0	0	135	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	425	410	202	410	477	205	270			205		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	425	410	202	410	477	205	270			205		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	98	100			100		
cM capacity (veh/h)	528	531	839	552	487	835	1294			1366		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	3	14	207	270
Volume Left	1	0	1	0
Volume Right	0	14	0	135
cSH	507	835	1294	1700
Volume to Capacity	0.01	0.02	0.00	0.16
Queue Length 95th (ft)	0	1	0	0
Control Delay (s)	12.2	9.4	0.0	0.0
Lane LOS	B	A	A	
Approach Delay (s)	9.9		0.0	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	188	1	1	0	0	0	0	1	1	123	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	204	1	1	0	0	0	0	1	1	134	1	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	270	271	1	272	270	2	1			2		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270	271	1	272	270	2	1			2		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	68	100	100	100	100	100	100			92		
cM capacity (veh/h)	639	583	1083	636	584	1083	1622			1620		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	205	1	2	135
Volume Left	204	0	0	134
Volume Right	0	1	1	0
cSH	639	1083	1700	1620
Volume to Capacity	0.32	0.00	0.00	0.08
Queue Length 95th (ft)	35	0	0	7
Control Delay (s)	13.3	8.3	0.0	7.4
Lane LOS	B	A		A
Approach Delay (s)	13.3		0.0	7.4
Approach LOS	B			

Intersection Summary			
Average Delay	10.9		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

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SECTION 1 DESCRIPTION OF SEELEY WASTEWATER RECLAMATION FACILITY IMPROVEMENTS

1.1 INTRODUCTION

Imperial Valley Solar, LLC (formerly SES Solar Two, LLC [Applicant]) filed an Application for Certification (AFC) with the California Energy Commission (CEC) and Bureau of Land Management (BLM) for its proposed Imperial Valley Solar (formerly SES Solar Two) Project (Imperial Valley Solar or Project) in June 30, 2008. The Application was deemed adequate on October 8, 2008. Since then, the Applicant has continued to work with agencies and the public to assess potential Project improvements. This report provides additional information about the upgrades to the Seeley Wastewater Reclamation Facility (SWWRF) that are related to the Imperial Valley Solar Project.

1.2 SEELEY WASTEWATER RECLAMATION FACILITY

1.2.1 Background

According to the original AFC filing, the Imperial Irrigation District (IID) would provide the water supply for the project from its Westside Main Canal raw canal water, which was to be treated to provide an appropriate quality of water for mirror wasting and to meet the standards for on-site drinking water. The applicant estimated approximately 33 acre-per-feet per year (apy) of water would be used annually for mirror washing and domestic use. There were no provisions in the AFC for a backup water supply.

In the first set of data requests, the CEC and BLM asked the Applicant for additional information on the reliability of the Imperial Valley Solar water supply from IID and the source of back-up water in the event that there are future interruptions in the primary water. In considering the responses to these questions, an in-depth evaluation of the Imperial Valley Solar water supply options in terms of reliability, cost, and environmental impact was performed. After extensive research, in June 2009 Imperial Valley Solar provided a Supplement to the AFC to report the Applicant's new primary source of water: reclaimed water from the SWWRF.

The June 2009 Supplement analyzed the 12-mile waterline that will transport water from SWWRF to the Imperial Valley Solar site. Since the publication of that supplement, Seeley County Water District (SCWD) released a Draft Mitigated Negative Declaration (MND) for the SWWRF Improvements. These improvements are necessary to ensure that no discharges from the facility exceed established effluent limits in the future. The Imperial Valley Solar Project is anticipated to take up to 200,000 gallons-per-day (gpd) of the treated effluent. Other possible users of the tertiary-treated effluent include existing and new uses identified and evaluated in Imperial County's General Plan.

Rather than adopting the MND, SCWD is preparing an Environmental Impact Report (EIR). The CEC Staff Assessment (SA) for the Imperial Valley Solar Project assumed that the MND would be adopted. Because the MND was not adopted, this report provides an independent analysis of the potential impacts of the SWWRF improvements.

1.2.1.1 Location

SCWD currently operates a complete wastewater collection system, including an existing water reclamation facility serving the unincorporated community of Seeley, which is located within Imperial County, California. The SCWD has proposed an upgrade of an existing facility, located along the western boundary of the unincorporated community of Seeley in Imperial County, California. The existing plant is located immediately east of the New River, north of Evan Hewes Highway, and west of New River Boulevard. The community of Seeley is located approximately eight miles west of El Centro, 10 miles north of the border between the United States and Mexico, and approximately 100 miles east of San Diego (Figure 1-1 and Figure 1-2. The project site is located within a 5-acre area, within the existing SWWRF property (see Figure 1-3).

1.2.2 Seeley Waste Water Treatment Facility Upgrades Overview

After evaluating the currently available water supply options, the Applicant has concluded that the primary source of water for the Project will be furnished by the SWWRF. Imperial Valley Solar will finance upgrades to the existing treatment plant so its effluent meets Title 22 requirements for recycled water. In exchange, Imperial Valley Solar will have access to approximately 150,000 gpd and up to 200,000 gpd of reclaimed water for use in all construction and operation activities except for potable water.

History and Background. The existing Seeley Wastewater Reclamation Facility (SWWRF) has the permitted capacity to treat up to 250,000 gallons per day (gpd) of wastewater to secondary standards. The SWWRF currently processes approximately 120,000 gpd. The SWWRF currently includes a series of five treatment ponds, including two 0.12-acre "reactor ponds" (Nos. 1 and 2) and three 0.14-acre sedimentation ponds (Nos. 3, 4, and 5). Once treated, the effluent is piped to a drainage ditch located immediately northwest of the SWWRF property, which then discharges into the New River. The existing treatment process is outlined in Figure 1-4 and the existing SWWRF plant features are in Figure 1-5.

Purpose and Need of the SWWRF Project. SCWD is planning to upgrade the existing treatment plant to a tertiary treatment process resulting in a facility that meets water recycling criteria as established in the California Code of Regulations (CCR) Title 22 for unrestricted reuse. The proposed SWWRF will be constructed, operated, and maintained as described below.

The purpose of the SWWRF project is to improve water quality and preserve fresh water resources in the Imperial Valley. The existing SWWRF discharges treated secondary effluent to the New River, under a National Pollutant Discharge Elimination System (NPDES) discharge permit from the Regional Water Quality Control Board (RWQCB), Region 7 – Colorado River Basin. The SCWD's current NPDES permit (Order No. R7-2007-0036, NPDES Permit No. CA0105023) establishes effluent limits for flow and water quality, including total suspended solids (TSS), 5-day biochemical oxygen demand (BOD5), pH, Alpha-BHC, bacteria, and total dissolved solids (TDS). Over the past several years, discharge from the existing facility has exceeded established effluent water quality limits, resulting in violations issued to the SCWD. The SWWRF project involves upgrading the existing facility to a tertiary treatment process, resulting in a facility that meets water recycling criteria established in CCR Title 22 for unrestricted reuse.

This upgrade is intended to alleviate future violations by providing a robust and reliable treatment system that can meet permitted effluent limits.

In addition to improving water quality, by upgrading the facility's treatment process to tertiary Title 22 standards, the SCWD would be able to meet the Seeley community's existing and future recycled water needs, thereby preserving fresh water resources in the Imperial Valley. Potential customers included local parks, schools, and others whom would benefit from public irrigation. There are currently no agreements in place for purchase and/or delivery of recycled water to these customers. SCWD has agreed to make available reclaimed water to Imperial Valley Solar (see Attachment A to the June 2009 Supplement – Will Serve Letter). An agreement between SCWD and Imperial Valley Solar was signed at the Seeley Board Meeting on May 18, 2009. Under the agreement, SCWD will provide up to 200,000 gpd to the Imperial Valley Solar Project for immediate construction use and long-term operations of the facility. Recycled water in excess of the solar project's daily demand is available for other recycled uses within the Seeley service area or will be discharged to the New River through the existing outfall.

Project Objectives and Characteristics. The SWWRF project objective is to upgrade the existing SWWRF to a tertiary treatment process, resulting in a facility that meets water recycling criteria as established in the CCR Title 22 for unrestricted reuse. Recycled water is regulated by the Health and Safety Code, Water Code, and CCR Titles 17, and 22, collectively known as the California Health Laws Related to Recycled Water or "The Purple Book". Water recycling criteria are defined in the California Code of Regulations under Title 22, Social Security, Division 4 Environmental Health, Chapter 3 Water Recycling Criteria. Recycled water that has been treated pursuant to the CCR, Title 22 criteria is typically referred to as "Title 22" recycled water. In order to meet the requirements of Title 22 disinfected tertiary wastewater, the SWWRF project must meet certain reliability requirements for full treatment (as outlined in Article 10 of Title 22, Chapter 3).

1.2.2.1 SWWRF Wastewater Treatment Components

During project design, several engineering analyses were performed to determine how to meet Title 22 treatment requirements while also re-using existing infrastructure to the maximum extent practical. The proposed design achieves both of these goals through an activated sludge system followed by membrane filtration and ultraviolet disinfection. Various improvement designs were analyzed and compared qualitatively with consideration of water quality, operations and maintenance, and constructability. To upgrade the existing SWWRF to a Title 22 tertiary treatment facility, the project will retrofit the existing SWWRF with a modified fully-mixed activated sludge process coupled with membrane microfiltration, resulting in a membrane bioreactor (MBR) process. The MBR process will be followed by an ultraviolet disinfection process to reliably produce Title 22 recycled water for unrestricted uses. Figure 1-6 shows the proposed process flow and Figure 1-7 shows a detailed layout of the proposed upgrades to the SWWRF.

The SWWRF project design comprises the following major components:

- Modification of two of the five existing treatment ponds (Nos. 3 and 4) to a fully-mixed extended aeration activated sludge process;

- Conversion of two of the existing five treatment ponds (Nos. 2 and 5) to in-ground earthen basins lined with a synthetic flexible membrane and a floating cover for storage of at least 300,000 gallons of recycled water, and abandonment of the final pond (No. 1);
- Upgrade in-plant pumping facilities, including upgrades to the existing influent pump station, new interstage pump station, new permeate pump station, new waste sludge pump station, and a new recycled water pump station;
- Installation of new grit removal system, fine screens upstream of the interstage pump station, and two new submerged microfiltration membranes;
- Installation of an open channel ultraviolet disinfection system;
- Installation of skid-mounted sodium hypochlorite system;
- Construction of on-site sludge-drying beds;
- Construction of a Tertiary Treatment Complex and Aeration Equipment Building; and
- Installation of facility utilities (process piping and plant water system), upgraded electrical service, and gravel and paved access roads.

Preliminary Components. In January 2009, the SCWD installed a new influent pump station as part of the Mt. Signal Pump Station and Sewer Pipeline Project. This pump station currently discharges raw wastewater from an existing force main to the primary oxidation pond (see Figure 1-4). The SWWRF project's preliminary treatment upgrades include retrofitting the influent pump station with the addition of influent screening and a grit removal system. A 6-millimeter (mm) coarse screen will be installed in the influent pump station wet well. The pond currently used for preliminary treatment (the primary oxidation pond) will be abandoned and the existing force main that carries wastewater from the influent pumping station will be re-routed directly to the new grit removal system. Grit removal is important to protect subsequent wastewater treatment processes as grit accumulation can plug and degrade critical treatment components, such as the bio-reactors and membranes in the microfiltration process, which is described in greater detail below. Once through the grit removal system, wastewater will be directed through a new flow split structure, which splits the combined raw wastewater and return activated sludge between the two biological reactor ponds.

Secondary Treatment Components. Secondary treatment upgrades include modifying two of the three larger Clemson pond basins (Nos. 3 and 4) into a full-mixed, activated sludge system. As part of this retrofit, the basin floors will be raised 5 feet to provide the desired operating volume and floor area necessary for the aeration system. Four aeration blowers (including two standby blowers) will be installed to provide adequate air pressure for aeration of the ponds. The aeration blower equipment and aeration system control panel will be located in a newly constructed 870-square-foot Aeration Equipment Building, located immediately west of the bio-reactor ponds.

Tertiary Treatment Components. The existing SWWRF does not include tertiary treatment facilities; therefore, all tertiary treatment components included in the SWWRF project will be newly constructed.

Mixed liquor will be conveyed from the bioreactor basins through the fine screens and then pumped with a newly constructed interstage pump station to the new tertiary treatment facility and into the membrane filtration tanks. The fine screen is intended to prevent course material from entering the membrane tanks, which would damage the membrane filtration units.

Microfiltration

The proposed microfiltration system includes two stainless steel membrane tanks, sized to accommodate the full rated capacity of the plant with one tank off-line. Membranes were selected for this component of the tertiary treatment process because of the following advantages:

- Consistent effluent quality that is independent of the influent water quality;
- Reduced size needed for ultraviolet disinfection system when following membrane filtration;
- Full automation with minimal operator involvement;
- Direct filtration of mixed liquor, thereby eliminating the secondary clarification process and chemical addition necessary for granular media filtration.

The microfiltration membrane modules will be submerged within each of the two tanks. A new 2,293-square-foot Tertiary Treatment Complex will be constructed adjacent to the membrane tanks and will house appurtenant systems, including three agitation air blowers, two compressors, permeate pumps, electrical equipment, a laboratory, a membrane clean-in-place system (including chemical dosing pumps), and spare-part storage. The membrane microfiltration system includes two permeate pumps (including one stand-by pump) to draw filtered water (i.e., permeate or filtrate) through the membrane fibers and convey the permeate into the ultraviolet disinfection tanks.

Sludge Processing

The solids remaining in the microfiltration membrane tanks will be re-circulated to the bio-reactor system to maintain the biological mass in the activated sludge system. A sludge wasting station will be installed in the proximity of the Tertiary Treatment Complex, consisting of redundant pumps to transfer waste sludge from the treatment system. The pump station will include a pump bypass to allow gravity flow of waste sludge to the sand-lined sludge-drying beds. The waste sludge will be diverted to newly-constructed sludge-drying beds located west of the membrane tanks. The sludge-drying beds will consist of sand and gravel layers underlain with a containment liner. Drain piping will be provided to collect and convey water that percolates through the granular media back to the treatment process. As sludge settles in the drying beds, water will either evaporate or percolate into the underground drainage system, which will collect the wastewater under the sludge beds and convey it back to the influent pump station at the beginning of the treatment process.

It is anticipated that dried sludge would be removed at least once per year. Biosolids will likely be transported to agricultural facilities in Sentinel-Hyder, Arizona, located approximately 160 miles from the SWWRF, where biosolids are used to grow non-food crops.

Ultraviolet Disinfection

Permeate (filtrate) will be pumped from the membrane tanks to the proposed ultraviolet system. The system includes three ultraviolet banks housed in a stainless steel tank for ultraviolet disinfection using low-pressure, high-intensity (LPHI) amalgam lamps. The selected LPHI lamps emit ultraviolet radiation at a wavelength effective for destroying microorganisms and the proposed system is accepted technology for disinfection of filtered wastewater to meet Title 22 requirements. The stainless steel tanks will be installed on concrete slabs at grade and equipped with an overhead awning to shade the equipment from sun and precipitation (see Figures 1-6 and 1-7).

On-Site Recycled Water Storage

As part of the SWWRF project, two of the five existing treatment ponds (Nos. 2 and 5) will be converted to in-ground earthen basins lined with a synthetic flexible liner and fitted with a floating cover for storage of at least 300,000 gallons of recycled water (see Figures 1-6 and 1-7). Disinfected tertiary water can either be directly discharged to the New River after ultraviolet disinfection or directed to the on-site recycled water storage reservoirs.

Chlorinated Disinfection

Sodium hypochlorite (NaOCl) will be used in the treatment process for both cleaning (described below) as well as disinfection. As part of the disinfection process, sodium hypochlorite will be added to treated effluent after UV disinfection and prior to entering the recycled water storage tanks. Chlorination will provide a disinfection residual to minimize biological re-growth and to prevent algae production in the storage and transmission system. Recycled water that will be directly discharged to the New River will not be dosed with chlorine.

Clean-In-Place System. To maintain the treatment components, a clean-in-place system will be installed to perform intermittent cleaning functions. Maintenance cleans, consisting of a sodium hypochlorite cleaning process, are designed to remove surface degradation on the microfiltration membranes and are anticipated to be performed bi-monthly. During maintenance cleans, sodium hypochlorite is circulated through the membranes to oxidize organic matter. If necessary, a recovery clean will follow, which includes soaking the membranes for 6 to 8 hours in dilute sodium hypochlorite solution and then soaking the membranes in a citric acid solution to remove scaling and accumulation. The frequency of recovery cleans is site specific, but averages once every six months.

The sodium hypochlorite chemical storage tank (for cleaning and disinfection) will be located inside the environmentally controlled Tertiary Treatment Complex in order to minimize chemical degradation. The storage tank will be vented to the exterior of the building. Citric acid will be delivered to the site in neat totes as required for recovery cleans – chemical storage is not anticipated due to the infrequency of citric acid use. The Tertiary Treatment Complex will also house the chemical dosing pumps for the sodium hypochlorite and citric acid.

1.2.2.2 SWWRF Distribution

As part of the SWWRF project, a recycled water pump station consisting of three pumps will be installed near the on-site recycled water storage reservoirs described above. By upgrading the facility's treatment process to tertiary Title 22 treatment standards, SCWD will be able to meet the Seeley community's existing and future recycled water needs. If tertiary-treated effluent is distributed off site, the recycled water uses would offset potable water demands and would result in the reduction or discontinuation of effluent discharged along the unlined channel (Wildcat Channel) into the New River.

As described previously, SCWD has established a working agreement with one potential customer for recycled water, Imperial Valley Solar, LLC. Imperial Valley Solar, LLC has filed an Application for Certification (AFC) with the California Energy Commission (CEC) and Bureau of Land Management (BLM) for its proposed Imperial Valley Solar Project. The solar project applicant is also preparing an application to the Local Agency Formation Commission (LAFCO) for the provision of water from the SCWD. The Imperial Valley Solar Project is currently undergoing a separate environmental review process with the CEC. If approved, the solar project will have a right of up to 200,000 gpd of the tertiary-treated effluent. To access of the water, Imperial Valley Solar will construct approximately 12 miles of pipeline from the Seeley facility to the Project water treatment plant along the Evan Hewes Highway. This waterline was analyzed in the Supplement to the AFC released in June 2009. The current influent rate to the SWWRF is about 112,000 to 150,000 gpd (104 gpm or 168 afy). The proposed SWWRF upgrades along with a newly constructed pipe delivery system from Seeley to the Project and proposed onsite storage will be adequate to provide a reliable source of water for the Imperial Valley Solar Project.

In addition to the Imperial Valley Solar Project, SCWD may sell the recycled water to other customers in the Seeley service area. No formal agreements currently exist for sale or distribution of treated water to any such customers. As other future recycled water customers are unknown at this time, future distribution of treated effluent from the improved SWWRF to off-site uses would necessitate subsequent environmental review pursuant to CEQA Guidelines Section 15168.

1.2.2.3 SWWRF Construction Methods and Schedule

The construction phasing for a wastewater treatment plant generally begins with initial procurement of equipment and materials concurrent with physical mobilization on the project site. Following the start of the procurement phase, general site civil work will begin, focused on rough grading, installation of yard piping, and preparation for structural work. As the general civil work progresses, structural work will commence and include the installation of foundation slabs and concrete structures. Once foundation slabs are complete, equipment deliveries will begin and mechanical installation will commence. As equipment is installed, the electrical work will continue, tying each facility area to the on-site electrical system. After all mechanical and electrical work is complete, the facility will be engaged, tested, and commissioned.

SCWD anticipates construction of the SWWRF improvements in ten phases. The overall construction duration is estimated to be approximately 10 months. The anticipated construction phasing durations are presented in Table 1-1.

Table 1-1
SWWRF Construction Characteristics

Phase No.	Construction Phase	Duration (Weeks)	Construction Equipment	
			By Phase	All Phases
1	Procurement and Mobilization	26	None	None
2	Demolition	3	Jackhammer, Haul Truck	Air Compressor, Crane, Forklift, Generator Set, 2 Loaders, Water Truck
3	Rough Grading	6	Bulldozer, Dump Truck, Excavator, 2 Plate Compactors	
4	Construct Sludge-Drying Beds	10	None	
5	Install Yard Piping	18	2 Excavators	
6	Structural Work – Concrete	10	2 Concrete Mixers, 2 Concrete Pumpers	
	Structural Work – Buildings	8	Forklift	
	Structural Work – Coatings	3	None	
7	Mechanical Work	14	None	
8	Electrical Work	12	Plate Compactor, Loader	
9	Final Grading and Cleanup	4	Concrete Mixer, Paver	
10	Facility Start-Up, Testing, and Commissioning	8	None	None

1.2.2.4 SWWRF Operations and Maintenance

Operations and maintenance of the improved SWWRF will be comparable to that of a typical tertiary treatment plant. Staffing and administration of the improved facility will be similar to the operations and maintenance of the existing SWWRF; however, SCWD may need to increase staffing by up to two additional operators specific to the upgraded tertiary treatment plant operations and maintenance requirements. The existing SWWRF is staffed between 7:00 a.m. and 5:00 p.m., Monday through Friday with designated "on-call" staff over the weekends for emergencies. The improved SWWRF will include necessary monitoring and alarm systems to enable remote monitoring. An increased operational schedule is not anticipated.

New long-term operational deliveries for the improved SWWRF may include the following:

- Chemical (sodium hypochlorite) delivery: once every 2 or 3 months, tentatively scheduled to coincide with delivery to the nearby water treatment plant;
- Chemical (citric acid) delivery: once or twice per year, delivered in a chemical tote on a flatbed truck;
- Additional equipment maintenance deliveries, several times per year depending on upgraded equipment requirements; and
- Sludge removal, estimated at several truckloads annually. Sludge will be stockpiled on the site until sufficiently dried and then hauled to an appropriate landfill or disposal site.

As described above, a clean-in-place system will be installed as part of the SWWRF project to help maintain the tertiary treatment components. Intermittent maintenance and recovery cleans will be performed to minimize degradation of the microfiltration membranes.

1.2.2.5 SWWRF Discretionary Actions

The following discretionary actions must be completed before the tertiary treatment upgrades can be constructed:

The proposed improvements involve upgrading the existing SWWRF from secondary treatment with a New River discharge permit to a California Title 22 treatment plant with tertiary effluent suitable for unrestricted recycled uses. The SWRWF project would not expand the current permitted capacity of 250,000 gpd. The existing "live stream" NPDES permit will either be modified to include a Reclamation Master Permit with site-specific requirements for each separate end user or maintained for live-stream discharge and accompanied by new Waste Discharge Requirements for unrestricted Title 22 recycled uses. SCWD is in the process of preparing an Engineer's Report (Title 22 Report) and Rules and Regulations documents for approval of the RWQCB. Approval of the treatment system will be coordinated with the RWQCB to meet applicable permitting requirements for the project.

SECTION 2 ENVIRONMENTAL INFORMATION

2.1 INTRODUCTION

2.2 AIR QUALITY

This section presents a discussion of the potential impacts related to air quality during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS. Public health is addressed separately in Section 2.16.

2.2.1 Affected Environment

The affected environment is substantially unchanged from that presented in the AFC. Specifically, the climate and meteorology discussions in the AFC have not changed. The existing air quality has been updated as shown in Table 2.2-1.

Table 2.2-1
Ambient Air Quality Data

	Units	Most Stringent Ambient Air Quality Standard	2004	2005	2006	2007	2008
Ozone (O_3)							
Maximum 1-hour concentration	ppm	0.09	0.096	0.122	0.129	0.118	0.135
Maximum 8-hour concentration	ppm	0.070	0.08	0.097	0.101	0.094	0.084
Nitrogen Dioxide (NO_2)							
Maximum 1-hour concentration	ppm	0.053	0.067	0.065	0.066	0.071	0.081
Annual concentration	ppm	0.030	0.013	0.011	0.011	0.011	0.009
Carbon Monoxide (CO)							
Maximum 1-hour concentration	ppm	20	2	4.2	3.1	2.5	3.1
Maximum 8-hour concentration	ppm	9.0	1.17	2.23	2.59	1.67	1.71
Respirable Particulate Matter (PM_{10})							
Maximum 24-hour concentration	$\mu g/m^3$	50	57	81	146	117	88.2
Annual concentration	$\mu g/m^3$	20	35.4	33.9	43.3	47.5	32.7
Fine Particulate Matter[3] ($PM_{2.5}$)							
Maximum 24-hour concentration	$\mu g/m^3$	35	25.1	22.1	27.1	18.2	17
Annual concentration	$\mu g/m^3$	12	9.7	9.4	8.8	8.5	8.1
Sulfur Dioxide (SO_2)							
Maximum 24-hour concentration	ppm	0.04	0.003	0.002	0.041	0.004	0.007
Annual concentration	ppm	0.03	0.000	0.000	0.001	0.001	0.001

Notes:
ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter
Sources: CARB 2010a; EPA 2009a.

The Salton Sea Air Basin (SSAB) is currently classified as a nonattainment for the federal and state ozone standards, the federal and state PM_{10} standards, and the federal $PM_{2.5}$ standards. Table 2.2-2 summarizes the SSAB's federal and state attainment designations for each of the criteria pollutants.

Table 2.2-2
SSAB Attainment Classification

Pollutant	Federal Designation	State Designation
Ozone	Moderate Nonattainment	Nonattainment[1]
Carbon Monoxide	Attainment	Attainment
PM_{10}	Serious Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment[2]	Unclassified
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates (SO_4)	—	Attainment
Hydrogen Sulfide (H_2S)	—	Unclassified
Vinyl Chloride	—	Unclassified
Visibility Reducing Particles	—	Unclassified

Source: CARB 2010b. EPA 2009b.

Notes:
1 CARB has not issued area classifications based on the new state 8-hour standard. The previous classification for the 1-hour O_3 standard was Moderate.
2 The portion of Imperial County encompassing the urban and surrounding areas of Brawley, Calexico, El Centro, Heber, Holtville, Imperial, Seeley, and Westmorland is designated nonattainment; the remainder of the SSAB is designated unclassifiable/attainment.

2.2.2 Environmental Consequences

This section describes the potential air quality impacts from the upgrade to the SWWRF. A discussion of the potential emission sources during construction and operation of the upgrade to the SWWRF is presented in this section. The SWWRF upgrade and associated activities will result in minor changes that will not cause significant construction or operations related impacted to air quality.

The ICAPCD has established significance thresholds to assist lead agencies in determining whether a proposed project may have a significant air quality impact (ICAPCD 2007). Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 2.2-3 are exceeded.

Table 2.2-3
ICAPCD Air Quality Significance Thresholds
(pounds/day)

Criteria Pollutant	Construction (pounds/day)	Operation (pounds/day)
Carbon Monoxide (CO)	550	550
Oxides of Nitrogen (NO_x)	100	55
Volatile Organic Compounds (VOC)	75	55
Oxides of Sulfur (SO_x)	—	150
Particulate Matter (PM_{10})	150	150
Particulate Matter ($PM_{2.5}$)	—	—

Source: ICAPCD 2007.

For nonattainment pollutants, if emissions exceed the thresholds shown in Table 2.2-3, a project could also have the potential to result in a cumulatively considerable net increase in these pollutants, and thus it could have a cumulatively significant impact on the ambient air quality.

The ICAPCD has not adopted health impact thresholds for CEQA purposes. However, a source of TACs that uses Best Available Control Technology would be considered by the ICAPCD to be acceptable for permitting purposes if its TAC emissions resulted in a lifetime cancer risk less than 10 in one million over a 70-year lifetime for sensitive receptors (Hernandez 2010a).

2.2.2.1 Project Construction Emissions

The primary emission sources during construction of the proposed SWWRF Improvements would include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, and erection of facility structures. Different areas within the proposed SWWRF site would be disturbed at different times over this period. Estimated land disturbance for construction activities is assumed to be five acres.

Emissions from the construction phase of the project were estimated through the use of emission factors from the URBEMIS 2007, Version 9.2.4, land use and air emissions model (Jones & Stokes Associates 2007). For the purposes of modeling, it was assumed that the proposed project would commence in November 2010 and would last approximately 5 months. Construction phases and associated durations would include the following: demolition (3 weeks), rough grading (6 weeks), sludge drying beds (10 weeks), installation of yard piping (18 weeks), concrete work (10 weeks), building construction (8 weeks), architectural coatings (3 weeks), mechanical work (14 weeks), electrical work (12 weeks), and final grading and cleanup (4 weeks). Several of these phases would overlap with one another. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during project construction.

Fugitive dust emissions from the construction of the SWWRF would result from:

- Site grading/excavation activities at the construction site;
- Installation of new structures and water line; and
- Onsite travel on unpaved surfaces.

Combustion emissions during construction would result from:

- Exhaust from the off-road construction equipments, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water trucks used to control construction dust emissions;
- Exhaust from on-road construction vehicles, including pickup trucks and diesel trucks used to transport workers and materials around the construction site, and from diesel trucks used to deliver concrete, equipment, and construction supplies to the construction site; and,
- Exhaust from vehicles used by workers to commute to the construction site.

The equipment mix anticipated for each phase construction activity was based on typical construction practices, and is indicated in Appendix 2.2. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. To account for fugitive dust control measures in the calculations, it was assumed that the active sites would be watered at least two times daily, resulting in an approximately 55% reduction of particulate matter.

Table 2.2-4 shows the estimated maximum construction emissions associated with the construction phase of the proposed project.

Table 2.2-4
Estimated Maximum Construction Emissions
(pounds/day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Proposed Project Emissions	10.61	58.56	41.48	0.01	26.24	8.12
Pollutant Threshold	*75*	*100*	*550*	—	*150*	—
Threshold Exceeded?	No	No	No	—	No	—

Source: URBEMIS 2007 Version 9.2.4. See Appendix 2.2 for complete results.
Note:
The emissions shown are the maximum values for any construction year.

As shown, construction emissions would not exceed the ICAPCD's daily thresholds for VOC, NOx, CO, or PM10. As such, construction of the proposed project would result in a less-than-significant impact. In order to further reduce emissions, mitigation is provided (see Section 2.2.4, Mitigation Measures, Mitigation Measure AQ-1). This mitigation is consistent with the standard mitigation measures identified in the ICAPCD's *CEQA Air Quality Handbook*.

2.2.2.2 Project Operations Emissions

2.2.2.2.1 Wastewater Treatment

The operational VOC emissions from the wastewater treatment processes were estimated using emission factors from the Joint Emission Inventory Program (JEIP) Report (CH2M-Hill 1993). These emission factors are specific to different wastewater processes found at facilities in the SCAQMD. The JEIP was a comprehensive source testing and data analysis program to develop an emission inventory pursuant to SCAQMD Rule 1179 (Publicly Owned Treatment Works Operations). For the analysis of operation, the baseline emissions from the existing SWWRF were based on the current influent flow rate of 0.12 million gallons per day (MGD), average dry weather flow. For the upgraded SWWRF, an influent flow of 0.25 MGD, corresponding to the future treatment capacity, was used. It should be noted, however, that the treatment capacity of the SWWRF will not be increased as a result of the proposed upgrade. The JEIP Report factors for the following treatment processes were used to estimate the process emissions for the existing SWWRF:

- Activated Sludge – Mechanical
- Secondary Clarifiers

The SWWRF upgrade would replace the reaction basins and mechanical aerators with membrane bioreactor (MBR) technology using diffused aeration. The facility would use membrane filters for removal of suspended solids instead of secondary sedimentation basins. Lastly, the upgrade would add new sludge drying beds. Accordingly, the JEIP Report factors for the following treatment processes were used to estimate the process emissions for the upgraded SWWRF:

- Activated Sludge – Diffused Air
- Sludge Drying Bed - Static

The JEIP Report emission factors were expressed in units of pounds of VOC as carbon (C) per MGD per year. VOC emissions were converted to report them as methane (CH4)[1]; thus a factor of 1.33 (molecular weight of CH4 divided by molecular weight of C or 16/12 = 1.33). The emission factors were multiplied by the respective influent flow rates and divided by 365 days per year to calculate the daily emissions for the existing and upgraded SWWRF.

The estimated daily VOC emissions from the existing and upgraded SWWRF are shown in Table 2.2-5, along with the net change in daily emissions resulting from the proposed project. Detailed calculations are shown in Appendix 2.2.

2.2.2.2.2 Motor Vehicles

Operations and maintenance activities would potentially increase staffing by up to two additional staff specific to the upgraded tertiary treatment plant operations and maintenance requirements. In addition, new long-term operational deliveries for the improved SWWRF may include:

- Chemical (Sodium Hypochlorite) delivery: once every 2 or 3 months, scheduled if feasible to coincide with delivery to the nearby water treatment plant;
- Chemical (Citric Acid) delivery: once or twice per year, delivered in a chemical tote on a flatbed truck;
- Additional equipment maintenance deliveries, several times per year depending on upgraded equipment requirements; and
- Sludge removal, estimated at several truckloads annually. Sludge will be stockpiled on the site until sufficiently dried and then hauled to an appropriate landfill or disposal site.

Maximum daily motor vehicle emissions associated with operation of the proposed project were estimated using emission factors from the SCAQMD (refer to Appendix 2.2 for detailed calculations). The estimated daily emissions from motor vehicles are shown in Table 2.2-5.

[1] While the VOC emissions are reported as CH_4, they are not likely to be emitted as CH_4, a greenhouse gas. Aerobic treatment processes are not anticipated to emit CH_4.

2.2.2.2.3 Generator Set

The proposed project would utilize a 275-kW (422 horsepower) diesel engine-generator set. It is estimated that the emergency generator set would be utilized approximately 2 hours per day, and a maximum of 50 hours per year. Utilizing current CARB and USEPA engine standards (Tier 3), the emissions resulting from operation of the generator set have been estimated and are included in Table 2.2-5.

2.2.2.2.4 Emissions Summary

The estimated daily emissions from treatment processes, motor vehicles, and the generator set are shown in Table 2.2-5, along with the net change in daily emissions resulting from the proposed project. As shown in Table 2.2-5, the operational emissions would be less than the ICAPCD significance thresholds, and the operation of the proposed project would have a less-than-significant impact on air quality.

Table 2.2-5
Estimated Maximum Operational Emissions
(pounds/day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Existing SWWRF	0.009	—	—	—	—	—
Upgraded SWWRF (Proposed Project)						
Wastewater Treatment	0.034	—	—	—	—	—
Employee Trips	0.02	0.02	0.17	0.00	0.00	0.00
Sludge Removal Trips	0.56	6.91	2.22	0.01	0.33	0.29
Emergency Generator*	1.86	5.58	4.84	0.01	0.28	0.25
Total Emissions	*2.47*	*12.51*	*7.23*	*0.02*	*0.61*	*0.54*
Net Emissions	*2.46*	*12.51*	*7.23*	*0.02*	*0.61*	*0.54*
Pollutant Threshold	*55*	*55*	*550*	*150*	*150*	—
Threshold Exceeded?	No	No	No	No	No	—

Source: See Appendix 2.2 for complete results.*$PM_{2.5}$ emissions assumed to be 90% of PM_{10} emissions.

2.2.2.3 Greenhouse Gas Emissions

In 2006, the California Legislature passed and Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (AB32) directing the California Air Resources Board (CARB) to develop regulations to achieve the goal of reducing statewide greenhouse gas (GHG) emissions to 1990 levels by 2020. Additionally, California's current Renewables Portfolio Standard (RPS) is intended to increase the share of renewable energy to 20% by the end of 2010. Based on Governor Schwarzenegger's Executive Order calling for a statewide 33% RPS, the Climate Change Scoping Plan developed to implement AB 32 anticipates that California will have 33% of its electricity provided by renewable resources by 2020.

GHGs contributed from the proposed project would consist of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The proposed project would result in (1) construction GHG emissions associated with construction equipment and vehicle trips and (2) operational GHG emissions associated with the

operation of motor vehicles, the emergency generator, and electrical generation. The proposed project would assist in the attainment of the state's goals by supplying recycled water to the proposed Imperial Valley Solar Two Project, thereby expediting the generation of renewable energy in California in place of a typical fossil-fuel-fired power plant. Excess reclaimed water may also be available for other reclaimed uses within the Seeley CWD service area to conserve the use of potable water. Additionally, the proposed project would utilize premium efficiency motors to conserve energy associated with operation of the upgraded SWWRF. The project would therefore be consistent with state initiatives aimed at reducing GHG emissions, and impacts with respect to GHG emissions and climate change would be less than significant.

2.2.2.4 Odors

The upgrades to the SWWRF may have the potential to cause more odorous activities, due to the tertiary treatment of additional wastewater. Although, since the existing facility already has odorous activities, generally small increases in odorous activities are not perceptible to most people. Thus, it is expected that odors from the SWWRF Project will be similar to those from the existing facility with no potentially significant impacts.

2.2.3 Cumulative Impacts

Since the SWWRF is located approximately 13 miles from the Imperial Valley Solar Project, the potential air quality impacts from each portion of the project will not be additive. Thus, no additional cumulative analysis will be conducted for the SWWRF project. The AFC and subsequent responses to Data Requests determined that no significant cumulative impacts are associated with the Imperial Valley Solar Project, and none are identified as part of this analysis.

CEQA requires that environmental documents evaluate potential cumulative impacts, and while no cumulative impacts between the SWWRF and the Imperial Valley Solar Project are anticipated, there are potential cumulative impacts related to a reduction in water entering the New River and ultimately the Salton Sea, potentially increasing exposure of sea bed leading to windborne particulates. While on a project specific basis, the water level reduction from the SWWRF would not create a noticeable change in the environment, as discussed above this reduction must be evaluated in light of several closely related projects that may cause a cumulatively considerable impact when the SWWRF's incremental effects are included.

The effect of reduced inflow volumes from the New River, as well as other sources, on the Salton Sea due to these potential cumulative projects would ultimately reduce the total surface area of the Salton Sea and expose multiple acres of land that are currently submerged by water (playa). The potential effect would be the exposure of this sediment and a resulting increase in potential windborne sediments and dust suspension.

Similar to the findings from the Draft and Final IID Water Conservation and Transfer Project EIR/EIS, the removal of the current levels of effluent that is currently being discharged into the New River from the SWWRF would translate to only a minimal impact, and would not noticeably or substantially reduce the existing water levels of the Salton Sea. Currently, the SWWRF is only operating at a permitted 200,000 gallons per day (gpd) level and is only capable of treating that amount. The SWWRF currently discharges

effluent treated to secondary standards via an unlined channel to the New River. Current influent flow rate to the treatment facility and outflow to the New River is approximately 112,000 gpd based upon recorded effluent flow data. As previously discussed, over the past several years, discharge from the facility has exceeded allowed effluent limits, and the District has received notices of violations. (URS September 2009).

Similar to the projects addressed in the cumulative section of the IID Water Conservation and Transfer Project EIR/EIS, the existing level of water entering the New River from the current SWWRF operations is not sufficient to either directly, indirectly, or cumulatively create any significant new impacts beyond what has already been addressed in the identified environmental documents. The current 120,000 gpd corresponds to approximately .34 acre-feet of daily water, or approximately 124 acre-feet per year (afy). While more in-depth hydrology and biology studies are being completed at this time, 124 afy is not anticipated to have a noticeable difference on current or proposed Salton Sea water levels. No cumulative air quality impacts are anticipated due to the SWWRF project related to the removal of the existing effluent entering the New River, beyond the direct and indirect significant and unavoidable impacts attributed to the IID Water Conservation and Transfer Project regarding an increase in exposed playa due to Salton Sea water level reductions.

2.2.4 Mitigation Measures

The only additional mitigation measures that are recommended based on the SWWRF upgrades are related to dust control mitigation measures to limit fugitive dust emissions. The District will ensure that the contractor manages and controls fugitive dust pursuant to local requirements. :

2.2.5 LORS Compliance

Most of the LORS presented in Section 5.2.5 of the Imperial Valley Solar Project AFC are applicable to the SWWRF upgrade Project. Newly proposed and adopted LORS are discussed below and summarized in Table 2.2-9. Where applicable, the SWWRF Project will comply with these LORS.

Table 2.2-9
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
40 Code of Federal Regulations (CFR) Parts 51 and 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and offsets for major sources. Permitting and enforcement delegated to ICAPCD. Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants.
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart III Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compression-ignition internal combustion engines.
State	
Health and Safety Code (HSC)	Permitting of source needs to be consistent with Air Resources Board (ARB) approved

Table 2.2-9
Laws, Ordinances, Regulations, and Standards
(Continued)

Applicable LORS	Description
Section 40910-40930	Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
California Code of Regulations (CCR) Section 93115	Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. Limits the types of fuels allowed, establishes maximum emission rates, and establishes recordkeeping requirements on stationary compression-ignition engines.
Local	
ICAPCD Rule 201 Permits	Requires an Authority to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutants without first obtaining a Permit to Operate.
ICAPCD Rule 207 New and Modified Stationary Source Review	Specifies BACT and offsets requirements for a new or modified emissions unit that has potential to emit any regulated pollutants.
ICAPCD Rule 400 Fuel Burning Equipment – Oxides of Nitrogen	Limits the emission levels of oxides of nitrogen from any source to no more than 140 lbs/hr of NO_x, calculated as NO_2.
ICAPCD Rule 401 Opacity of Emissions	Limits the opacity of discharges from any single source to less than 20% opacity or No. 1 on the Ringlemann Chart.
ICAPCD Rule 403 General Limitations on the Discharge of Air Contaminants	Limits the concentration of the discharge of air contaminants, combustion contaminants, and particulate matter into the atmosphere.
ICAPCD Rule 405 Sulfur Compounds Emission Standards, Limitations, and Prohibitions	Limits the concentration of the discharge of sulfur compounds and the sulfur content of liquid fuels.
ICAPCD Rule 407 Nuisances	Prohibits the discharge from any source of any air contaminant that may cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endangers such persons or public or which may cause injury or damage to business or property.
ICAPCD Rule VIII Fugitive Dust Rules 800 through 806	These rules identify mitigation requirements to reduce fugitive dust emissions.
ICAPCD Rule 1101 New Source Performance Standards	Incorporates the Federal NSPS (40 CFR 60) rules by reference.

2.2.5.1 Federal

National Ambient Air Quality Standards

On January 22, 2010, the U.S. Environmental Protection Agency (EPA) announced a new hourly NO_2 standard of 100 parts per billion (ppb) based on the 3-year average of the 98th-perentile of the annual

distribution of daily maximum 1-hour concentrations. The final rule for the new hourly NAAQS was published in the Federal Register on February 9, 2010, and became effective on April 12, 2010.

On December 8, 2009, EPA issued a proposed rule for a new one-hour SO_2 standard within the range of 50-100 ppb, based on the three-year average of the annual 99th percentile (or 4th highest) of one-hour daily maximum concentrations. The new rule is expected to be effective in June 2010. The EPA also proposes to revoke both the existing 24-hour and annual primary SO_2 standards.

On January 19, 2010, EPA issues a proposed rule to slower the eight-hour primary standard, which was at 0.075 ppm in the 2008 final rule, to a lower level within the range 0.060 to 0.070 parts per million (ppm). The new rule is expected to be effective in August 2010.

Greenhouse Gas Regulations

On July 11, 2008, the U.S. EPA gave *Advance Notice of Proposed Rulemaking: Regulating Greenhouse Gas Emissions under the Clean Air Act* (CAA). It reviewed various CAA provisions that may be applicable to regulate GHGs and examined the issues that regulating GHGs under those provisions may raise. It also provided information regarding potential regulatory approaches and technologies for reducing GHG emissions and raised issues relevant to possible legislation and the potential for overlap between legislation and CAA regulation. The Congress instructed the U.S. EPA to publish a proposed mandatory greenhouse gas rule using its authority under the existing CAA in September 2008 and a final rule by June 2009.

The Proposed Mandatory Greenhouse Gas Reporting Rule public comment period ended June 9, 2009. The comment period was open for 60 days, following publication of the proposed rule in the Federal Register, April 10, 2009. In general, U.S. EPA proposes that suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles, and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions submit annual reports to U.S. EPA. These reports will serve to inform future policy decisions. The gases covered by the proposed rule are carbon dioxide (CO_2), methane (CO_4), nitrous oxide (N_2), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and other fluorinated gases including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFE).

On September 30, 2009, U.S. EPA published proposed rules addressing applicability thresholds for GHG emissions under Prevention of Significant Deterioration (PSD) and Title V permitting programs and to set a PSD significance level for GHG emissions. These proposed applicability levels (between 10,000 and 25,000 metric tons per year of carbon dioxide equivalents) would be phased in during the next six years. These rules became final on December 29, 2009.

2.2.5.2 State

Greenhouse Gas Regulations

On September 30, 2008, Governor Arnold Schwarzenegger signed Senate Bill (SB) 375 (Steinberg). SB 375 focuses on housing and transportation planning decisions to reduce fossil fuel consumption and conserve farmlands and habitat. This legislation is important to achieving AB 32 goals because

greenhouse gas emissions associated with land use, which includes transportation, are the single largest source of emissions in California.

On October 24, 2008, CARB released the Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significant Thresholds for Greenhouse Gases under CEQA recommending CHC-related significance thresholds which lead agencies can use in the significance determination pursuant to OPR's request (CARB 2008). The preliminary interim thresholds are for two sectors: 1) industrial projects, and 2) residential and commercial projects.

On December 30, 2009, Natural Resources Agency released revised CEQA guidelines for implementation of CEQA, which include guidance for the assessment of GHG emissions. These Guideline amendments are slated to take effect in mid-March 2010. The amended CEQA Guidelines emphasize the lead agencies have the discretion to determine appropriate significance thresholds for evaluating GHG impacts that are supported by substantial evidence in the record.

2.2.6 References

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2.3 GEOLOGIC HAZARDS AND RESOURCES

This section presents a discussion of the potential impacts related to geologic hazards and resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.3.1 Affected Environment

The affected environment includes geologic hazards and resources related to the SWWRF, located 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

2.3.2 Environmental Consequences

The project site is located in the Imperial Valey portion of the Salton Trough physiographic province. The Salton Trough is a topographic and geologic structural depression resulting from large scale regional faulting. The trough is bounded on the northeast by the San Andreas Fault and Chocolate Mountains and the southwest by the Peninsular Range and faults of the San Jacinto Fault Zone. Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity. The nearest regional fault is the Superstition Hills which is located approximately eight miles from the proposed project site. The Imperial Valley is directly underlain by lacustrine deposits, which consist of interbedded lenticular and tabular silt, sand, and clay (Landmark, pg. 7, 2009).

Site development potentially affecting geological hazards and resources include building pad preparation, clarifiers and pump station excavations, embankment construction and underground utility installation for a variety of pipelines associated with the reclamation plant operation (*Ibid*, pg. 1, 2009). Figure 2.3-1, Existing Geotechnical Hazards, provides a visual of onsite/nearby geotechnical hazards.

Seismicity and Faulting

The project site is located in the seismically active Imperial Valley of southern California and is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. However, the site it is not located within a State of California Alquist-Priolo Earthquake Fault Zone. The proposed site structures should be designated in accordance with the 2007 California Building Code (CBC) for a “Maximum Considered Earthquake” (MCE) and with the appropriate site coefficients. The Maximum Considered Earthquake is defined as the ground motion having a 2 percent probability of being exceeded in 50 years (*Ibid*, pg. 8, 2009).

<u>Groundshaking</u>

The primary seismic hazard at the project site is the potential for strong groundshaking during earthquakes along the Imperial, Brawley, and Superstition Hills Faults. Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Site accelerations

are also dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same area. Deterministic horizontal peak ground acceleration from maximum probable earthquakes on regional faults have been estimated. The deterministic PGA estimate for the project site is based on the ground motion having a 10% probability of being exceeded in 50 years, or the Design Basis Earthquake (return period of 475 years). The peak ground acceleration estimate for the Design Basis Earthquake was estimated to be 0.50g. The peak ground accelerations estimate for the Maximum Considered Earthquake, which is defined as an event having a 2% probability of being exceeded in 50 years (return period of 2,500 years), was estimated to be 0.72g (Landmark, pg. 9-10, 2009).

Surface Rupture

As previously mentioned, the project site is not located within a State of California, Alquist-Priolo Earthquake Fault Zone. Surface fault rupture is considered to be unlikely at the project site because of the well-delineated fault lines through the Imperial Valley as shown on USGS and CGS maps. Therefore, impacts due to surface rupture would be less than significant. However, because of the high tectonic activity and deep alluvium of the region, the potential for surface rupture on undiscovered or new faults that may underlie the site cannot be determined (*Ibid*, pg. 8, 2009).

Landsliding

The project site is located within the incised New River channel. Even though the western portion of the WWTP property has been re-graded, there are indications of a landslide on the New River bluff along the western edge of the site. Linear erosion piping voids of about 1 to 3 feet in length are located along the west crown slope edge (*Ibid*, 2009). The geotechnical report prepared by Geotechnics Incorporated in 2003 indicated tension cracks associated with the landslide extending back into the area of the previously abandoned unlined wastewater ponds. Geotechnics also noted evidence of piping in the southwest corner of the site which as been covered by recent placement of undocumented fill on the western side of the project site (Geotechnics, Inc., 2003).

Volcanic Hazards

The site is not located in proximity to any known volcanically active area, therefore the risk of volcanic hazards is considered low (Landmark, pg. 9, 2009).

Tsunamis, seiches, and flooding

The site does not lie near any large bodies of water, so the threat of tsunami, seiches, or other seismically-induced flooding is unlikely. The project site is not located within the FEMA 100 year Flood Area of the New River (*Ibid*, 2009). Impacts would be less than significant.

Liquefaction

Liquefaction occurs when granular soil below the water table is subjected to vibratory motions, such as produced by earthquakes. With strong ground shaking, an increase in pore water pressure develops as the soil tends to reduce in volume. If the increase in pore water pressure is sufficient to reduce the vertical

effective stress (suspending the soil particles in water), the soil strength decreases and the soil behaves as a liquid. Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure to shallow bearing foundations. Liquefaction is a potential design consideration for the proposed project because of underlying saturated sandy strata.

Liquefaction potential at the project site was evaluated using the 1997 NCEER Liquefaction Workshop methods. The 1997 NCEER methods utilize direct SPT blow counts or CPT cone readings from site exploration and earthquake magnitude/peak ground acceleration estimates from the seismic hazard analysis. A ground acceleration of 0.50g was used in the analysis with a 10-foot groundwater depth. Liquefaction induced settlements were estimated using the 1987 Tokimatsu and Seed method.

A computed factor of safety less than 1.0 indicates a liquefiable condition.

The soil encountered at the points of exploration included saturated silts and silty sands that could liquefy during a California Building Code-Design Basis Earthquake. Liquefaction can occur within several isolated silt and sand layers between depths of 17 to 45 feet. The likely triggering mechanism for liquefaction appears to be strong groundshaking associated with the rupture of the Imperial Fault, Superstition Hills Fault and possibly the Cerro Prieto Fault (Landmark, pg. 11-12, 2009). Analysis is summarized in Table 2.3-1 below.

Table 2.3-1
Summary of Liquefaction Analysis

Boring Location	Depth to First Liquefiable Zone (ft)	Potential Induced Settlement (in)
B-1	10	½
B-2	10	¼

Source: Adapted from Landmark Consultants, Inc, 2009

Based on empirical relationships, total induced settlements are estimated to be about ¼ to ½ inches should liquefaction occur.

Since the potentially liquefiable silty and sandy soils are overlain by 10 feet of non-liquefying soil which resist groundwater movement, it is unlikely that the light structure loads planned are sufficient to result in liquefaction induced settlement greater than the surrounding land mass. It is expected that the proposed improvements will settle at the same rate as the land mass should liquefaction occur (*Ibid*, pg. 13, 2009). However, since the clarifier and reclaimed water pump station are planned to be founded at 10-15 feet below existing grade (below non-liquefying soils), Mitigation Measure GEO-1 and GEO-2 are provided below. Therefore impacts related to liquefaction would be less than significant with mitigation incorporated.

The analysis conducted by Landmark Consultants, Inc in 2009 and Geotechnics Incorporated in 2003 indicated that the proposed construction and operations of the SWWRF upgrades would not result in any potentially significant impacts to geologic hazards and resources as the SWWRF upgrades would not expose people or structures to rupture of a known earthquake fault, seismic-related ground failure or

landslides. However, SWWRF upgrades could result in substantial soil erosion or locate the project on unstable or expansive soils, as well as subject buildings to seismic ground shaking due to relatively close proximity to nearby faults. Mitigation is provided below that would reduce impacts to a less than significant level. Soil erosion potential and expansive soils are discussed in greater detail in Section 2.4: Soil Resources.

2.3.3 Cumulative Impacts

No additional cumulative impacts to geologic hazards and resources have been identified as part of this analysis beyond those identified in Section 2.3.3 of the AFC.

2.3.4 Mitigation Measures

Mitigation measures for geologic hazards and resources are described in Section 2.3.4 o the Project AFC. Additional mitigation measures are recommended based on this analysis for the upgrades to the SWWRF related to the Imperial Valley Solar Project. These measures would be incorporated into the design of the SWWRF improvements:

GEO-1: To ensure structure stability below existing grade, the subgrade for the clarifier should be overexcavated 24 inches below the bottom of concrete and replaced with drainage rock. Prior to crushed rock placement, the bottom of the excavation should be covered with a geotextile filter fabric (Landmark, pg. 15, 2009).

GEO-2: Loose undocumented fill material will be completely removed and uniformly moisture conditioned to 5 to 10% above optimum moisture content (clays) or 2 to 6% above optimum (silts), and recompacted to 85 to 90% (clays) or 87 to 92% (silts) of the maximum density determined in accordance with ASTM D1557 methods (Landmark, pg. 16, 2009).

2.3.5 LORS Compliance

The LORS presented in Section 5.3.6 of the Project AFC. In addition to LORS identified in Section 5.3.6 of the Project AFC, the following LORS would apply to the proposed project:

The Project will comply with all applicable LORS.

2.3.6 References

Geotechnics Incorporated. *Report of Geotechnical Investigation, Wastewater Treatment Plant, Seeley, California.* Prepared for Nolte Associates, Inc. May 12, 2003.

Landmark Consultants, Inc. *Seeley Water Reclamation Facility, Title 22 Additions, Seeley, Ca.* Prepared for Dudek and Associates. August 2009.

2.4 SOIL RESOURCES

This section presents a discussion of the potential impacts related to soil resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.4.1 Affected Environment

The affected environment includes soil resources related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

2.4.2 Environmental Consequences

As previously mentioned in Section 2.3: Geologic Hazards and Resources, the project site is located in the Imperial Valey portion of the Salton Trough physiographic province. The Imperial Valley is directly underlain by lacustrine deposits, which consists of interbedded lenticular and tabular silt, sand, and clay. The Late Pleistocene to Holocene lake deposits are less than 100 feet thick and derived from periodic flooding of the Colorado River which intermittently formed a fresh water lake (Lake Cahuilla). Older deposits consists of Miocene to Pleistocene non-marine and marine sediments deposited during intrusions of the Gulf of California. Basement rock consisting of Mesozoic granite and Paleozoic metamorphic rocks are estimated to exist at depths between 15,000 – 20,000 feet (Landmark, pg. 7, 2009). Additionally, the project site is underlain by alluvial sediments which are estimated to be several thousand feet thick (Geotechnics, pg. 4, 2003).

Construction of the proposed project, as denoted in the project description, would involve general civil work during Phase 2 including earthwork, yard piping, pre-cast concrete structures, on-site sewer facilities, surface improvements (asphalt concrete, concrete walkways/sidewalks, and gravel access roads), and rough and final grading. The most significant civil work for the Proposed Project is the installation of the sludge drying bed facilities, including underdrains and block partition walls. The overall duration of this phase is approximately 5 months.

Earthwork associated with the Proposed Project will include minimal grading for foundation of proposed structures and miscellaneous excavation, backfill, and compaction for the plant facilities. Pads will be graded and compacted for proposed buildings and structures. Yard piping will be installed underground and will involve trenching, pipe fitting, backfilling, and compaction. The final earthwork task will be final grading to restore/maintain the site's drainage.

The general civil work for the project will utilize conventional construction equipment, including excavators, loaders, dump trucks, bulldozers, plate compactors, water trucks, equipment/material haul trucks, concrete mixers, concrete pumps, asphalt concrete paving machines, cranes, conveyors, compressors, and generators.

Deep excavations for the recycled water pumps and interconnecting piping, on-site sewer facilities, and utility connections will likely utilize sloped trench wall construction and/or trench shields or pre-

engineered shoring systems. The excavations associated with installation of on-site appurtenances are anticipated to be traditional cut/cover with minimal haul-off quantities.

Construction of the proposed improvements onsite could result in a temporary increase in erosion and sedimentation from soil disturbance at the project site. However, in accordance with National Pollutant Discharge Elimination System (NPDES) regulations, a Storm Water Pollution Prevention Plan (SWPPP) and use of Best Management Practices (BMPs) would be implemented during construction. Erosion and sediment control BMPs may include, but are not limited to: installation of sediment barriers such as silt fence, straw wattles, and gravel/sand bags to prevent offsite sedimentation; dust abatement measures to minimize fugitive dust; removal of soil tracked onto paved surfaces; stabilizing or removing trench spoil and stockpiles; and avoiding construction and grading during periods of inclement weather. Project adherence with these standard construction measures will ensure potential soil erosion impacts would be less than significant.

Laboratory tests were conducted on site on selected bulk (auger cuttings) and relatively undisturbed soil samples obtained in thin-wall tubes from the soil boring to aid in classification and evaluation of selected engineering properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials (ASTM) or other standardized methods as denoted in the Geotechnical Report prepared by Landmark Consultants, Inc. in 2009. Engineering parameters of soil strength, compressibility and relative density utilized for developing design criteria provided within this report were obtained from the field and laboratory testing program (Landmark, pg. 5, 2009).

Expansive Soil

In general, much of the near surface soils in the Imperial Valley consist of silty clays which are moderate to highly expansive. Site soils have been classified as Site Class D (stiff soil profile). Subsurface soils encountered during the field exploration conducted on June 21, 2009 generally consist of 10 to 17.5 feet of interbedded soft to stiff silty clay (CL) and loose to medium dense sandy silts/silts (ML). Stiff to very stiff clay (CL-CH) were encountered to a depth of 10 to 51.5 feet, the maximum depth of exploration.

The native surface silty clays likely exhibit low to moderate swell potential when correlated to Plasticity Index tests (ASTM D4318) performed on the native clays. Silty soil layers exhibit low swell potential. Native clay and silt are expansive when wetted and can shrink with moisture loss (drying). Development of building foundations, concrete flatwork, and asphaltic concrete pavements should include provisions for mitigating potential swelling forces and reduction in soil strength, which can occur from saturation of the soil. Causes for soil saturation include landscape irrigation, broken utility lines, or capillary rise in moisture upon sealing the ground surface to evaporation. Moisture losses can occur with close proximity of structures to downslopes and root system moisture extraction from deep rooted shrubs and trees placed near the foundations (Landmark, pg. 10-11, 2009).

Typical measures used for industrial projects to remediate expansive soil include moisture conditioning subgrade soils to a minimum of 5% above optimum moisture (ASTM D1557) within the drying zone of surface soils, and design of foundations that are resistant to shrink/swell forces of silty/clay soil (*Ibid*, 2009). Additionally, all site excavations would conform to CalOSHA requirements for Type B and Type

C soils to prevent impacts to soil resources. In order to mitigate for potential impacts related to erosion and sedimentation, Mitigation Measures SOIL-1 and SOIL-2 are provided below.

The analysis conducted by Landmark Consultants, Inc in 2009 and Geotechnics Incorporated in 2003 as well as inferences derived from the project description indicated that the proposed SWWRF upgrades could result in a temporary increase in erosion and sedimentation from soil disturbance at the SWWRF site. Construction of the SWWRF upgrades would comply with National Pollutant Discharge Elimination System (NPDES) regulations, a Storm Water Pollution Prevention Plan (SWPPP) and use Best Management Practices (BMPs). Adherence to these construction measures would ensure that impacts to soil resources would be less than significant.

2.4.3 Cumulative Impacts

No additional cumulative impacts to soil resources have been identified as part of this analysis beyond those identified in Section 2.4.3 of the AFC.

2.4.4 Mitigation Measures

Mitigation measures for soil resources are described in Section 2.4.4 of the Project AFC. With compliance with the NPDES regulations, the SWPPP and use of BMPs, as well as additional mitigation measures provided below for the upgrades to the SWWRF, impacts would be less than significant with mitigation incorporated.

SOIL-1: Temporary excavations with depths of 4 feet or less may be cut nearly vertical for a short duration. Excavations deeper than 4 feet will require shoring or slope inclinations in conformance to CalOSHA regulations for Type B soil. These temporary deep excavations will require slope inclinations no steeper than 1 ½ (H): 1(V) unless trench shoring is used (Landmark, pg. 24, 2009).

SOIL-2: All unlined permanent slopes should not be steeper than 3:1 to reduce wind and rain erosion. Protected slopes with ground cover may be as steep as 2:1. A minimum setback distance for excavated material and construction equipment will be 10 feet from the crown of the slope. If excavated materials are stockpiled adjacent to the excavation, the weight of the material should be considered as a surcharge load for the slope stability (Landmark, pg. 25, 2009).

2.4.5 LORS Compliance

The LORS presented in Section 5.4.6 of the Project AFC. No additional LORS are recommended for the upgrades to the SWWRF related to the Imperial Valley Solar Project. The Project will comply with all LORS.

2.4.6 References

Geotechnics Incorporated. *Report of Geotechnical Investigation, Wastewater Treatment Plant, Seeley, California.* Prepared for Nolte Associates, Inc. May 12, 2003.

Landmark Consultants, Inc. *Seely Water Reclamation Facility, Title 22 Additions, Seeley, Ca.* Prepared for Dudek and Associates. August 2009.

2.5 WATER RESOURCES

From a water resources perspective, the main purpose of this analysis of use of the SWWRF recycled water supply focuses on updates to previously analysis and information provided in Section 5.5.1 of the AFC, the Reclaimed Water and Hydrogen system supplemental filing to the AFC dated June 2009, and additional supportive material provided for use of the SWWRF water supply, docketed October 30, 2009.

The purpose of this analysis is to update the currently provided information to evaluate potential impacts associated with implementation of SWWRF upgrades in relation to water resources and particularly the SWWRF outlet channel that is tributary to the New River (Wildcat Channel). Additionally, this analysis provides updated information regarding SWWRF permitted operational capacity and current effluent discharge rates. Note that under the current RWQCB Waste Discharge Requirements for SWWRF (RWQCB Order No. 2007-07-0036) the SWWRF is currently permitted for up to 250,000 gpd of secondary treated water. This is an increase from the previous permit (RWQCB Order No. R7-2002-0126) which provided a permitted capacity of 200,000 gpd of secondary treated water. Proposed improvements to the SWWRF include upgrades to move from secondary to tertiary level treatment.

2.5.1 Affected Environment

The SWWRF is located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Project site. Imperial Valley Solar will construct an approximate 12-mile pipeline from the SWWRF to the Imperial Valley Solar water treatment plant along Evan Hewes Highway. The SWWRF is currently seeking to upgrade from a secondary to tertiary level of treatment (per Title 22 requirements).

The affected environment described in the original AFC and subsequent supplemental information remains unchanged. However, it is noted that SWWRF discharges to a minor tributary to the New River, locally referred to as Wildcat Drain/Channel. Additional discussion of the Wildcat Drain channel for the SWWRF discharge is provided in the Biological Resources section of this report.

2.5.2 Environmental Consequences

From a regional water resources perspective, environmental consequences for use of SWWRF recycled water as the sole water supply source for the Project remain unchanged from previously submitted data and analyses.

Project components for use of SWWRF recycled water as the sole water supply source for the project includes a water pipeline along Evan Hewes Highway to SWWRF along with onsite distribution of the raw water supply. The proposed water pipeline and onsite distribution were previously analyzed in the supplemental analyses for use of the SWWRF recycled water published in June 2009.

Water Supply and Use

Based on existing, available information, the current average influent rate to the SWWRF is about 112,000 to 150,000 gpd (78-104 gpm or 125-168 aft), which is capable of meeting the anticipated project operations phase water demand of approximately 30,000 gpd (33 afy). The proposed SWWRF upgrades along with a proposed pipe delivery system from SWWRF to the Project and proposed onsite storage will

be adequate to provide a reliable source of water for the Imperial Valley Solar Project. There are not expected to be any reductions or temporary interruptions of water from the SWWRF. If an unforeseen interruption were to occur, Imperial Valley Solar would temporarily suspend mirror washing operations.

Based upon previously supplied analyses, use of the SWWRF treated effluent is not considered to be a potential impact to regional water supply in the area of existing beneficial uses downstream (URS 2009).

Water Quality

There are no anticipated changes in previously analyzed and provided information regarding water quality for the SWWRF upgrades. The District has been sited several times for violations to NPDES permit stipulations. As described in Section 1.0, Purpose and Need, the project would actually improve surface water quality of the Wildcat Channel, New River and Salton Sea due to the higher level of treatment proposed at the WRF.

Storm Water Runoff and Flooding Hazards

There are no anticipated changes in previously analyzed and provided information regarding storm water runoff and flooding hazards associated with the use of SWWRF recycled water. The analysis conducted by Dudek for the Draft MND indicated that the proposed SWWRF improvements would not result in any potentially significant impacts to storm water runoff and flooding hazards (Dudek 2009).

2.5.3 Cumulative Impacts

Throughout the spring and summer of 2010, Dudek will conduct a surface and groundwater study to determine the Seeley Water Reclamation Facility's cumulative contribution the New River and Salton Sea hydrologic systems. The first steps of this study were undertaken in late March 2010. Dudek hydrogeologists visited the Seeley Water Reclamation Facility on March 19, 2010 in order to investigate the sources of water to the Wildcat Channel north of the SWWRF. The primary findings from the site visit are: 1) vegetation exists upstream of the SWWRF effluent discharge location; 2) no seeps were observed along the channel walls; 3) no surface agricultural drains were observed feeding Wildcat Channel; and 4) flow in the Wildcat channel may be reduced downstream of the effluent discharge point due to the proposed reduction in discharge flows from SWWRF due to Project use.

The Wildcat Channel has two upstream branches, one lying immediately north of the SWWRF and a second lying 50 meters north of the first. The discharge point for the SWWRF lies at the head of the first channel (32º 47.766'N, 115º 42.007'W, as measured on a hand-held Garmin GPS unit). The two branches of the channel are separated by a flat promontory covered in thick vegetation. Dudek personnel were unable to access the downstream edge of the promontory in order to observe the exact confluence point of the two drainages. From a review of aerial photographs, the confluence appears to occur approximately 30 meters northwest of the SWWRF effluent discharge point.

The exact location of the northern channel head was not identified during the site visit, however the presence of vegetation along the northern channel indicates its head lies at least 100 meters east of New River Boulevard. Thus the head of the northern channel is upstream of the effluent discharge point and vegetation along this northern channel is not supported by effluent discharge from the SWWRF.

Dudek personnel conducted field observations along ~~walked~~ both the northern and southern edges of the drainage looking for indications of seepage along the channel walls. No indications of seepage were observed on either side of the channel during the site visit. Additionally, no agricultural drains were observed along the northern wall of the channel.

Dudek personnel were able to access the discharge channel bottom approximately 250 meters downstream of the effluent discharge point, close to where the discharge channel meets the main channel of the New River (32º 47.856'N, 115º 41.118'W, as measured on a hand-held Garmin GPS unit). The channel walls were approximately 10 meters high at this location. The wetted surface of the channel bottom ranges from approximately 0.5 to 3 meters wide and the stream is approximately 5 cm deep. No direct measurements of the flow velocity were taken, though field observations note the possibility of a reduced flow in the Wildcat Channel downstream compared to what was observed at the effluent discharge point from SWWRF.

In addition to the site visit, Dudek also conducted a literature review for additional information on agricultural water use in the vicinity of the drainage. No peer-reviewed, academic articles were found that document agricultural return flows in the vicinity of the SWWRF. Dudek contacted David Bradshaw at Imperial Irrigation District (IID) for information gathered by IID on agricultural return flows from IID water. On average, the farms in the IID apply 5.5 to 6.5 acre feet of water per acre per year. Of this, roughly 15% is expected to drain from the agricultural fields within the IID.

2.5.4 Mitigation Measures

The mitigation measures and other discussion presented in Section 5.5 of the Project AFC are applicable. Based on the information available to date, no additional mitigation measures are recommended based upon the SWWRF upgrades related to the Imperial Valley Solar Project. If the proposed project's reduction in flows of treated effluent to the drainage, New River and Salton Sea water systems are cumulatively significant, mitigation would be provided upon completion of the surface and groundwater hydrology study.

With implementation of the mitigation measures outlined in Section 5.5 of the Project AFC, and given information available to date, impacts to water resources as a result of construction and operation will be reduced to less than significant levels.

2.5.5 LORS Compliance

Minor changes were provided for the LORS compliance and Agency contact tables provided in the previous supplemental submittal regarding Regional Water Quality Control Board contacts. The Project will comply with all LORS.

Table 2.5.2
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
CWA §402; 33 USC §1342; 40 CFR Parts 110, 112, 116	Requires NPDES Permits for construction and industrial storm water discharges. Requires preparation of a SWPPP and Monitoring Program.	Coverage under NPDES industrial storm water permit maybe required. NOI for coverage under NPDES construction storm water permit will be filed before construction.	SWRCB and RWQCB	J. Carmona
CWA §311; 33 USC §1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	Project will conform by proper management of oils and hazardous substances both during construction and operation. If an accidental release or unintended spi9ll occurs it will promptly be reported.	RWQCB and DTSC	J. Carmona
CFR, Title 40, Parts 124, 144 to 147	Requires protection of underground water resources.	Underground water resources will be protected due to the lined evaporation pond.	Environmental Protection Agency	
State Jurisdiction				
CWC §13552.6	Use of potable domestic water for cooling towers and air conditioning is unreasonable use if suitable recycled water is available.	Recycled water will be the sole source of water for the project. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona / J. Snyder
California Constitution Article 10 §2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	Project includes appropriate water conservation measures, both during construction and operation.	SWRCB and RWQCB	J. Carmona
State Water Resources Control Board Resolution	Addresses sources and use of cooling water supplies for power plants that depend on inland waters for cooling and in areas subject to general water shortages.	Recycles water will be the sole source of water for the project. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona (RWQCB), J. Kassel (SWRCB)

Table 2.5.2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Porter-Cologne Water Quality Act of 1972; CWS § 13000-14957, Division 7, Water Quality	Requires State and Regional Water Quality Control Boards to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative and numerical water quality standards.	Project will conform to applicable state water standards, both qualitative and quantitative, before and during operation. Applicable permits will be obtained from Regional Water Quality Control Board.	SWRCB and RWQCB	J. Camona
Title 22, CCR	Addresses the use of recycled water for cooling equipment.	Recycled water will be the sole source of water for the project. No cooling towers are proposed.	California Department of Health Services and RWQCB	J. Stone (DEH)/C. Raley (RWQCB)
The Safe Drinking Water and Toxic Enforcement Act of 1986 (proposition 65), Health and Safety Code 25241.5 *et seq.*	Prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.	Project will conform to all state water quality standards, both qualitative and quantitative. Project will not discharge into any drinking water source. If an unintended spill occurs, reporting of spill will be prompt.	California Department of Health Services	J. Crisologo
CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	Recycled water will be the sole source of water for the project. No cooling towers are proposed.	SWRCB and RWQCB	J. Carmona / J. Snyder
CWC Section 5002	Requires a "Notice of Extraction and Diversion of Water" to be filed with the State Water Resources Control Board on or before 1 March of the succeeding year.	Notice will be filed as required by state law.	SWRCB and RWQCB	C. Raley (RWQCB), J. Kassel (SWRCB)
CWC Section 13751	Requires a "Report of Completion" to be filed with the State Water Resources Control Board within 60 days of well construction.	A groundwater well is not proposed.	SWRCB and RWQCB	J. Snyder / J. Carmona

Table 2.5.2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
California Public Resources Code §25523(a); 20 CCR §§1752, 1752.5, 2300-2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part 1	The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC and RWQCB	J. Snyder / J. Carmona (RWQCB)
CWC §§13271-13272; 23 CCR §§2250-2260	Reporting of releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products	No releases of hazardous substances are anticipated; however, Project will conform to all State water quality standards, both qualitative and quantitative. If an unintended spill occurs, reporting of spill will be prompt.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)
CWC §13260-13269l 23 CCR Chapter 9	Requires the filing of a Report of Waste Discharge and provides for the issuance of WDRs with respect to the discharge of any waste that can affect the quality of the waters of the state.	An ROWD will be filed for the RO Unit discharge waste. The RO Unit will be constructed and monitored in accordance with RWQCB requirements.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)
CEQA, Public Resources Code §21000 *et seq,*; CEQA Guidelines, 14 CCR §15000 *et seq,*; Appendix G	The CEQA Guidelines (Appendix G) contain definitions of projects that can be considered to cause significant effects to water resources.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC	
Title 27, CCR Division 2, §20375, SWRCB – Special Requirements for Surface Impoundments (C15:§2548)	This regulation governs the design requirements for surface impoundments.	The evaporation pond for wastewater disposal will be designed and operated in accordance with the requirements of this section.	SWRCB and RWQCB	J. Snyder and J. Carmona (RWQCB)
Local Jurisdiction				
Imperial County Ordinance, title 9, §91605.00 – 91605.06	These codes regulate flood hazard reduction.	The Project will be designed by a licensed engineer and meet all floodplain design standards.	Imperial County	P. Valenzuela

Table 2.5.2
Summary of LORS – Water Resources
(Continued)

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Imperial County Ordinance, Title 9, §90515.00 – 90515.11	The codes classify the Project as light industrial development and regulates its uses.	The Project will conform to all code standards.	Imperial County	P. Valenzuela
Imperial County APCD, Regulation VIII, Fugitive Dust Rules		The Project will conform to all code standards.	Imperial County	

Source: URS Corporation, 2008.
Notes:
APCD = Air Pollution Control District
CEQA = California Environmental quality Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
CWC = California Water Code
LORS = Laws, Ordinances, Regulations, and Standards
NOI = Notice of Intent
NPDES = National Pollutant Discharge Elimination System
RWQCB = Regional Water Quality Control Board
SWRCB = State Water Resources Control Board
SWPPP = Storm Water Pollution Prevention Plan
USC = United States Code

Table 2.5-3
Agency Contact List for LORS – Water Resources

Agency	Contact	Title	Telephone
California Regional Water Quality Board, Colorado River Basin Region	John Carmona	NPDES, 401 Certification, Storm Water	760-346-7491
California Regional Water Quality Board, Colorado River Basin Region	Jennie Snyder	Chapter 15 and Non-chapter 15	760-776-8962
State Water Resources Control Board	Jim Kassel	Water Rights	916-341-5446
California Department of Health Services	Jeff Stone	Recycled Water	805-566-9767
California Department of Health Services	Joseph Crisologo	Water Security	213-580-5723
Imperial County Planning/Building Development Department	Patricia A. Valenzuela	Planner II	760-482-4320
California Department of Water Resources, Division of Planning and Local Assistance, Southern District	Tim Ross		818-500-1645

Source: Colorado River Basin RWQCB, 208; CDPH, 2008a, CDPH, 2008b (References per Section 5.5 of Project AFC)

2.5.6 References

California Unions for Reliable Energy (CURE) Data Requests Set One, dated April 6, 2009, CDC Docket Number 08-AFC-05.

Dudek, 2009. *Draft Mitigated Negative Declaration for the Seeley Wastewater Reclamation Facility Improvements.* Prepared for Seeley County Water District, Imperial Valley, California. December 2009.

Salton Sea Ecosystem Restoration Program Programmatic Environmental Impact Report, Chapter 5, Surface Water Resources, last accessed April 29, 2009 at: http://www.saltonsea.water.ca.gov/PEIR/draft/

State Water Resources Control Board website last accessed on April 29, 2009 at: http://www.swrcb.ca.gov/rwqcb7/water_issues/programs/salton_sea/watershed.shtml

URS. 2009. Letter Report Provided to Seeley County Water District. "SES Solar Two Imperial County California URS Project No. 27657106.00200." September 23, 2009.

2.6 BIOLOGICAL RESOURCES

This section presents a discussion of the potential impacts related to biological resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.6.1 Affected Environment

The SWWRF is located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the project site. According to the Draft MND for the SWWRF upgrades (Dudek 2009), the SWWRF site supports developed/disturbed land with limited to no vegetative growth, and discharges up to 0.15 cubic feet per second (cfs) of effluent to the New River through an unlined drainage that is approximately 800 feet long and 50 feet wide (0.92 acre). The offsite areas are composed of disturbed land as well as vegetated areas largely associated with the New River as described below. A total of approximately 79 acres is included in both the onsite SWWRF and the offsite drainage and river areas. The offsite area includes the unnamed drainage and any areas at the SWWRF proposed to receive surface disturbance during construction, as well as areas 500 feet upstream and 500 feet downstream of the channel's confluence with the New River.

Methods

The current biological resources database was compiled by reviewing sensitive biological resources in the SWWRF project vicinity including the California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (on-line database), technical reports including, but not limited to, the biological and hydrological reports prepared for the Seeley Water/Wastewater Master Plan (2003), and other relevant information in Dudek files. General reconnaissance surveys were conducted on the SWWRF site in May 2002 (Tierra Environmental, Inc. 2002) and July 2009 (Dudek 2009) with a follow-up visit in March 2010. During the visits in 2002 and 2009, a general review of the SWWRF was conducted. During the March 2010 visit, a general reconnaissance survey was conducted of the offsite areas within the unnamed drainage and further downstream as defined above in order to be able to evaluate the potential for special status species to occur onsite and to assist with evaluating indirect impacts. The vegetation communities on the entire SWWRF site including offsite areas were classified pursuant to the California Department of Fish and Game (CDFG) *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game, Biogeographic Data Branch, Vegetation Classification and Mapping Program, September 2003). During the March 2010 reconnaissance field survey, a general inventory of all plant and animal species detected by sight, calls, tracks, scat, or other sign was compiled, and a determination of potential sensitive species that could potentially occur on site or in the general project vicinity based on suitable habitat conditions and geographic range was performed. Observable sensitive resources including flowering annual plants, shrubs and trees, and conspicuous wildlife (i.e., birds and some reptiles) with special status or commonly accepted as regionally sensitive by the CNPS, California Department of Fish and Game (CDFG) and United States Fish and Wildlife Service (USFWS) was recorded. The vegetation map and any locations of special status species

was digitized into a Geographical Information System (GIS) format and used to create the Biological Resources Map.

Based on the review of soil maps and the existing databases, it was determined there is a potential for special status plant species to occur within the project area, thus rare plant surveys were initiated in the project area in March 2010 and additional surveys will be conducted through summer/fall 2010 in order to search for plants during their appropriate blooming periods. The first survey pass was conducted on March 19, 2010 to survey for rare plant species that would be detectable in the early spring. The surveys covered the entire SWWRF as well as the offsite area defined above. Additional surveys are anticipated to be conducted during the blooming periods of other potential special status plant species in May and October 2010.

Based on the vegetation communities present either onsite or within the offsite survey area, surveys will be conducted for a number of special status wildlife species including Yuma clapper rail (*Rallus longirostris levipes*), California black rail (*Laterallus jamaicensis coturniculus*), burrowing owl (*Athene cunicularia*), gila woodpecker (*Melanerpes uropygialis),* least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), vermilion flycatcher (*Pyrocephalus rubinus*), yellow-billed cuckoo (*Coccyzus americanus*), and flat-tailed horn lizard (*Phrynosoma [=Anota] mcallii*). Where they are available, survey protocols will be followed for conducting focused surveys for these species. For species that do not have protocol methods for conducting surveys, the species will be searched for in conjunction with other species surveys during the time period when they might be present, active, and detectable.

Results

This section addresses the vegetation communities and associated wildlife habitats that occur in the project area. A total of 10 vegetation communities and other land cover types were identified within the project component areas, including low-high elevation riparian scrub, desert iodine bush scrub, arrowweed scrub, desert sink scrub, fresh-brackish water marsh, giant reed grassland, tamarisk scrub, open water, disturbed and developed lands (Table 2.6-1, Figure 2.6-1). These vegetation communities and other land cover types are described below.

Low-High Elevation Riparian Scrub (35.16 acres)

Low-high elevation riparian scrub refers to a broad categorization of riparian habitats ranging from the low elevation, desert riparian scrub habitats of the Mojave and Sonoran Deserts to the high elevation, riparian woodland habitats of southern California's mountain regions. These habitats are found adjacent to permanent surface water, such as streams, rivers, and springs where intermittent to frequent flooding is necessary for plant persistence and floodway dynamics.

In the context of the project area, portions of the New River and the adjacent floodplain is best characterized as a low elevation desert riparian scrub community comprised of a mix of shrub to sub-shrub vegetation with no clear dominant species including, but not limited to, tamarisk (*Tamarix* sp.), arrowweed (*Pluchea sericea*), mesquite (*Prosopis* sp.), and quailbush (*Atriplex lentiformis*). Vegetation within this community is mainly associated with the channel banks of the river adjacent to the flow line, but outside of the primary benches with high saline soils.

Vegetative cover was sparse to moderate ranging from 30% to 75% cumulative cover. At 35.16 acres, low-high elevation riparian scrub is the most prevalent native plant community within the project area.

Desert Iodine Bush Scrub (1.53 acres)

Desert iodine bush scrub is a low elevation plant community typically found along lake/river margins or in dry lake beds, hummocks, and seeps. This plant community is tolerant of extreme environmental conditions and as such is often found growing in high saline substrates subjected to and dependent on intermittent flooding. Iodine bush (*Allenrolfea occidentalis*), alkali heath (*Frankenia grandiflora*), alkali sacaton (*Sporobolus airoides*), bush seepweed (*Suaeda moquinii*) and saltgrass (*Distichlis spicata*) dominate this plant community, growing less than two meters high with a continuous to open canopy (Sawyer and Keeler-Wolf, 1995). Within the project area, desert iodine bush scrub is mainly characterized by iodine bush with less than 20% cover of seepweed (*Suaeda moquinii*) and pickleweed (*Salicornia subterminalis*). This community was mapped along the east side of the New River on a primary river bench supporting high saline, sodic soils.

Arrowweed Scrub (1.31 acres)

Arrowweed scrub refers to moderate to dense streamside riparian thickets strongly dominated by arrowweed with cattails (*Typha* ssp.), bulrush (*Scirpus* ssp.), rushes (Juncus ssp.), and salt grass occurring as scattered individuals, especially around the habitat margins (Holland 1986). This community is commonly associated with disturbed environments and occurs in streambanks, ditches, and washes with gravelly or sandy channels (Holland 1986). Within the project area, arrowweed scrub was mapped along the east side of the New River, just north of the confluence, in areas supporting more than 50% cover of arrowweed.

Desert Sink Scrub (7.82 acres)

Desert sink scrub is typically found on moist valley bottoms and lake beds in lower elevation, desert environments throughout the Sonoran Desert, Mojave Desert, Owens Valley, and nearby areas, usually below 4,000 feet (Holland 1986). Plants are widely scattered and include succulent chenopods and iodine bush. It is found on poorly drained soils with high alkalinity and/or salt content. Within the project area, desert sink scrub was mapped along a primary river bench on the west and east side of the New River with less than 20% vegetative cover and flocculent, sodic soils.

Fresh-brackish Water Marsh (0.30 acre)

Fresh-brackish water marsh typically occurs in drainages, seeps, and other perennially-moist low places where the water table is close to or at the ground surface (Holland 1986). Dominant species include tall, emergent monocots, such as slender cattail (*Typha domingensis*) and bulrush (*Scirpus* sp.), as well as some low-lying herbaceous species, such as curly dock (*Rumex crispus*), marsh fleabane (*Pluchea odorata)*, reeds (*Calamagrostis* sp., *Phragmites* sp.), and a variety of hydrophytic grasses and herbs. Low-growing, woody plants can also occur in this plant community. Tree and shrub layers generally provide insignificant cover. Fresh-brackish water marsh requires continuous shallow inundation and occurs across a wide range of elevations.

Within the project area, fresh-brackish water marsh occurs at two geographically distinct locations in close association with the unnamed drainage extending west from the SWWRF to the New River. The first location is within 15 feet of the existing outfall, while the second location is farther downstream, closer to the river confluence. Both locations are dominated by cattails (*Typha* sp.).

Giant Reed Grassland (0.21 acre)

Within the project area, giant reed grassland refers to areas along the main flow line of the New River supporting near monotypic stands of giant reed (*Arundo donax*). Areas supporting giant reed grassland tend to support an open to intermittent canopy less than 8 meters (24 feet) in height with a variable ground layer (Sawyer and Keeler-Wolf 1995).

Tamarisk Scrub (7.22 acres)

Tamarisk scrub is a moderately dense shrub community with a continuous to open canopy supporting primarily non-native tamarisk with scattered emergent willows (*Salix* spp.), salt bushes (*Atriplex* spp.), catclaw acacia (*Acacia greggii*), and salt grass (*Distichlis spicata*) (Holland 1986; Sawyer and Keeler-Wolf 1995). Tamarisk scrub tends to establish in disturbed and undisturbed streams, waterways, bottom lands, banks and drainage washes of natural or artificial water bodies, as well as in moist rangelands and pastures. Within the project area, tamarisk scrub is dominated by tamarisk with less than 15% cover of arrowweed and is more or less restricted to the unnamed drainage and the channel banks of the New River where existing flows intermittently saturate these areas.

Open Water (2.31 acres)

Open water typically refers to areas containing pools of standing or flowing freshwater with little to no emergent vegetation. Because this land cover rarely supports hydrophytic vegetation, it is not considered a riparian habitat but rather a non-wetland waters of the U.S./State.

Open water can occur in marine, estuarine, riverine, lacustrine, and palustrine systems (Heber 2007). Open water provides aquatic habitat for waterfowl, fish, invertebrates, and amphibians. It is also a source of water for various land animals and a source of fish for birds. Open water has a wide distribution and variable biogeography.

Developed Land (16.19 acres)

Developed land refers to areas supporting man-made structures including homes, yards, roadways, and other highly modified lands supporting structures associated with dwellings or other permanent structures. Such structures typically support little to no natural vegetation growth and are not considered sensitive by local, state, and federal resource agencies and organizations. Developed lands occur across a wide range of elevations, topographic orientations, and soil types.

Areas mapped as developed in the project area include roads, buildings, parking lots, and structures associated with the SWWRF.

Disturbed Land (6.74 acres)

Disturbed land refers to areas that experience or have experienced high levels of human disturbance resulting in severely limited natural vegetation growth. Disturbed habitat typically includes dirt roads, abandoned pads, and other man-made land covers. Areas mapped as disturbed land within the project area include dirt roads, trails, and graded areas supporting sparse (i.e., less than 15% cumulative cover of weedy, ruderal species) to no vegetation.

Table 2.6-1
Vegetation Communities Within the Onsite and Offsite Areas of the Project

Vegetation Community/Land Cover	Existing Acreage
Low-high elevation riparian scrub	35.16
Desert iodine bush scrub	1.53
Arrowweed scrub	1.31
Desert sink scrub	7.82
Fresh-brackish water marsh	0.30
Giant reed grassland	0.21
Tamarisk scrub	7.22
Open water	2.31
Developed land	16.19
Disturbed land	6.74
Total	78.79

No special status plant species were detected during the first-pass focused rare plant survey conducted by Dudek in March 2010. Species observed are common in desert arid and riparian environments and included, but are not limited to, iodine bush, bush seepweed, tamarisk, arrowweed, mesquite, and quailbush. To ensure thorough coverage of potentially occurring special-status plant species in the project area, two additional surveys will be conducted in May and October 2010 to capture the blooming periods of over seven special status plant species including but not limited to Baja California ipomopsis (*Ipomopsis effuse*) and Abrams' spurge (*Chamaesyce abramsiana*).

The potential for special status plant species was evaluated based on the soils, location, and known occurrences of species within the region. The results of that evaluation is presented in Table 2. A number of special status plant species have a moderate potential to occur; however, all special status plant species will be surveyed for regardless of their evaluated potential and any special status plant species observed will be recorded.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Abronia villosa var. aurita	chaparral sand-verbena	None/ None/ 1B.1	Chaparral, coastal scrub, desert dunes; sandy/ annual herb/ January - September/ 260-5300 ft.	Occurrence shown on Cashen	Elevation too high	March and May	Low potential due to the elevation of the site being too low, however other studies indicate the species may be present. Surveys will be conducted for the species.
Astragalus insularis var. harwoodii	Harwood's milk-vetch	None/ None/ 2.2	Desert dunes, Mojavean desert scrub; sandy or gravely/ annual/ January-May/ 0 - 2400 ft.	Not in CNDDB/CNPS nine quad, but occurrence shown on Cashen MND Figure 2		March (was documented to be flowering on March 13, 2010)	Moderate potential due to presence of scrub habitat adjacent to riparian.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Astragalus magdalenae var. peirsonii	Peirson's milk-vetch	FT/SE/ 1B.2	Desert dunes/ perennial herb/ December-April/ -180 – 820 ft.	None in vicinity	Elevation too high; No suitable habitat (Tierra 2002)	March	Primarily restricted to Algodones Dunes but CNDDB near or in Anza Borrego State Park (probably doesn't occur there anymore) (CNDDB March 15, 2010)
Astragalus tricarinatus	triple-ribbed milk-vetch	FE/ None/ 1B.2	Joshua tree "woodland", Sonoran desert scrub/sandy or gravely/ perennial herb/ Feb-May/ 1480-3900 ft	Recorded in Riverside Co., not Imperial Co.	Elevation too high	March	Low potential due to distribution and elevation.
Ayenia compacta	California ayenia	None/ None/ 2.3	Mojavean desert scrub, Sonoran desert scrub/rocky/ perennial herb/ Mar-Apr/ 490-3590 ft	Recorded in Riverside Co., not Imperial Co.	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Calliandra eriophylla	pink fairy-duster	None/None/2.3	Desert scrub, sandy or rocky habitats/ deciduous shrub/ January - March/ 394-4,921 ft.	None	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.
Carlowrightia arizonica	Arizona carlowrightia	None/None/2.2	Sonoran desert scrub (SDScr)(sandy, granitic alluvium)/Mar-May/ deciduous shrub/ 935 - 1,411 ft	Recorded in San Diego Co., not Imperial Co.	Elevation too high	March and May	No potential. Outside of known range.
Castela emoryi	Emory's crucifixion-thorn	None/None/2.3	Mojavean and Sonoran desert scrub, playas, gravely soils/ perennial rhizomatus herb/(Apri) June-Julyr/295-2,198 ft.	Occurrence shown on Cashen MND Figure 2	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.
Chaenactis carphoclinia var. peirsonii	Peirson's pincushion	None/ None/ 1B.3	Sonoran desert scrub(sandy)/ annual herb/ Mar-Apr/ 10-1,640 ft	Recorded in Imperial Co., but not in vicinity		March	Moderate potential due to presence of suitable habitat.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Chamaesyce abramsiana	Abrams' spurge	None/None/2.2	Mojavean and Sonoran desert scrub; sandy soils/annual herb/Sept-Nov/-5-3,002 ft.	None	Potential	October	Moderate potential due to presence of suitable habitat.
Chamaesyce arizonica	Arizona spurge	None/None/2.3	Sonoran desert scrub(sandy)/ perennial herb/ Mar-Apr/ 160-980 ft	Recorded in Riverside Co., not Imperial Co.	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.
Chamaesyce platysperma	flat-seeded spurge	None/None/1B.2	Desert dunes, Sonoran desert scrub; sandy soils/annual herb/Feb-Sept/213-328ft.	Occurrence shown on Cashen MND Figure 2	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Coryphantha alversonii	foxtail cactus	None/ None/4.3	Mojavean desert scrub, Sonoran desert scrub/sandy or rocky, usually granitic/ perennial stem; succulent/ Apr-Jun/ 250-5000 ft	Recorded in Imperial Co., but not in vicinity.	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.
Croton wigginsii	Wiggins' croton	None/ SR/2.2	Desert dunes, Sonoran desert scrub/ perennial herb/ shrub/ March-May/ 150 – 350 ft.	Recorded in Imperial Co., but not in vicinity	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.
Cryptantha ganderi	Gander's cryptantha	None/ None/ 1B.1	Desert dunes, Sonoran desert scrub; sandy/ annual/ February-May/ 500 – 1300 ft.	Recorded in Imperial Co., but not in vicinity	Elevation too high	March (flowering on March 13, 2009)	Low potential due to elevation, however there is suitable scrub habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Ditaxis claryana	Glandular ditaxis	None/ None/2.2	Mojavean desert scrub, Sonoran desert scrub; sandy/ perennial herb/ Oct-Mar/ 0 – 1500 ft.	Recorded in Imperial Co., but not in vicinity		March	Moderate potential due to presence of suitable habitat.
Ditaxis serrata var. californica	California ditaxis	None/ None/ 3.2	Sonoran desert scrub/ perennial herb/ Mar-Dec/ 98-3280 ft	Recorded in Riverside Co., but not in Imperial Co.	Elevation too high	May	Low potential due to elevation, however there is suitable scrub habitat present.
Eucnide rupestris	annual rock-nettle	None/ None/ 2.2	Sonoran desert scrub/ annual herb/ December-April/ 1,640–1,968ft.	Occurrence shown on Cashen MND Figure 2	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Helianthus niveus ssp. tephrodes	Algodones Dunes sunflower	None/ SE/1B.2	Desert dunes/ perennial herb/ Elevation too high September-May/ 150 – 350 ft.	Recorded in Imperial Co., but not in vicinity	Elevation too high	March	Low potential. Restricted to Algodones Dunes (CNDDB March 15, 2010)
Imperata brevifolia	California satintail	None/ None/ 2.1	Chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps, riparian scrub/ rhizomatous herb/ September-May/0- 1,640 feet.	None	Potential	March	Moderate potential due to presence of suitable habitat.
Ipomopsis effusa	Baja California ipomopsis	None/ None/ 2.1	Chaparral, Sonoran desert scrub; sandy/ annual herb/ April-June/ 0-328 feet.	None	Potential	May	Moderate potential due to presence of suitable habitat.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Lepidium flavum var. felipense	Borrego Valley pepper-grass	None/None/1B.2	Pinyon and juniper woodland, Sonoran desert scrub /sandy/annual herb/Mar-May/ 1,493 – 2,756 ft	Recorded in San Diego Co., but not in Imperial Co.	Elevation too high	March (flowering on March 13, 2010)	Low potential due to elevation, however there is suitable scrub habitat present.
Leptosiphon floribundus ssp. hallii	Santa Rosa Mountains leptosiphon	None/ None /1B.3	Pinyon and juniper woodland, Sonoran desert scrub/ perennial herb/ May-Jul/ 3280-6560 ft	Recorded in San Diego and Riverside Cos., but not in Imperial Co.	Elevation too high	None	Low potential. Elevation of occurrence is much too high.
Linanthus maculatus	Little San Bernardino Mtns. linanthus	None/ None/ 1B.2	Desert dunes, Joshua tree "woodland", Mojavean desert scrub, Sonoran desert scrub/sandy/ annual herb/ Mar-May/ 640-6810 ft	Recorded in Riverside Co., but not in Imperial Co.	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present. May be outside of range.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Lycium parishii	Parish's desert-thorn	None/ None/2.3	Coastal scrub, Sonoran desert scrub/ shrub/ March-April/ 1000 – 3300 ft	Recorded in Imperial Co., but not in vicinity	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.
Malperia tenuis	brown turbans	None/ None/ 2.3	Sonoran Desert scrub; sandy/annual herb/ March-April/ 49-1,099 feet	Occurrence shown in Cashen MND Figure 2	Elevation too high	March (just about to flower, noted on March 13, 2010)	Low potential due to elevation, however there is suitable scrub habitat present.
Matelea parvifolia	spearleaf	None/ None /2.3	Mojavean desert scrub, Sonoran desert scrub/rocky/ perennial herb/ Mar-May/ 1440-3590 ft	Recorded in San Diego and Riverside Cos., but not in Imperial Co.	Elevation too high	May	Low potential due to elevation. May be outside of range.
Mentzelia hirsutissima	hairy stickleaf	None/ None/ 2.3	Sonoran desert scrub; rocky/ annual herb/ March-May/ 0-2300 ft.	Occurrence shown on Cashen MND Figure 2	Potential	May	Moderate potential due to presence of suitable habitat.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Nemacaulis denudata var. gracilis	Slender cottonheads	None/ None/ 2.2	Coastal dunes, desert dunes, Sonoran desert scrub/ annual/ (March)April-May/ -170 – 1300 ft.	Not in CNDDB/CNPS nine quad, but occurrence shown on Cashen MND Figure 2	Elevation too high	May	Low potential due to elevation, however there is suitable scrub habitat present.
Opuntia munzii	Munz's cholla	None/ None /1B.3	Sonoran desert scrub(sandy or gravely)/ perennial stem; succulent/ May/ 490-1970 ft	Recorded in Riverside Co., but not in Imperial Co.	Elevation too high	March and May	Low potential due to elevation, however there is suitable scrub habitat present.
Palafoxia arida var. gigantea	Giant Spanish-needle	None/ None/1B.3	Desert dunes/ annual, perennial herb/ February-May/ 50 – 350 ft.	Recorded in Imperial Co., but not in vicinity	Elevation too high	March	Low potential due to elevation, however there is suitable desert habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Phaseolus filiformis	slender-stem bean	None/ None /2.3	Sonoran desert scrub/ annual herb/ Apr/ 410-410 ft	Recorded in Riverside Co., but not in Imperial Co.	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.
Pholisma sonorae	Sand food	None/ None/1B.2	Desert dunes/ parasitic perennial herb/ April-June/ 0 – 650 ft.	Recorded in Imperial Co., but not in vicinity		May	Moderate potential due to presence of suitable habitat.
Pilostyles thurberi	Thurber's pilostyles	None/None/ 4.3	Sonoran Desert scrub/ perennial herb parasitic/ January/ 0-1,197 ft.	Occurs along the Evan Hewes Highway (Cashen Final MND)	Potential	March	Moderate potential due to presence of suitable habitat.
Salvia greatae	Orocopia sage	None/ None/1B.3	Mojavean desert scrub, Sonoran desert scrub/ evergreen shrub/ March-April/ -130 – 2700 ft.	Recorded in Imperial Co., but not in vicinity		March (evergreen shrub)	Low potential due to elevation, however there is suitable scrub habitat present.

Table 2.6-2
Special Status Plant Species with Potential to Occur on the Project Site
(Continued)

Scientific Name	Common Name	Status [1] Federal/ State/ CNPS	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range	Known occurrences (CNDDB)	Suitable Habitat/ Elevation	Survey Date Proposed	Potential for the species to Occur
Selaginella eremophila	Desert spike-moss	None/ None/2.2	Sonoran desert scrub, gravely or rocky/ rhizomatous herb/ (May) June (July)/ 650 – 3000 ft.	Recorded in Imperial Co., but not in vicinity	Elevation too high	May	Low potential due to elevation, however there is suitable scrub habitat present.
Teucrium cubense ssp. depressum	Dwarf germander	None/ None/ 2.2	Desert dunes, playa margins, Sonoran desert scrub/ annual/ March-May(October)/ 150 – 1300 ft.	Not in CNDDB/CNPS nine quad, but occurrence shown on Cashen MND Figure 2	Elevation too high	March	Low potential due to elevation, however there is suitable scrub habitat present.
Xylorhiza cognata	Mecca-aster	None/ None/ 1B.2	Sonoran desert scrub/ perennial herb/ January-June/ 50 – 1300 ft.	Recorded in Imperial Co., but not in vicinity		March	Moderate potential due to presence of suitable habitat.
Xylorhiza orcuttii	Orcutt's woody-aster	None/ None/ 1B.2	Sonoran desert scrub/ perennial herb/ March-April/ 50 – 1200 ft.	Recorded in Imperial Co., but not in vicinity		March	Moderate potential due to presence of suitable habitat.

No special status wildlife species were observed during the March 2010 visit or during visits conducted in 2002 and 2009. However, based on the reconnaissance survey conducted within the project area, specifically the offsite areas, there is a potential for a number special status wildlife species to occur (Table 3). The potential was evaluated based on the vegetation communities present and the distribution and known habitat preferences of the species. Based on this evaluation, a number of focused surveys are scheduled, as noted above, including focused surveys for burrowing owl, Yuma clapper rail, California black rail, least Bell's vireo, southwestern willow flycatcher (which will include detection of other willow flycatcher subspecies), and western yellow-billed cuckoo. Other special status species that also will be detected if present include flat-tailed horned lizard, vermilion flycatcher, and other riparian bird species such as the gila woodpecker.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Invertebrates				
Oliarces clara	Cheeseweed owlfly (cheeseweed moth lacewing)	None/ None/	Lower Colorado River drainage; creosote is the suspected larval host plant, seeks shelter under rocks, occurs in flight over streams.	Low. CNDDB record from 1908 north of the Whitewater River confluence. Suitable creosote scrub is not present.
Amphibians				
Incilius alvarius	Colorado River toad	None/ CSC	Breeds in temporary pools and irrigation ditches along the Colorado River and southern Imperial County.	Low potential. According to CaliforniaHerps.com, CDFG states this species has not been observed in California since 1955.
Lithobates [=*Rana*] *yavapaiensis*	Lowland (=Yavapai, San Sebastian & San Felipe) leopard frog	BLM/ CSC	Found along Colorado River and in streams near the Salton Sea.	Low potential. According to CaliforniaHerps.com, most accounts conclude this species has been extirpated from California.
Reptiles				
Gopherus agassizii	Desert tortoise	FT/ ST	Desert habitats; most common in desert scrub, desert wash, and Joshua tree woodland. Requires friable soil for nests and burrows. Creosote bush scrub with annual wildflowers preferred.	Low potential. SWWRF is not located within the range of this species.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Kinosternon sonoriense	Sonoran mud turtle	None/ CSC	Lacustrine and riverine habitats, 140-510 feet; may be extinct in California (most recent positive record from 1962 in a canal near the Laguna Dam on the Arizona side of the Colorado River).	Low potential. SWWRF is not located within the range of this species. May be extinct in California (most recent positive record from 1962 in a canal near the Laguna Dam on the Arizona side of the Colorado River).
Phrynosoma mcallii	Flat-tailed horned lizard	FS, BLM/ CSC	Fine sand and sparse vegetation in desert washes and desert flats. It is probably most abundant in areas of creosote bush and is found in desert scrub, wash, succulent shrub, and alkalai scrub habitats.	Nearest CNDDB occurrence about 4 miles away, but there are several records surrounding the site (at a distance). Moderate potential based on location; however, no fine windblown sand is present within the SWWRF.
Uma notata	Colorado Desert fringe-toed lizard	BLM/ CSC	Fine, loose, wind-blown sand dunes, dry lakebeds, sandy beaches or riverbanks, desert washes, and sparse desert scrub.	Moderate potential based on location; however, no fine windblown sand is present within the SWWRF.
Birds				
Aquila chrysaetos (nesting and nonbreeding/wintering)	Golden eagle	BCC, BLM, SBNF/ CDF, WL, P	Open country, especially hilly and mountainous regions; grassland, coastal sage scrub, chaparral, oak savannas, open coniferous forest.	Low potential. This species generally does not breed within Imperial County. Could winter in the region and forage within the adjacent agriculture lands however, the setting of the SWWRF is highly disturbed with human activity.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Athene cunicularia (burrow sites and some wintering sites)	Burrowing owl	BCC, BLM, SBNF/ CSC	Grassland, lowland scrub, agriculture, coastal dunes and other artificial open areas.	High potential. Burrowing owls have the potential to occur in the SWWRF. There is suitable friable soil, burrows from squirrels and rodents, and suitable habitat for the species on and offsite.
Botaurus lentiginosus	American bittern	None/ None	Emergent habitat of freshwater marsh and vegetation borders of ponds and lakes.	Low. Emergent wetlands habitat is non-contiguous and small in size.
Buteo swainsoni (nesting)	Swainson's hawk	BCC, FS/ ST/ ABC	Open grassland, shrublands, croplands.	High potential to migrate through the area and forage within the agriculture lands nearby.
Charadrius montanus (Nonbreeding/wintering)	Mountain plover	BLM, BCC, SMC/ CSC/ ABC	Nests in open, shortgrass prairies or grasslands; winters in shortgrass plains, plowed fields, open sagebrush, and sandy deserts.	High potential to winter within the agriculture lands nearby.
Coccyzus americanus occidentalis (nesting)	Western yellow-billed cuckoo	FC, BCC, FS, CNF, SMC, SBNF/ SE	Dense, wide riparian woodlands and forest with well-developed understories.	Low potential due to lack of suitable large and wide expanse of riparian habitat, however potential habitat is present within the tamarisk along the New River. Surveys will be conducted for this species even though the potential is low since it is known to occur rarely within the region.
Colaptes chrysoides	Gilded flicker	BCC/ SE/ ABC	Desert and riparian habitat along Colorado River; uses willows, cottonwood, tree yucca, and saguaro cactus.	Low potential. SWWRF is not located within the range of this species.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Dendrocygna bicolor (nesting)	Fulvous whistling-duck	None/ CSC	Fresh emergent wetlands, shallow lacustrine and quiet riverine waters; feeds in wet croplands and pastures. Nests in dense wetlands of cattails.	High potential to occur within the New River.
Empidonax traillii extimus (nesting)	Southwestern willow flycatcher	FE, CNF/ SE/ ABC	Riparian woodlands along streams and rivers with mature, dense stands of willows or alders; may nest in thickets dominated by tamarisk.	No CNDDB or USFWS occurrences in the vicinity. According to Tierra (2002), it is not expected due to small areas of willow scrub, however this species may use tamarisk as a winter stopover. Surveys will be conducted for this species.
Empidonax traillii brewsteri	Little willow flycatcher	FS, CNF/ SE	Riparian woodlands along streams and rivers with mature, dense stands of willows or alders; may nest in thickets dominated by tamarisk.	No CNDDB or USFWS occurrences in the vicinity. This subspecies of the willow flycatcher is observed commonly within the riparian areas around the Salton Sea area (Patten et al. 2002). Could occur in the riparian areas along the flow line of the New River and unnamed drainage.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Empidonax traillii	willow flycatcher (full species)	CNF/ SE/ ABC	Riparian woodlands along streams and rivers with mature, dense stands of willows or alders; may nest in thickets dominated by tamarisk	No CNDDB or USFWS occurrences in the vicinity. According to Tierra (2002), it is not expected due to small areas of willow scrub, however this species may use tamarisk as a winter stopover. The likely subspecies to occur within the riparian areas is little willow flycatcher. Surveys will be conducted for this species.
Falco peregrinus anatum	American peregrine falcon	BCC, (FD), FS, CNF/ SE, P, CDF	Nests on cliffs, buildings, bridges; forages in wetlands, riparian, meadows, croplands, especially where waterfowl are present.	No potential nesting habitat. Moderate potential to winter and forage within the region.
Haliaeetus leucocephalus (nesting & nonbreeding/wintering)	Bald eagle	(FD), CNF/ SE, P, CDF	Seacoasts, rivers, swamps, large lakes; winters at large bodies of water in lowlands and mountains.	No potential nesting habitat. Low potential to winter and forage within the region due to lack of suitable foraging habitat.
Icteria virens	Yellow-breasted chat	None/CSC	Riparian habitat including tamarisk and elderberry.	High potential to occur within the unnamed drainage and New River.
Grus canadensis tabida (nesting and nonbreeding/wintering)	Greater sandhill crane	FS/ ST, P	Wet meadow, shallow lacustrine, and fresh emergent wetland habitats (summer); annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains (winter).	High potential to forage within adjacent agriculture lands during winter. Would not breed in the region.
Ixobrychus exilis (nesting)	Least bittern	None/ CSC	Dense emergent wetland vegetation, sometimes interspersed with woody vegetation and open water.	High potential to occur within the New River.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Laterallus jamaicensis coturniculus	California black rail	BCC/ ST, P/ ABC	Saline, brackish, and fresh emergent wetlands.	Have been documented occurring within approximately two miles of the Project site. Moderate potential to occur onsite. Surveys are currently being conducted. Results to date are negative.
Melanerpes uropygialis	Gila woodpecker	BCC/ SE	Cottonwood and other desert riparian trees, shade trees, and date palms. Cavity nester in riparian trees of Saguaro cactus.	Moderate potential. Suitable nest trees are not present however, it could forage within riparian areas within the project area.
Micrathene whitneyi (nesting)	Elf owl	BCC/ SE/ ABC	Cottonwood- willow and mesquite riparian zone along Colorado River. Nests in deserted woodpecker holes, often in larger trees.	Low potential. SWWRF is not located within the range of this species.
Parabuteo unicinctus (nesting)	Harris' hawk	None/ WL	Small disjunct breeding population at the south end of the Salton Sea extirpated in the 1960s. Now a rare yearlong resident of southern Salton Sea and Imperial valley.	Low potential to occur within the area. Nesting opportunities are not present.
Pelecanus occidentalis californicus (nesting colony and communal roosts)	California brown pelican	FE/ (SD)	Open sea, large water bodies, coastal bays and harbors.	Low potential. No suitable foraging or nesting habitat.
Piranga rubra (nesting)	Summer tanager	SBNF/ CSC	Nests in riparian woodland; winter habitats include parks and residential areas.	Low potential. Has not been recorded within the region but could winter within the riparian habitat.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Pyrocephalus rubinus (nesting)	Vermilion flycatcher	None/ CSC	Nesters inhabit cottonwood, willow, mesquite, and other vegetation in desert riparian habitat adjacent to irrigated fields, irrigation ditches, pastures and other open, mesic areas in isolated patches.	Have been documented occurring within approximately four miles of the Project site. Moderate potential to occur within the riparian habitat. Surveys will be conducted.
Rallus longirostris yumanensis	Yuma clapper rail	FE/ ST, P/ ABC	Fresh-water marsh. Prefers stands of cattails and tules dissected by narrow channels of flowing water.	Have been documented occurring within approximately four miles of the Project site. Moderate potential to occur within the emergent vegetation. Surveys are currently being conducted. Results to date are negative.
Sternula [=*Sterna*] *antillarum browni* (nesting colony)	California least tern	FE/ SE, P/ABC	Coastal waters, estuaries, large bays and harbors, mudflats; nests on sandy beaches	Low potential. No suitable foraging or nesting habitat.
Toxostoma crissale	Crissal thrasher	BCC/ CSC	Dense thickets of shrubs or low trees in desert riparian and desert wash habitats. Also, dense sagebrush and other shrubs in washes within juniper and pinyon-juniper habitats.	Moderate potential to occur within upland areas around the riparian or within the riparian along the New River.
Toxostoma lecontei	Le Conte's thrasher	BCC, BLM, SBNF/ CSC/ ABC	Open desert wash, creosote scrub, alkali desert scrub, desert succulent scrub	Moderate potential to occur within upland areas around the riparian.
Vireo bellii arizonae (nesting)	Arizona Bell's vireo	BCC/ SE/ ABC	Summer resident along Colorado River, in willow thickets with undergrowth of mulefat.	Low potential. SWWRF is not located within the range of this species.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Vireo bellii pusillus (nesting)	Least Bell's vireo	FE, BCC, CNF/ SE/ ABC	Nests in southern willow scrub with dense cover within 1-2 meters of the ground; habitat includes willows, cottonwoods, baccharis, wild blackberry or mesquite on desert areas	No CNDDB or USFWS occurrences in the vicinity. According to Tierra (2002), it is not expected due to small areas of willow scrub, however the species could occur within the riparian habitat. Surveys are proposed to be conducted.
Mammals				
Antrozous pallidus	Pallid bat	None/ CSC	Rocky outcrops, cliffs, and crevices with access to open habitats for foraging	No suitable roost areas are present but this species may forage within the region.
Bassariscus astulus	Ringtail	SBNF/ None	Mixed forests and shrublands near rocky areas or riparian habitats.	Moderate potential to occur onsite.
Choeronycteris mexicana	Mexican long-tongued bat	None/ CSC/ WBWG	Desert and montane riparian, desert succulent scrub, desert scrub, and pinyon-juniper woodland. Roosts in caves, mines, and buildings.	No suitable roost areas are present but this species may forage within the region.
Corynorhinus townsendii	Townsend's big-eared bat	BLM, FS/ CSC/ WBWG	Mesic habitats, gleans from brush or trees or feeds along habitat edges	No suitable roost areas are present but this species may forage within the region.
Euderma maculatum	Spotted bat	BLM, SBNF/ CSC/ WBWG	Arid deserts and grasslands through mixed conifer forests; roosts in cliffs, feeds over water and along washes.	No suitable roost areas are present but this species may forage within the region.
Eumops perotis californicus	Western mastiff bat	BLM, SBNF/ CSC/ WBWG	Roosts in small colonies in cracks and small holes, seeming to prefer man-made structures	No suitable roost areas are present but this species may forage within the region.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Lasiurus xanthinus	Western yellow bat	None/ CSC/ WBWG	Desert and montane riparian, desert succulent scrub, desert scrub, and pinyon-juniper woodland.	No suitable roost areas are present but this species may forage within the region.
Macrotus californicus	California leaf-nosed bat	BLM, FS/ CSC/ WBWG	Desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis.	No suitable roost areas are present but this species may forage within the region.
Myotis velifer	Cave myotis	BLM/ CSC	Roosts in caves or mines in lowlands of Colorado River and adjacent mountain ranges.	No suitable roost areas are present but this species may forage within the region.
Neotoma albigula venusta	Colorado Valley woodrat	None/ None	Low-lying desert areas; mainly associated with beaver-tail cactus	Low potential. SWWRF is not located within the range of this species.
Nyctinomops femorosaccus	Pocketed free-tailed bat	SBNF/ CSC	Rocky desert areas with high cliffs or rock outcrops	No suitable roost areas are present but this species may forage within the region.
Nyctinomops macrotis	Big free-tailed bat	None/ CSC	Rugged, rocky canyons	No suitable roost areas are present but this species may forage within the region.
Ovis canadensis nelsoni	Nelson's bighorn sheep	BLM, FS / None	Alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian.	Low potential. SWWRF is not located within the range of this species.
Ovis canadensis nelsoni DPS	Peninsular bighorn sheep	FE, SBNF/ ST, P	Alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian.	Low potential. SWWRF is not located within the range of this species.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR
Perognathus longimembris bangsi	Palm Springs pocket mouse	BLM/ CSC	Desert riparain, desert scrub, desert wash and sagebrush. Most common in creosote-dominated desert scrub; rarely on rocky sites.	Low potential. SWWRF is not located within the range of this species.
Sigmodon arizonae plenus	Colorado River cotton rat	None/ CSC	Alluvial bottom along the Colorado River in areas supporting sedges, rushes, and other marsh plants.	Low potential. SWWRF is not located within the range of this species.
Sigmodon hispidus eremicus	Yuma hispid cotton rat	None/ CSC	Along Colorado River and in grass and agricultural areas near irrigation waters in dense grass and herbs.	Low potential. SWWRF is not located within the range of this species.
Spermophilus tereticaudus chlorus	Palm Springs round-tailed ground squirrel	FC/ CSC	Desert succulent shrub, desert wash, desert scrub, alkali desert scrub, and levees in cropland habitat. Also found in urban habitat. Found from -60 to 900m (-180 to 2900 ft) elevation.	Low potential. SWWRF is not located within the range of this species.
Taxidea taxus	American badger	None/ CSC	Dry, open treeless areas, grasslands, coastal sage scrub	Moderate potential to occur onsite. Suitable friable soils are present.
Fish				
Cyprinodon macularius	Desert pupfish	FE/ SE	Desert ponds, springs, marshes and streams in Southern California. Can live in salinities from fresh water to 68 ppt., can withstand temperatures from 9-45 C and DO levels down to 0.1 ppm.	Low potential. SWWRF is not located within the range of this species.
Gila elegans	Bonytail	FE/ SE/ AFS E	River channels and flooded, ponded, or inundated riverine habitats, especially those with little to no competition from non-native fishes; Spawning occurs over rocky substrates.	Low potential. SWWRF is not located within the range of this species.
Xyrauchen texanus	Razorback sucker	FE/ SE, P/ AFS E	Colorado River, canals, and ponds. Can swim in swift currents, but needs quiet waters. Spawns in sand/ gravel/ rocks in shallow water.	Low potential. SWWRF is not located within the range of this species.

Table 2.6-3
Sensitive Wildlife Species Detected or Potentially Occurring in Project Area
(Continued)

SCIENTIFIC NAME	COMMON NAME	STATUS FEDERAL/ STATE[1]	PRIMARY HABITAT ASSOCIATIONS	STATUS ONSITE OR POTENTIAL TO OCCUR

Note:
Based on the Special Animals List (February 2008), California Department of Fish and Game. Only these designations included:
Federal Designations:

BCC	Fish and Wildlife Service: Birds of Conservation Concern
BLM	Bureau of Land Management Sensitive Species
CNF*	Cleveland National Forest Sensitive Species
FC	Candidate for federal listing as threatened or endangered
(FD)	Federally-delisted; monitored for five years
FE	Federally-listed Endangered
FS	Forest Service Region 5 Sensitive Species
FT	Federally-listed as Threatened
MNBMC	Fish and Wildlife Service Migratory Nongame Birds of Management Concern
PFT	Proposed for listing as Federally Threatened
SBNF	San Bernardino National Forest Sensitive Watch List
SMC*	Fish and Wildlife Service Region 1 Species of Management Concern

State Designations:

CDF	California Department of Forestry and Fire Protection Sensitive Species
CSC	California Species of Special Concern
P	California Department of Fish and Game Protected and Fully Protected Species
SE	State-listed as Endangered
ST	State-listed as Threatened
WL	California Department of Fish and Game Watch List

Other

AFS E	American Fisheries Society Endangered classification
ABC	American Bird Conservancy: United States WatchList of Birds of Conservation Concern:
WBWG	Western Bat Working Group High Priority species

The federally listed Yuma clapper rail has been reported in marsh vegetation elsewhere in Imperial County; and the nearest documented occurrence is about two miles north of the SWWRF near where the New River empties into the Salton Sea (Dudek 2009) or approximately one mile south in an area known as Fig Lagoon (J. Konecny, pers comm 3/16/2010). Although the amount of suitable habitat in the project area for both the Yuma clapper rail and California black rail is relatively small, these species are known to use relatively small patches of emergent marsh vegetation for breeding and foraging purposes. Since there are documented occurrences within the New River and patches of suitable habitat are present in the project area interspersed with other native habitat, conducting focused surveys is warranted. John Konecny of Konecny Biological Services is in the process of conducting focused surveys for the Yuma clapper rail and the California black rail. Six protocol-level surveys are required two of which were conducted on April 4 and 11, 2010. The results of these surveys to date are negative.

The state- and federally-listed endangered least Bell's vireo and southwestern willow flycatcher could occur in the project area, especially the southwestern willow flycatcher, which is known to use tamarisk patches in the vicinity as migratory stopover. Burrowing owl and vermilion flycatcher are also known from the general vicinity and the burrowing owl may use the more upland disturbed habitat areas within the SWWRF plant property. Focused surveys for the least Bell's vireo and southwestern willow flycatcher are in the process of being conducted; the first survey for least Bell's vireo is proposed on April 22, 2010.

Among the wildlife species observed from current and previous survey work included the following: black-necked stilt (*Himantopus mexicanus)*; mourning dove (*Zenaida macroura*); northern flicker (*Colaptes auratus*); northern rough-winged swallow (*Stelgidopteryx serripennis*); black phoebe (*Sayornis nigricans*); phainopepla (*Phainopepla nitens)*; Bewick's wren (*Thryomanes bewickii)*; verdin (*Auriparus flaviceps)*; yellow-rumped warbler (*Dendroica coronata*); song sparrow (*Melospiza melodia*); house finch (*Carpodacus mexicanus*); western kingbird (*Tyrannus verticalis*); killdeer (*Charadrius vociferous*); red-winged blackbird (*Agelaius phoeniceus*); and lesser nighthawk (*Chordeiles acutipennis*) (Dudek 2009).

2.6.2 Environmental Consequences

Evaluation of the contribution that the SWWRF flows into the unnamed drainage provide to the biological resources will be conducted through an ongoing hydrology study. The hydrology study will describe the water budget and sources and quantity of surface water available to the fresh-brackish water marsh habitat that currently receives wastewater treatment effluent from the SWWRF.

The analysis conducted by Dudek for the Draft MND indicated that surface water is supplied to the wetland by agricultural return flows and underdrain flow from a separate drinking water treatment plant, and that this water will be adequate to maintain the wetland after water supply from the SWWRF is discontinued (Dudek 2009). However, since that time, new information regarding habitat requirements of potentially present endangered species has been provided. The hydrology study is necessary to quantify how reducing water to the emergent wetland will affect the wetland habitat and any listed species that may occupy the affected habitat. If potentially significant impacts are identified based on this study, the mitigation measures identified in 2.6.4 will be required to reduce the impacts to levels of less than significant.

Focused surveys for special-status bird species will be completed during the appropriate spring/summer survey periods to determine whether the emergent wetland is occupied by these sensitive species as part of the studies associated with the EIR for the SWWRF upgrades. If potentially significant impacts are identified based on the surveys, the mitigation measures identified in 2.6.4 will be required to reduce the impacts to levels of less than significant.

2.6.3 Cumulative Impacts

The analysis conducted by Dudek for the Draft MND indicated there are no additional cumulative effects due to the proposed SWWRF upgrades. If potentially significant impacts are identified based on the hydrologic study and/or surveys, the mitigation measures identified in 2.6.4 will be required to reduce the impacts to levels of less than significant.

The IID Water Conservation and Transfer Project EIR/EIS determined that no significant and unavoidable direct, indirect, or cumulative impacts would occur to biological resources. In the Salton Sea area, the IID Water Conservation and Transfer Project will reduce water levels at the Salton Sea, which will increase the current salinity levels above those determined in the baseline. However, the EIR/EIS determined that this reduction in water and increase in salinity levels would not significantly impact biological resources. The EIR/EIS determined that the project would not impact any of the important surrounding wetlands, including the tamarisk, shoreline strand communities and wetlands dominated by Cattail and Bulrush vegetation within the Salton Sea area. The document found that the fresh water sources coming from the CVWD would continue to support the Cattail wetlands, and that the Tamarisk, also the primary component of the shoreline strand community, is essentially an invasive species and in areas where drainwater or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. Therefore, while reduction in Salton Sea flow will impact some of the Tamarisk dominated wetlands, a reduction in the amount of habitat would not be anticipated to cause a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife and (2) no special-status species depend on tamarisk. Moreover, implementation of the Salton Sea Conservation Strategy under the HCP component of the IID Water Conservation and Transfer Project would further ensure that no significant impacts occur (Draft EIR/EIS, pp. 3.2-139 to 3.2-140; Final EIR/EIS, p. 3-39).

The IID Water Conservation and Transfer Project EIR/EIS determined that there would be a less than significant impact on nesting and roosting sites, mudflat and shallow water habitat. Colonial nest or roost sites are available at the Salton Sea for ground-nesting birds, including black skimmers, terns and gulls, American white pelicans, California brown pelicans, and doublecrested cormorants. The surface elevation of the Salton Sea is projected to decline with or without the IID Water Conservation and Transfer Project, and the project would only accelerate the process by a number of years, which was determined to not be a significant impact. Also components of the HCP would create islands for nesting of species. Delta areas would be maintained and impacts to rookeries in trees, shrubs, and snags were found to be less than significant. The Amended and Restated Addendum to the EIR/EIS for the IID Water Conservation and Transfer Project also provided for two roost sites for the brown pelican along the Southern California Coast. The roost sites are to be functioning by 2018 and demonstrated to support at least 100 pelicans each and up to 1,200 in combination, which has been determined by the CDFG to be an appropriate measure of mitigation to offset impacts to brown pelicans at the Salton Sea. The roost sites will be maintained through 2048. This is a long-term measure that will maintain the brown pelican populations in Southern California and will replace habitat lost at the Salton Sea because of increased salinity and the resultant loss of food source. (Draft EIR/EIS, pp. 3.2-156 to 3.2-157; Addendum, p. 3-7).

The EIR/EIS found that while migratory birds, specifically shorebirds and waterfowl, could be affected by the changes in salinity and surface water elevation, it found that reduced water surface elevations are not expected to adversely affect the availability of foraging habitat for shorebirds. As the water surface elevation falls, new mudflat habitat would be created at lower elevations, and the shallow water habitat and mudflat area may even increase at the south end of the Salton Sea. (Draft EIR/EIS, pp. 3.2-157 to 3.2-158).

The IID Water Conservation and Transfer Project EIR/EIS determined the increased salinity will have a less than significant effect on fish and invertebrate resources, and increased selenium will have no impact

on fish and birds at the Salton Sea. Increasing the salinity of the Salton Sea would have an impact on invertebrate species, changing the predominant species to brine flies and brine shrimp. As stated in the EIR/EIS, the Salton Sea is naturally transitioning to a more saline system, as has occurred at Mono Lake and the Great Salt Lake. The document found that this change in the composition of the invertebrate community in and of itself is not a significant impact but could significantly affect bird or fish resources through reduced food availability. Comparing the Salton Sea to Mono Lake, the IID Water Conservation and Transfer Project EIR/EIS concluded that given the shorebird and waterbird species that use the Salton Sea also use Mono Lake, in which the brine flies and brine shrimp are the primary prey species, it is reasonable to expect that these species would similarly exploit brine flies and brine shrimp as they become the dominant invertebrate species at the Salton Sea. Therefore, changes in the invertebrate community would have a less than significant impact on shorebirds and other waterbirds using this resource. (Draft EIR/EIS, p. 3.2-140, pp. 3.2-145 to 3.2-146, 3.2-155 to 3.2-156).

Similar reasoning exists for specific species of fish; however some species, such as the gulf croaker, which feed predominantly on pileworms, would therefore be impacted as pileworms disappear from the environment due to increased salinity levels. Further, increased salinity levels alone would directly impact a number of game species, particularly the different species' ability to reproduce, causing the species to move to other areas within the Salton Sea such as further up the rivers. Regardless, this is not determined to be a significant impact within the EIR/EIS due to the lack of impact on any sensitive or native species (all of these species have been introduced to the Salton Sea), and despite the IID Water Conservation and Transfer Project, the Salton Sea is heading towards such an increase in salinity levels with or without the project. The EIR/EIS also determined that increased salinity in the Salton Sea could isolate drains supporting desert pupfish. However, implementation of the HCP measures will reduce this impact to a less than significant level. (Draft EIR/EIS, pp. 3.2-149 to 3.2-150, p. 3.2-159; Final EIR/EIS, pp. 3-40 to 41; Addendum, p. 3-8).

The EIR/EIS found that in the Salton Sea, reduced fish abundance due to the increase in salinity levels will affect piscivorous birds – or birds that habitually feed on fish. These changes in fish abundance due to salinity levels would occur under both the IID Water Conservation and Transfer Project and the environmental baseline, and the project would only accelerate this increase in salinity levels. The mean of the salinity projections shows the salinity of the Salton Sea surpassing 60 ppt in 2023 under the baseline conditions, which is the point at which the reproductive capability of much of the fish in the Salton Sea would be substantially impaired, resulting in an important loss of the food source for piscivorous birds, such as white pelicans, brown pelicans, black skimmers, and doublecrested cormorants. As the abundance of fish decline at the Salton Sea, the level of use by piscivorous birds would decline. If fish persist in the deltas of the New and Alamo Rivers, a smaller level of use by piscivorous birds could be supported at the Salton Sea. Regardless, the EIR/EIS for the IID Water Conservation and Transfer Project determined that the project would accelerate the changes in reduction of fish abundance and the subsequent response of piscivorous birds by about 11 years and that this earlier occurrence of adverse effects to piscivorous birds is considered a significant, but avoidable, impact of the water conservation and transfer component due to the implementation of the HCP components. In particular, the refined Salton Sea Habitat Conservation Strategy as evaluated in the Amended and Restated Addendum to the EIR/EIS for the IID Water Conservation and Transfer Project will provide additional mitigation water to the Salton Sea for the first 15 years of the overall project, a step which will essentially keep to the same salinity level increases as the baseline for those years, and maintaining the salinity level of 60 ppt at or around the year 2019,

approximately 4 years prior to the baseline year of 2023. (Draft EIR/EIS, pp. 3.2-150 to 3.2-154; Addendum, pp. 3-6 to 3-7).

The Draft and Final IID Water Conservation and Transfer Project EIR/EIS evaluated the potential for cumulative impacts from all related projects that may collectively contribute to impacts in the impacted area. As determined in the analysis, implementation of the water conservation and transfer component would be expected to accelerate increases in the salinity and decreases in water surface elevation of the Salton Sea. Implementation of some of the other projects described in the cumulative impact analysis could also add to these effects; however, the incremental effects of these projects were determined to not be substantial. The cumulative impact section for biological resources reiterated that the measures from the HCP, as well as the Amended and Restated Addendum, will more closely resemble the baseline conditions and that there were no significant or unavoidable impacts related to biological resources that could not be mitigated. The refined Salton Sea Habitat Conservation Strategy would provide mitigation water to offset flow reductions in the Salton Sea resulting from the IID Water Conservation and Transfer Project, which in turn would reduce project specific impacts to the Salton Sea's biological resources to a level that is less than cumulatively considerable. Additionally, the document found that other programs, including other wetland enhancement projects, would also offset cumulative impacts to such resources in the Salton Sea area. (Draft EIR/EIS, p. 5-34; Final EIR/EIS, pp. 3-36 to 3-39; Addendum, pp. 3-5, 3-8, 3-23).

Similar to the discussion above under Air Quality, the existing level of water entering the New River from the current SWWRF operations is not sufficient, similar to the projects addressed in the cumulative section of the IID Water Conservation and Transfer Project EIR/EIS, to either directly, indirectly, or cumulatively create any significant new impacts beyond what has already been addressed within the related environmental documents. While more in-depth biology studies are nonetheless being prepared in order to evaluate this reduction of water, diversion of 124 afy is not anticipated to have a noticeable difference on current or proposed Salton Sea water levels or the salinity levels of the Salton Sea.

2.6.4 Mitigation Measures

If potentially significant impacts are identified based on the hydrologic study and/or surveys, the mitigation measures identified in 2.6.4 will be required to reduce the impacts to levels of less than significant.

Based on the hydrology analysis and bird surveys to be conducted as a part of the studies associated with the SWWRF improvements, one of the potential scenarios of effects may occur. Table 2.6-4 summarizes each scenario, and the probable resulting environmental consequences and mitigation requirements.

Table 2.6-4
Potential Scenarios for Effects of Discontinuing SWWRF Flows to Emergent Wetland

Potential Scenarios for Effects of Discontinuation of SWWRF Flows to Emergent Wetland	Environmental Consequences	Mitigation or Avoidance Measures
Discontinuance of SWWRF water flow does not cause loss of wetland and wetland is not occupied by special status species.	Emergent wetland is maintained and no impacts to listed bird species, as described in Draft MND (MND).	Avoidance of native habitat disturbance during bird breeding season. No other mitigation required.
Discontinuation of SWWRF water flow results in the loss of emergent wetland and/or tamarisk scrub vegetation.	Emergent wetland is not maintained and wetlands habitat loss occurs.	A Section 1602 Lake and Streambed Alteration Agreement would likely be required from the CDFG to permit permanent changes to aquatic resources. Habitat mitigation to compensate for the loss of wetlands habitat would be required to satisfy no net loss.
Burrowing owl is present within the SWWRF plant area.	The burrowing owl location is proposed to be directly impacted by the SWWRF upgrade.	Avoid impacting the species directly during the breeding season. Conduct passive relocation per the Burrowing Owl Mitigation Guidelines (1993).
Burrowing owl is present within the surrounding area but not within the SWWRF plant area.	The burrowing owl location is not proposed to be impacted.	If the location is within 150 feet of the proposed activity, the burrowing owl may be affected indirectly by noise and construction activity. Noise attenuation measures may be required depending on schedule and the extent of noise.
Special status riparian bird species are present within the unnamed drainage or New River within the project area including any of the following: least Bell's vireo, southwestern willow flycatcher, willow flycatcher, and western yellow-billed cuckoo.	Species within the riparian habitat would not be impacted directly but could be impacted indirectly in the long term if the vegetation changes due to modifications in water flow or there is noise emanating from the construction activities	If wetlands habitat is not maintained and the project results in the loss of habitat that is used by confirmed present federally-listed riparian bird species, formal consultation with the USFWS under Section 7 or Section 10 of the ESA would be required. Habitat mitigation would likely be required to compensate for the loss of wetlands habitat. Avoidance of native habitat disturbance during bird breeding season. Construction noise abatement measures during the bird breeding season.
Yuma clapper rail or California black rail are determined to be present within the unnamed drainage or within portions of the New River within the project area.	Emergent wetland is maintained; noise impacts to listed riparian bird species may occur during construction.	Avoidance of native habitat disturbance during bird breeding season. Construction noise abatement measures during the bird breeding season.

Table 2.6-4
Potential Scenarios for Effects of Discontinuing SWWRF Flows to Emergent Wetland
(Continued)

Potential Scenarios for Effects of Discontinuation of SWWRF Flows to Emergent Wetland	Environmental Consequences	Mitigation or Avoidance Measures
Yuma clapper rail or California black rail are determined to be present within the unnamed drainage or within portions of the New River within the project area.	Emergent wetland is not maintained.	Mitigation in the form of habitat restoration/creation will be required. Permits will be required.

2.6.5 LORS Compliance

The LORS presented in Section 5.6.11 of the Project AFV are applicable to the revised Project and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.6.11 of the Project AFC is unchanged and the SWWRF upgrades related to the Imperial Valley Solar Project do not affect the required permits or Project schedule presented in Section 5.6.11 of the Project AFC. The Project will comply with all LORS.

2.6.6 References

Dudek, 2009. *Draft Mitigated Negative Declaration for the Seeley Wastewater Reclamation Facility Improvements*. Prepared for Seeley County Water District, Imperial Valley, California. December 2009.

2.7 CULTURAL RESOURCES

This section presents a discussion of the potential impacts related to cultural resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.7.1 Affected Environment

The affected environment includes the SWWRF, discussed below and a proposed waterline, which extends east of the original line and runs parallel to Evan Hewes Highway rather than the railroad right-of-way (ROW) that will connect to the SWWRF to provide recycled water to the Imperial Valley Solar Project site. The waterline was discussed in a supplemental analysis provided in June 2009.

The SWWRF is located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Project site. Imperial Valley Solar will construct an approximate 12-mile pipeline from the SWWRF to the Imperial Valley Solar water treatment plant along Evan Hewes Highway. The pipeline will be buried within the Evan Hewes Highway ROW approximately 30” below the existing grade. The line will enter the Imperial Valley Solar property at the exact location as the previously identified line (approximately 1,000 yards east of Plaster City and then run due south to the Raw Water Storage Tank).

2.7.2 Environmental Consequences

Based on information contained in the Draft MND for the SWWRF Improvements (Dudek 2009), a cultural resources pedestrian survey and a cultural record search were conducted for the Final MND/Environmental Assessment for the Proposed Seeley Water/Wastewater Master Plans (2003), and no significant cultural resources were identified within the project area.

2.7.2.1 Cultural Resources Survey Results

A records search was conducted February 18, 2009, for a quarter-mile radius around the centerline of the survey corridor for the waterline project, which included the existing SWWRF project site. The records search revealed 11 projects had been previously conducted and 21 cultural resource locations had been previously documented in the records search buffer area. Table 2.7-1 lists the previously performed investigations within the water line records search buffer, which includes the SWWRF project site as it is within the buffer of the record search area. Table 2.7-1 presents the cultural resources previously documented within the records search boundary. The record search for the waterline project covered a larger area than the SWWRF. No previously recorded cultural resources sites were documented within the boundaries of the SWWRF.

Table 2.7-1
Previously Performed Cultural Resources Investigations

Project Name	NABD #	Produced by	Produced for	Date
Archaeological Examination for the Seeley, California Wastewater Facilities Plan	1100070	Jay and Sherilee Von Werlhof Imperial Valley College Museum	Design Sciences	May 1976
Cultural Resource Investigation for 30 Proposed Asset Management Parcels in Imperial Valley, CA	1100301	Patrick Welsh	BLM	July 1983
Review of Alamosa PCS Site # 82502020 Count of Imperial, CA	1100757	Environmental biologists, Inc/SBA	Imperial County, CA	September 2000
Cultural Resource Assessment AT&T Wireless Services Facility No. IM004 Imperial County, CA	1100804	Curt Duke, LSA Associates	GeoTrans Inc.	March 2002
Cultural Resources Survey and Assessment of a Cellular Phone Tower Replacement and Associated Access road Along Old US Highway 80 Near Dixieland, Imperial County, CA	1100820	Philip de Barros, Ph.D. Professional Archaeological Services	Phase One Inc.	May 2000
Section 106 consultation Request Cell Site CA-7 New Site # 58 Seeley, Imperial County, CA	1100916	Joseph M. Nixon, Ph.D., Tierra Environmental Services	BRG Consulting Inc.	May 2002
Archaeological Examination of A Proposed County Waste Disposal Site near Calexico, CA	1100071	Jay and Sherilee Von Werlhof	Department of Public Land Works, Imperial County	May 1976
Phase 1 Archaeological Survey of the Proposed Imperial Site, New Mental Health Treatment Facility Project	1101071	Mark C. Robinson, Applied EarthWorks, Inc.	State of California Real Estate Services Division	January 2000
Cultural Resources Study of the Mount Signal and Dixie Ranch Imperial county Prison Alternatives Imperial County, CA	1101057	Andrew Pigniolo, ERC Environmental and Energy Services Company, Inc.	California Department of Corrections	January 1990
Volume I Phase II Archaeological Survey o the La Rosita 230 kV Interconnection Project	1100251	Cultural Systems Research, Inc.	San Diego Gas and Electric	November 1987
Cultural Resource Survey for the Seeley Water and Wastewater Treatment Master Plan Project, City of Seeley, Imperial County, California	1101036	Joseph M. Nixon Ph.D. Tierra Environmental Services	BRG Consulting, Inc.	May 2002a

A cultural resource survey was previously conducted for the SWWRF Master Plan Project and included a field survey of 2.5 acres of the existing project site as well as a one-linear mile survey for associated facilities. The survey was negative and no cultural resources were identified (Nixon 2002a).

Table 2.7-2
Previously Recorded Cultural Resource Sites

Site Name	Cultural Affiliation	Description	Comments
CA-IMP-321	Prehistoric	Cremation	Site location has not been verified since initial recording.
4-IMP-453	Prehistoric	Potter shards	Site location has not been verified since initial recording.
4-IMP-1425	Prehistoric	Isolated find – pottery sherd	
4-IMP-1426	Prehistoric	Village site – extensive pottery and lithic materials	Site location has not been verified since initial recording.
4-IMP-4193H	Historic	Refuse deposit	
4-IMP-4389	Prehistoric	Pottery scatter – pot drop	Site location has not been verified since initial recording.
4-IMP-4390H	Historic	Refuse deposit	Site location has not been verified since initial recording.
4-IMP-4391H	Historic	Refuse deposit	No further information available.
4-IMP-4602	Prehistoric	Isolate – Basalt flake	Salton Buff; site location has not been verified since initial recording.
4-IMP-4603	Prehistoric	Isolate – Basalt flake	
CA-IMP-7816H	Historic	Refuse Deposit	Potentially related to the railroad; site location has not been verified since initial recording.
US Highway 80	Historic	Linear Highway	Reevaluated with the SES solar Two Class III Cultural Resources Technical Report.
San Diego and Arizona Easter Railway	Historic	Linear Rail Road	Reevaluated with the SES solar Two Class III Cultural Resources Technical Report.
P-13-009129	Prehistoric	Isolate – Brownware pottery sherd	
CA-IMP-8427	Prehistoric	Open Camp with lithic tools and flakes, ceramics, and three features and groundstone	No further available
P-13-009221	Prehistoric	Isolate – two secondary porphyry flakes	
P-13-00922	Historic	Isolate – glass insulator cap	

Table 2.7-2
Previously Recorded Cultural Resource Sites
(Continued)

Site Name	Cultural Affiliation	Description	Comments
CA-IMP-8658	Prehistoric	Temporary Camp lithic tools and flakes, ceramics groundstone and a feature.	No further information available
P-13-009727	Prehistoric	Isolate-single gray metavolcanic flake	
CA-IMP-8729	Prehistoric	Lithic and ceramic scatter	No further information available
CA-IMP-8730	Prehistoric	Lithic ceramic scatter	No further information available

A survey buffer of 150 feet on either side of the waterline center was established for the waterline cultural resource survey. The waterline survey area did not include the SWWRF plant site. However, as addressed above, the plant site had previously been surveyed (Nixon 2002a) with negative results.

The result of the survey was the recordation of one previously recorded cultural resource site, three newly recorded cultural resource sites, and five newly recorded prehistoric isolated artifacts along the waterline route. The tabular results of the survey are presented in Table 2.7-3. None of these sites are located in proximity to or within the boundaries of the SWWRF project area.

Table 2.7-3
Cultural Resource Survey Results

Site Name	Cultural Affiliation	Description
Previously Recorded Site		
IMP-4391/H	Historic	Refuse Deposit
Newly Recorded Sites		
KRM- SLY-1	Historic	Linear site, 17 highway markers, 12 historic refuse deposit locations
KRM-SLY-3	Prehistoric	Ceramic and lithic scatter
KRM-SLY-5	Prehistoric	Possible open camp
Newly Recorded Isolates		
SLY-ISO-2	Prehistoric	Metavolcanic hammerstone
SLY-ISO-4	Prehistoric	Tested metavolcanic cobble
SLY-ISO-6	Prehistoric	Metavolcanic secondary flake
SLY-ISO-7	Prehistoric	Sandstone mano fragment
SLY-ISO-8	Prehistoric	Metavolcanic secondary flake

The Class III pedestrian survey of The Seeley Water Line Extension Corridor results in the recording of three sites, one historic and two prehistoric; five isolated finds; and the reevaluation of one previously recorded site. One of the sites is recommended as requiring further investigation to determine if subsurface deposits exist and eligibility for nomination to the NRHP or the CRHR. The remaining sites are recommended as requiring no further work. Previously recorded site IMP-4391H was unevaluated. URS recommends the site as not eligible for nomination to the NRHP or CRHR. None of these sites is within the boundaries of the SWWRF project area.

2.7.2.2 Historic Build Environment Survey Results

In March and April, 2009, Mr. Jeremy Hollins, URS Architectural Historian, completed a supplemental reconnaissance-level historic architecture survey for six historic-period properties located immediately outside of the right-of-way for a proposed subsurface waterline that travels from the northeast corner of the Project Area to the SWWRF, primarily along Evan Hewes Highway in Imperial County, California.

Per the CEC Rules of Practice and Procedure and Power Plant Site Regulations Revisions, Appendix D (g)(2)(C), the proposed waterline is not considered an "above-ground linear facility," and, therefore, the historic architecture survey did not extend a half-mile past the proposed waterline. Rather, investigators performed a historic architecture survey for the parcels adjacent to the west and eastbound lanes of Evan Hewes Highway. Of note, the reconnaissance survey occurred from public vantage points, since site access and right-of-entry were not available at the time of survey for the privately-owned properties. In area where views of the property were obstructed (*e.g.*, tree overgrowth), arrangements were made to access the properties or investigators utilized available information to study the property. For the most part, the survey did not consider properties set far back from the edge/boundary of their parcel and large rural properties were not identified or evaluated beyond the area reasonably subject to effect by the Project.

The six historic-period properties included: Portion of the Dixie Drain 3, Portion of Fern Canal, Portion of Fig Canal, Portion of Forget-Me-Not Canal, Portion of Foxglove Canal (previously recorded as CA-IMP-8821H), and Portion of Salt Creek Drain 2. Historic-period properties which were previously surveyed as part of the Solar II project were not surveyed as part this supplemental reconnaissance-level architecture survey. These properties included: CA-IMP-7834H (Portion of the Westside Main Canal), P-37-025680 (Portion of San Diego and Arizona Railroad), CA-IMP-7886H (Portion of Highway 80), CA-IMP-7739H (Portion of U.S. Gypsum Rail-Line), and P-13-009303 (Plaster City Plant). The WWTP expansion project would not result in the demolition of any structures that could be considered historic, therefore impacts to historic resources would not occur.

2.7.3 Cumulative Impacts

No additional cumulative impacts to cultural resources have been identified as part of this analysis beyond those identified in Section 2.7.3 of the AFC.

2.7.4 Mitigation Measures

No additional mitigation measures recommended based on the SWWRF upgrades related to the Imperial Valley Solar Project.

2.7.5 LORS Compliance

The LORS presented in Section 5.7.11 of the Project AFC are applicable and no additional LORS are recommended. The LORS compliance evaluation presented in the AFC remains unchanged. Similarly, the agency contact information presented in Section 5.7.11 of the Project AFC is unchanged and the proposed Project modifications do not affect the required permits or Project schedule presented in Section 5.7.11 of the Project AFC. The Project will comply with all LORS.

2.7.6 References

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USGS. 1943. 1957. Painted Gorge 7.5-minute USGS Quadrangle Maps.

USGS.1940. Plaster City 15-Minute USGS Quadrangle Map.

USGS. 1943, 1944. Plaster City 1 to 62,500 Scale Map.

USGS. 1940. Brawley 15-minute USGS Quadrangle Map.

USGS. 1957. Brawley 7.5-minute USGS Quadrangle Map.

USGS. 1957, 1979. Seeley 7.5-minute USGS Quadrangle Map.

2.8 PALEONTOLOGICAL RESOURCES

This section presents a discussion of the potential impacts related to paleontological resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.8.1 Affected Environment

The affected environment includes paleontological resources related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

2.8.2 Environmental Consequences

Paleontological resources are the remains and/or traces of prehistoric plant and animal life (i.e., fossils, teeth, and bones) exclusive of human remains. Paleontological resources include not only the fossil remains, but also the localities in which they are collected and the geologic deposits (rock formations) in which the fossils were originally buried. Fossil remains are important as they provide indicators of the earth's chronology and history. They represent a limited, nonrenewable, and sensitive scientific and educational resource.

As previously mentioned in Section 2.3: Geologic Hazards and Resources, the project site is located in the Imperial Valley portion of the Salton Trough physiographic province. The Salton Trough is a topographic and geologic structural depression representing the northward extension of the Gulf of California, containing both marine and non-marine sediments since the Miocene Epoch. Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity (Landmark, 2009).

The Imperial Valley is directly underlain by lacustrine deposits, which consist of interbedded lenticular and tabular silt, sand, and clay. These lake-derived deposits are created at a sedimentation rate 10 times higher than that of a marine environment. Lacustrine deposits are often rich in organic shales which are important source rocks for petroleum (NASA, 2005). The Late Pleistocene to Holocene lake deposits are probably less than 100 feet thick and derived from periodic flooding of the Colorado River which intermittently formed a fresh water lake (Lake Cahuilla). Older deposits consist of Miocene to Pleistocene non-marine and marine sediments deposited during intrusions of the Gulf of California. Basement rock consisting of Mesozoic granite and Pleozoic metamorphic rocks are estimated to exist at depths between 15,000 -20,000 feet (Landmark, 2009).

Although the Imperial Valley does contain fossil bearing and deposit-rich soils that could potentially contain paleontologically significant resources, the proposed construction and operations of the SWWRF upgrades would not result in any potentially significant impacts to paleontological resources as the site vicinity does contain any known paleontological resources. Additionally, the project site has been previously disturbed as a result of prior construction of the original wastewater treatment facility. Moreover, proposed upgrades to the site would not expand facility treatment capacity, and therefore

would not significantly disturb additional land that could contain fossil-bearing soils or prehistoric traces of plant and animal life. The SWWRF upgrades would result in minor changes that do no create additional construction or operation related impacts to paleontological resources.

2.8.3 Cumulative Impacts

No additional cumulative impacts to paleontological resources have been identified as part of this analysis beyond those identified in Section 2.8.3 of the AFC.

2.8.4 Mitigation Measures

Mitigation measures for paleontological resources are described in Section 2.8.4 of the Project AFC. No additional mitigation measures are recommended based on this analysis for the upgrades to the SWWRF related to the Imperial Valley Solar Project.

2.8.3 LORS Compliance

The LORS presented in Section 5.8.6 of the Project AFC. No additional LORS are recommended for the upgrades to the SWWRF that are related to the Imperial Valley Solar Project. The Project will comply with all LORS.

2.8.4 References

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2.9 LAND USE

This section presents a discussion of the potential impacts related to land use during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.9.1 Affected Environment

The affected environment includes land use related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site in Imperial County.

2.9.1.1 Land Use Plans and Policies

2.9.1.1.1 Imperial County General Plan 2008

The Imperial County General Plan establishes the vision and planning framework for the future development of the County, and as such, has identified the general distribution, location and extent of land uses within the County's boundaries. The General Plan has established comprehensive goals and policies designed to achieve development and community objectives. The General Plan was originally adopted in 1993, followed by a comprehensive review and update in 2008. The plan includes ten elements that are discussed as individual chapters within the document including: Land Use, Housing, Circulation and Scenic Highways, Noise, Seismic and Public Safety, Agricultural, Conservation and Open Space, Geothermal/Alternative Energy and Transmission, Water, and Parks & Recreation.

Urban Areas indicated in the General Plan include the seven incorporated cities of Imperial County and five unincorporated communities. Urban Areas are characterized by a full level of urban services, in particular public water and sewer systems, and contain or propose a broad range of residential, commercial, and industrial uses. It is anticipated that the unincorporated communities will eventually be annexed or incorporated, and therefore should be provided with a full range of public infrastructure normally associated with cities. Any new development shall provide for the extension or development of full urban services such as public sewer and water, drainage improvements, streetlights, fire hydrants, and fully improved paved streets with curbs, and in many cases, sidewalks.

Allowed uses in Urban Areas would include residential uses at a density of 1 to a maximum of 29 dwelling units per acre; low to high intensity commercial land uses including professional offices, neighborhood and general commercial uses would be permitted; light to medium industrial uses would be allowed. Landfills are not allowed within this category.

Applicable goals and objectives from each of the General Plan Elements that would apply to the project area/location or the type of project are outlined below.

Land Use Element Goals and Objectives

Commercial Agriculture

Goal 1: Preserve commercial agriculture as a prime economic force.

Objective 1.1: Encourage the continued agricultural use of prime/productive agricultural lands.

Objective 1.2: Discourage the location of incompatible development adjacent to or within productive agricultural lands.

Regional Vision

Goal 3: Achieve balanced economic and residential growth while preserving the unique natural, scenic, and agricultural resources of Imperial County.

Objective 3.2: Preserve agriculture and natural resources while promoting diverse economic growth through sound land use planning.

Objective 3.5: Ensure safe and coordinated traffic patterns, contiguous growth, and promote a planned and consistent development around city/township areas.

Objective 3.8: Utilize non-agricultural land as a resource to diversify employment opportunities and facilitate regional economic growth. Uses must be consistent with each site's resource constraints, the natural environment, and the County Conservation and Open Space Element.

Objective 3.9: Identify and pursue funding sources for clean up of the New and Alamo Rivers and the Salton Sea.

Objective 3.13: Plan for more regional infrastructure systems to reduce the number of smaller treatment facilities to provide greater efficiency and opportunity to service areas that currently are unnerved or lack adequate services.

Towns and Communities

Goal 4: Preserve and enhance distinctive historic desert towns and newer communities.

Objective 4.1: Preserve and enhance existing urban and rural communities.

Objective 4.3: Maintain and require compatible land uses within the existing communities.

Objective 4.4: Limit the establishment of non-residential uses in predominantly residential neighborhoods and require effective buffers when appropriate non-residential uses are proposed.

Public Facilities Goals and Objectives

Goal 8: Coordinate local land use planning activities among all local jurisdictions and state and federal agencies (LU-41).

> Objective 8.4: Ensure that all future proposed private and public facilities are adequate to meet expected population growth and the needed additional services around local cities.
>
> Objective 8.7: Ensure that development, improvement, timing, and location of community sewer, water, and drainage facilities will meet the needs of existing communities and new developing areas.

Protection of Environmental Resources

Goal 9: Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality.

> Objective 9.1: Preserve as open space those lands containing watersheds, aquifer recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes.

Implementing Policies and Programs

The Land Use Element lists the following implementing policy and action program for the planning of public facilities within Imperial County:

E.3 Urban Areas

> Policy: A primary concern for new development in Urban Areas, particularly those which are adjacent to incorporated cities, is the adequacy of existing public services and facilities, and the level of infrastructure improvements proposed by new development (LU-67).
>
> Program: All proposed subdivision development and new multiple family, commercial, and industrial development within the Urban Area category, shall be required to provide full public street and drainage improvements, including the installation of curb and gutter, sidewalks, sewers and potable water. Such improvements shall comply with that City's design and improvement standards (LU-67).

Water Element Goals and Objectives

Adequate Domestic Water Supply

Goal 1: The County will secure the provision of safe and healthful sources and supplies of domestic water adequate to assure the implementation of the County General Plan and the long-term continued availability of this essential resource.

Objective 1.2: Cooperation between Cities and County for the need to maintain, upgrade, and expand domestic water and sewage treatment facilities of the communities within the County, the need for the implementation of appropriate development fees, and the raising of service fees to off-set limited public financial resources.

Protection of Surface Waters

Goal 2: Long-term viability of the Salton sea, Colorado River, and other surface waters in the County will be protected for sustaining wildlife and a broad range of ecological communities.

Conservation and Open Space Element Goals and Policies

Conservation of Environmental Resources for Future Generations

Goal 1: Environmental resources shall be conserved for future generations by minimizing environmental impacts in all land use decisions.

Objective 1.1: Recognize that the degradation of one natural resource will have concomitant negative effect upon the total resource base, including water, vegetation, air, wildlife, soil, and minerals.

Preservation of Biological Resources

Goal 2: The County will preserve the integrity, function, productivity, and long-term viability of environmentally sensitive habitats, and plant and animal species.

Objective 2.1: Conserve wetlands, fresh water marshes, and riparian vegetation.

Objective 2.4: Use the environmental impact report process to identify, conserve and enhance unique vegetation and wildlife resources.

Objective 2.6: Attempt to identify, reduce, and eliminate all forms of pollution which adversely impact vegetation and wildlife.

Preservation of Water Resources

Goal 8: The County will conserve, protect, and enhance the water resource in the planning area.

Objective 8.5: Protect and improve water quality and quantity for all water bodies in Imperial County.

Objective 8.11: Identify watersheds (recharge areas) and key areas for the protection of water quality and groundwater.

Objective 8.13: Encourage water conservation and efficient water use among municipal and industrial water users, as well as reclamation and reuse of wastewater.

2.9.1.1.2 Imperial County Land Use Ordinance

Division 5, *Zoning Areas Established*, of the Land Use Ordinance was adopted November 24, 1998 and last amended in 2008. The purpose of this ordinance is to protect the public health, safety and welfare; to provide for the orderly development, classify, regulate and where applicable segregate land uses; to regulate the height and size of buildings; to regulate the area of yards and other open spaces around buildings; to regulate the density of population; and to provide the economic and social advantages resulting from orderly planned land uses and resources. This is accomplished through the classification of every lot or parcel of land within the unincorporated area of the County of Imperial in one of the base zoning areas established in Section 90501.

G/S (Government/Special Public Zone)

The purpose of the G/S zone is to designate areas that allow for the construction, development and operation of government facilities and special public facilities; primarily this zone allows for all types of government owned and/or government operated facilities, be they office or other uses. It also allows for special public uses such as security facilities, jails, solid and/or hazardous waste facilities and other similar special public benefit uses. Wastewater treatment facilities are permitted in this zone with a Conditional Use Permit.

2.9.1.2 Regional Setting

Imperial County is a predominantly agricultural area located in the southeastern portion of the state. Presently, approximately one-fifth of the nearly 3 million acres of the County is irrigated for agricultural purposes. In addition, approximately 50 percent of the County lands are largely undeveloped and under federal ownership. The developed area where the County's incorporated cities, unincorporated communities, and supporting facilities comprise less than one percent of the land (EIR III-1). The unincorporated communities of Imperial County, including the community of Seeley, cover approximately 8,754 acres or about half of all developed lands within the County (LU-24).

The designated Urban Area of the community of Seeley covers approximately 1,520 acres. Seeley is located west of the City of El Centro and south of the Naval Air Facility. It is bounded on the west by the New River, on the north by El Centro Street, on the east by Bennett Road, and on the south by Interstate 8. The San Diego and Arizona Railway cuts diagonally through the township of Seeley.

2.9.1.3 Project Site

The proposed project is located in the northwest corner of the designated Urban Area of Seeley on an approximately 5-acre site. Agricultural land exists to both the west and north, separated from the proposed Project site by a buffer of open space. The New River and associated riparian vegetation, which is zoned as Open Space/Preservation, is immediately west of the proposed Project site. Undeveloped land borders both the southern and northeastern edges of the project site. Single-family residential homes are also adjacent to the proposed Project site on the eastern edge. See Figure 5.10-1 Existing Land Use Context. The proposed project site is designated as "Urban Area" and is zoned as a "Government/Special Public Zone" (See Figure 5.10-2, Existing Land Use Designations Context).

The wastewater treatment upgrade is proposed on the existing Water Reclamation Facility (WRF) site. The entire site is enclosed by a standard chain link fence, except for a public parking area on the eastern edge of the site. The center of the site is occupied by the SCWD administrative building and two separate gravel-paved parking areas, one gated and one un-gated. Five treatment ponds occupy the southeastern portion of the project site, including two 0.21-acre "reactor" ponds and three 0.14-acre sedimentation ponds. Once treated, the existing WRF discharges effluent into an 800-foot-long by 50-foot-wide earthen, unlined drainage channel. This drainage channel merges with the New River, which run immediately adjacent to the western side of the project site, approximately 900 feet from the existing pipe outfall. A partially graded, undeveloped area covers the southwestern portion of the site. This area contains miscellaneous equipment, patches of gravel and sparse scrub brush. The entire northern half of the project site is occupied by two large rectangular 2.4-acre facultative treatment ponds. The western pond is currently unused, and is dry with vegetation growing on the pond floor. The eastern pond was recently retrofitted to serve as the primary oxidation pond.

2.9.2 Environmental Consequences

The Proposed Project is located on the western edge of the Township of Seeley. The project would involve an upgrade to an already existing Wastewater Treatment Facility and would not change the existing land use. Therefore, no significant impacts related to division of an established community would occur.

The Imperial County General Plan designates the proposed Project site as "Urban Area" which allows for public facilities that provide services to the community. The Imperial County Land Use Ordinance zones the proposed Project site as "Government/Special Public," which allows for any type of government owned or government operated facility. The Project would result in an upgrade to the existing wastewater treatment facility, which includes constructing new facilities and retrofitting current facilities. The proposed Project is consistent with both the land use designation and zoning for the site, and will result in the same type of land use as currently exists on the site.

A summary of applicable goals and policies of the County's General Plan (2008) is provided in Table 2.9-1. The second column discusses the project's relationship to the goal or policy, and the third column states whether the project is consistent with that goal or policy.

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Land Use Element			
Goal 1	Preserve commercial agriculture as a prime economic force.	The project site is not currently being used for agriculture and implementation of the proposed project will not disrupt surrounding agricultural uses.	Consistent
Objective 1.1	Encourage the continued agricultural use of prime/productive agricultural lands.	The proposed project will not preclude any agricultural use. Furthermore, the project will increase local water supply, a current constraint on local agriculture.	Consistent

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element
(Continued)

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Objective 1.2	Discourage the location of incompatible development adjacent to or within productive agricultural lands.	The project site is not located on agricultural land. Agricultural lands are located to the north and west of the project site; however, they are separated from the site by the New River and by a buffer of undeveloped land.	Consistent
Goal 3	Achieve balanced economic and residential growth while preserving the unique natural, scenic, and agricultural resources of Imperial County.	The proposed project will reduce limits to economic and residential growth by providing an additional water supply. The project will not impact any natural, scenic or agricultural resources.	Consistent
Objective 3.2	Preserve agriculture and natural resources while promoting diverse economic growth through sound land use planning.	The proposed project is consistent with the current land use designation and zoning for the project site.	Consistent
Objective 3.5	Ensure safe and coordinated traffic patterns, contiguous growth, and promote a planned and consistent development around city/township areas.	The proposed project is consistent with the current land use designation and will result in the same land use type as currently exists on the site. The development is contiguous with currently developed areas.	Consistent
Objective 3.8	Utilize non-agricultural land as a resource to diversify employment opportunities and facilitate regional economic growth. Uses must be consistent with each site's resource constraints, the natural environment, and the County Conservation and Open Space Element.	The proposed project will increase water availability in the community, a current constraint to growth. The use is consistent with current resource constraints, the natural environment, and the County Conservation and Open Space Element.	Consistent
Objective 3.9	Identify and pursue funding sources for clean up of the New and Alamo Rivers and the Salton Sea.	The proposed project would result in a higher quality treated effluent which will beneficially impact the water quality of the New River and Salton Sea.	Consistent
Objective 3.13	Plan for more regional infrastructure systems to reduce the number of smaller treatment facilities to provide greater efficiency and opportunity to service areas that currently are unnerved or lack adequate services.	The proposed project upgrades the capability of the WTF to treat wastewater to a tertiary level. The WRF provides service to an unincorporated community of Imperial County.	Consistent
Goal 4	Preserve and enhance distinctive historic desert towns and newer communities.	The project will be consistent with the land use designation and all applicable design requirements for "Urban Areas."	Consistent

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element
(Continued)

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Objective 4.1	Preserve and enhance existing urban and rural communities.	The project will be consistent with the land use designation and all applicable design requirements for "Urban Areas."	Consistent
Objective 4.3	Maintain and require compatible land uses within the existing communities.	The proposed project is consistent with the current land use designation and zoning for the project site.	Consistent
Objective 4.4	Limit the establishment of non-residential uses in predominantly residential neighborhoods and require effective buffers when appropriate non-residential uses are proposed.	The proposed project is consistent with the current land use designation and zoning for the project site. Residential neighbourhoods are located to the east of the project and are separated by a street buffer.	Consistent
Goal 8	Coordinate local land use planning activities among all local jurisdictions and state and federal agencies.	The project is consistent with all applicable local, state, and federal plans and policies.	Consistent
Objective 8.4	Ensure that all future proposed private and public facilities are adequate to meet expected population growth and the needed additional services around local cities.	The project will increase water supply for the local community and currently meets local needs for wastewater treatment.	Consistent
Objective 8.7	Ensure that development, improvement, timing, and location of community sewer, water, and drainage facilities will meet the needs of existing communities and new developing areas.	The proposed project will continue providing wastewater treatment service to the local community. Associated sewer and water facilities will be improved and ultimately will be consistent with applicable local policies.	Consistent
Goal 9	Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality.	The proposed project will not impact adjacent natural resources. The project will result in the continued existence of the WRF on the project site.	Consistent
Objective 9.1	Preserve as open space those lands containing watersheds, aquifer recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes.	All construction will occur on undeveloped lands or land currently being used for wastewater treatment facilities. There will be no direct, construction-related impacts to adjacent riparian vegetation or watershed resources.	Consistent

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element
(Continued)

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Policy E.3	A primary concern for new development in Urban Areas, particularly those which are adjacent to incorporated cities, is the adequacy of existing public services and facilities, and the level of infrastructure improvements proposed by new development.	The project would entail improvements to the existing wastewater treatment process. The addition of the tertiary treatment process would actually enhance the existing infrastructure available to the local community (improved wastewater treatment and potential source of recycled water for irrigation purposes).	Consistent
Program E.3	All proposed subdivision development and new multiple family, commercial, and industrial development within the Urban Area category, shall be required to provide full public street and drainage improvements, including the installation of curb and gutter, sidewalks, sewers and potable water. Such improvements shall comply with that City's design and improvement standards.	The proposed project would not result in the construction of additional housing or commercial/industrial land uses, therefore installation of street infrastructure would not be necessary.	Consistent
Water Element			
Goal 1	The County will secure the provision of safe and healthful sources and supplies of domestic water adequate to assure the implementation of the County General Plan and the long-term continued availability of this essential resource.	The proposed project will provide an additional source of recycled water which has the potential to replace potable water that is currently being used for non-potable uses.	Consistent
Objective 1.2	Cooperation between Cities and County for the need to maintain, upgrade, and expand domestic water and sewage treatment facilities of the communities within the County, the need for the implementation of appropriate development fees, and the raising of service fees to off-set limited public financial resources.	The project proposes to improve the quality of the wastewater treatment infrastructure to provide an additional water supply to the local community.	Consistent

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element
(Continued)

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Goal 2	Long-term viability of the Salton sea, Colorado River, and other surface waters in the County will be protected for sustaining wildlife and a broad range of ecological communities.	It is anticipated that the project would not have a cumulatively considerable impact to biological resources. However, hydrology and biological resource studies are still being conducted to determine the extent of an impact, if any, the project would have on these resources.	Consistent
Conservation and Open Space Element			
Goal 1	Environmental resources shall be conserved for future generations by minimizing environmental impacts in all land use decisions.	The proposed project is undergoing environmental review with the intention of identifying environmental impacts and minimizing their effects.	Consistent
Objective 1.1	Recognize that the degradation of one natural resource will have concomitant negative effect upon the total resource base, including water, vegetation, air, wildlife, soil, and minerals.	Impacts to natural resources, including cumulative effects, are being analyzed in an environmental review process.	Consistent
Goal 2	The County will preserve the integrity, function, productivity, and long-term viability of environmentally sensitive habitats, and plant and animal species.	A study is currently being conducted both from a biological and hydrological perspective, to determine the extent (if any) of impacts on the wetland resources in the Wildcat Channel and/or New River.	Preliminary conclusion is that the project is consistent with this policy, but still yet to be determined.
Objective 2.1	Conserve wetlands, fresh water marshes, and riparian vegetation.	A study is currently being conducted both from a biological and hydrological perspective, to determine the extent (if any) of impacts on the wetland resources in the Wildcat Channel and/or New River.	Preliminary conclusion is that the project is consistent with this policy, but still yet to be determined.
Objective 2.4	Use the environmental impact report process to identify, conserve and enhance unique vegetation and wildlife resources.	The proposed project is undergoing an environmental review which includes the identification of means by which to conserve and enhance unique vegetation and wildlife resources.	Consistent
Objective 2.6	Attempt to identify, reduce, and eliminate all forms of pollution which adversely impact vegetation and wildlife.	need to insert this response once biology and hydrology studies are done.	Consistent
Goal 8	The County will conserve, protect, and enhance the water resources in the planning area.	The proposed project will eliminate a source of discharge to the New River that has frequently exceeded water quality standards.	Consistent

Table 2.9-1
Project Consistency with the Imperial County General Plan Land Use Element
(Continued)

Goal/objective	Summary of Policy	Proposed Project	Consistent/ Inconsistent
Objective 8.5	Protect and improve water quality and quantity for all water bodies in Imperial County.	The project would result in a higher level of treatment that would be discharged into the New River. This would improve water quality. The project would reduce water quantity of the New River and Salton Sea over the long term. Hydrological studies are in the process of being prepared to determine the extent of this impact and associated environmental affects.	Consistent
Objective 8.11	Identify watersheds (recharge areas) and key areas for the protection of water quality and groundwater.	The project would not conflict with the County's intention to identify key areas for watershed protection. The project would be constructed on the existing wastewater treatment plant property. Further, water quality in the New River would be enhanced by the higher quality of treatment.	Consistent
Objective 8.13	Encourage water conservation and efficient water use among municipal and industrial water users, as well as reclamation and reuse of wastewater.	The proposed project would entail the use of reclaimed wastewater to be used for non-potable uses.	Consistent

As demonstrated in Table 2.9-1, the proposed project would generally be consistent with applicable goals and objectives in the County's General Plan and would therefore not result in a significant conflict with County land use plans, policies, or regulations.

2.9.3 Cumulative Impacts

No additional cumulative impacts to land use have been identified as part of this analysis beyond those identified in Section 2.9.3 of the AFC.

2.9.4 Mitigation Measures

Mitigation measures for land use are described in Section 2.9.4 of the Project AFC. No additional mitigation measures are recommended based on this analysis for the upgrades to the SWWRF related to the Imperial Valley Solar Project.

2.9.5 LORS Compliance

The LORS presented in Section 5.9.6 of the Project AFC. Note, LORS related to Imperial County planning documents are also described above under 2.9.3, Affected Environment.

2.9.6 References

Dudek, 2009. Draft Mitigated Negative Declaration for the Seeley Wastewater Reclamation Facility Improvements. Prepared for Seeley County Water District, Imperial Valley, California. December 2009.

Imperial, County of. 2008 (amended). General Plan. Originally published in 1993.

Imperial, County of. 2008 (amended). Land Use Ordinance. Division 5, Zoning Areas Established. Originally adopted in November 24, 1998.

2.10 SOCIOECONOMICS

This section presents a discussion of the potential impacts related to socioeconomics during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.10.1 Affected Environment

The affected environment includes the socioeconomic environment related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site in Imperial County.

2.10.2 Environmental Consequences

The socioeconomic conditions within the Town of Seeley reflect economic, income, and growth-related trends that have taken place throughout the primarily agrarian rural character of Imperial County. As such, Imperial County data provides the strongest indicators for socioeconomic projections relating to the Town of Seeley, and thus, the project site. As an unincorporated area of Imperial County, Seeley is designated as part of the Metropolitan or Micropolitan Statistical Area of El Centro for statistical and demographic purposes.

In 2000, Imperial County comprised 4,174.73 square miles, accounting for 34.1 persons per square mile. The 2008 population estimates according to the U.S. Census Bureau American Community Survey tabulated Imperial County at 163,972 residents with a 15.2 percent change in population from April 1, 2000 to July 1,2008 – a notably faster rate of growth compared to California overall which maintained an 8.5 percent change between 2000 and 2008. The racial breakdown of the County's population is illustrated in Table 2.10-1 below.

Table 2.10-1
Racial Breakdown of Population, Imperial County and California, 2008

Racial Group	Imperial County	California
Caucasian persons	89.9%	76.6%
African American persons	4.2%	6.7%
American Indian and Alaska Naïve persons	2.1%	1.2%
Asian persons	2.5%	12.5%
Native Hawaiian and Other Pacific Islander	0.2%	0.4%
Persons reporting two or more races	1.1%	2.6%
Persons of Hispanic or Latino origin	76.8%	36.6%
Caucasian, not Hispanic	16.3%	42.3%

Source: American Community Survey

The median household income for Imperial County is approximately $36,894.accounting for 54,459 housing units as of 2008. Homeownership rates in 2000 were approximately 58.3 percent (compared to California overall at 56.9 percent) with the median value of owner-occupied housing units at $100,000 (U.S. Census Bureau, American Community Survey, 2000-2008).

Business data for Imperial County is included in Table 2.10-2 below:

Table 2.10-2
Business Profiles, Imperial County and California

Business Type	Imperial County	California
Private nonfarm establishments, 2007	2,544	891,997
Private nonfarm employment, 2007	34,272	13,771,650
Private nonfarm employment, % change 2000-2007	35.2%	6.9%
Non-employer establishments, 2007	8,037	2,757,179
Total # of firms, 2002	7,272	2,908,758

Source: U.S. Census Bureau, American Community Survey

The proposed project would generate approximately 20-25 construction worker positions during construction phases of the wastewater treatment facility improvements in the Town of Seeley. Following completion of construction, operational stages of the proposed project would employ an additional 1 to 2 workers. Therefore, proposed construction and operations of the SWWRF upgrades would result in an additional number of construction workers onsite with a minimal and temporary effect on local employment. There would be no potentially significant socioeconomic impacts.

2.10.3 Cumulative Impacts

No additional cumulative socioeconomic impacts have been identified as part of this analysis beyond those identified in Section 2.10.3 of the AFC.

2.10.4 Mitigation Measures

No additional mitigation measures are recommended based on this analysis for the upgrades to the SWWRF related to the Imperial Valley Solar Project.

2.10.5 LORS Compliance

No additional LORS are recommended for the upgrades to the SWWRF related to the Imperial Valley Solar Project. The Project will comply with all LORS.

2.10.6 References

U.S. Census Bureau. Imperial County. 2000-2008 *U.S. Census Bureau* and *American Community Survey*. Data derived from Population Estimates, Census of Population and Housing, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, and Survey of Business Owners. Last revised: February 23, 2010.

2.11 TRAFFIC AND TRANSPORTATION

A Traffic Impact Analysis, dated April 2010, was prepared by Linscott Law & Greenspan (LLG) to analyze the potential impacts of the SWWRF on traffic and circulation in the project area (see Appendix 2.11). This section presents a discussion of the potential impacts related to traffic and transportation during construction and operations of the SWWRF upgrades.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.11.1 Affected Environment

The affected environment includes traffic and transportation related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site in Imperial County.

The study area for the SWWRF includes the project vicinity and locations expected to be affected by project traffic. The study area includes 4 intersections and 3 roadways (including 4 segments) (see Figure 2.11-1), as follows:

Intersections.

- Evan Hewes Highway and New River Road
- Evan Hewes Highway and Drew Road
- I-8 Westbound Ramps and Drew Road
- I-8 Eastbound Ramps and Drew Road

Roadway Segments.

- New River Road: North of Evan Hewes Highway
- Drew Road: I-8 Westbound Ramps to Evan Hewes Highway
- Evan Hewes Highway: West of New River Road
- Evan Hewes Highway: New River Road to Drew Road

Existing traffic volumes were calculated using intersection turning movement counts conducted during the weekday morning peak hour period (7:00 AM to 9:00 AM) and during the weekday evening period (4:00 PM to 6:00 PM) in March 2010 by LLG Engineers. ADT volumes for roadway segments were obtained through machine data collection. See Figure 2.11-2.

The project study area is located in a rural setting and all intersections are unsignalized. All existing study area intersections currently operate at an acceptable LOS B or better in the AM and PM peak hour conditions and all study area roadway segments operate at an acceptable LOS C or better.

2.11.2 Environmental Consequences

The County of Imperial's goal for operation of intersections and roadway segments is LOS C or better. An intersection or roadway that operates at a LOS C or better and degrades to a LOS D or worse is considered a significant direct impact. A cumulative impact can occur if the intersection or segment level of service is already operating below County standards and the project increases the delay by more than 2 seconds or the volume-to-capacity ratio by more than 0.02. The desirable operation for freeway mainline segments is LOS D or better. Should the mainline level of service degrade to LOS E or F with the addition of project traffic, and increase the volume to capacity ratio (v/c) by more than 0.01, the impact is considered to be direct and significant. An impact is considered cumulatively significant if the mainline is already operating at LOS E or F and the volume-to-capacity ratio increase is greater than 0.01.

The peak hour intersection operations in the near-term scenario (construction year with project) are all calculated to operate at LOS B or better with the addition of project-related construction traffic. The increase in delay due to construction traffic varies between 0.1 and 0.4 seconds at these intersections, which is not considered significant. Roadway segment operations under the construction year with project condition are calculated to continue to operate at LOS C or better with the addition of construction traffic. The increase in the volume-to-capacity ratio due to the construction traffic is less than 0.01 on all segments, which is not considered significant. See Figures 2.11-3 through 2.11-8.

With the completion of the project, it is anticipated that there will be an increase in operating staff by 2 employees. The increase in operational traffic is anticipated to be minimal, with 24 additional daily trips and 4 additional trips during the AM and PM peak hours. These increases in operational traffic are less than the trips generated by construction traffic. It is therefore anticipated that the intersection and segment operations will continue to operate at acceptable levels of service after construction. Impacts would be less than significant.

2.11.3 Cumulative Impacts

Cumulative impacts are discussed in Section 5.11.3 of the Project AFC. There are no anticipated additional cumulative impacts to traffic and transportation directly attributable to the SWWRF upgrades, including both internal and external (regional and local) circulation. The relatively expansive distance (13 miles east of the IVS) between the Imperial Valley Solar Project site and SWWRF and disparate access routes contribute to the findings of less than significant cumulative impacts.

2.11.4 Mitigation Measures

Mitigation measures for impacts related to traffic and transportation presented in Section 5.11.4 of the Project AFC. No additional mitigation measures for traffic and transportation are recommended based on the SWWRF upgrades related to the Imperial Valley Solar Project.

2.11.5 LORS Compliance

The LORS presented in Section 5.11.5 of the Project AFC are applicable to the SWWRF upgrades related to the Imperial Valley Solar Project and no additional LORS are recommended. The Project will comply with all LORS.

2.11.6 References

Linscott, Law and Greenspan. 2010. Traffic Impact Analysis for the Seeley County Water District WWTP Upgrade. April 20.

2.12 NOISE

This section presents a discussion of the potential impacts related to noise during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.12.1 Affected Environment

The affected environment includes noise and receivers related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site in Imperial County.

The primary noise source in the SWWRF project area appears to be vehicular traffic along County Highway S80. Other noise sources in the project area include sporadic traffic along Main Street, Rio Vista Street and New River Road, occasional small airplane and helicopter flights, and the existing wastewater treatment plant facility. The nearest noise sensitive receptors are residences located across the east side of New River Road, approximately as close as 200 feet from the nearest noise-producing upgrade features. Additional homes in the general area are located approximately 1,200 feet southwest of the site.

The existing noise levels adjacent to the SWWRF project site were monitored during the morning hours of March 17, 2010. The measurements were made with a calibrated Larson-Davis Laboratories Model 700 (S.N. 2132) integrating sound level meter equipped with a ½-inch pre-polarized condenser microphone with pre-amplifier. This sound level meter meets the current American National Standards Institute standard for a Type 1 precision sound level meter. The sound level meter was positioned at a height of approximately 5 feet above the ground, at four separate noise measurement locations (see Figure 2.12-1). The noise levels measured represent the approximate ambient daytime noise level at the monitored locations. The data indicate that the noise levels at the four monitored sites range between 51 and 58 dBA.

2.12.2 Environmental Consequences

The environmental consequences for Noise during Project construction and operation remain unchanged from those discussed in AFC section 5.12.2 and 2.12.2 of the Supplemental Filing.

Construction Equipment. The primary potential noise impacts during construction result from activities involving jackhammers, backhoes, front end loaders, bulldozers, cranes, forklifts, dump trucks, concrete trucks, road surfacing equipment, and vibratory equipment. Noise generated by construction equipment will occur with varying intensities and durations during the various phases of construction. The closest noise sensitive receptors are residences located across the project site's eastern boundary on New River Road, approximately 200 feet or more from the primary upgrade construction area. At this distance, and using an estimate of engine noise based on rated power (Beranek & Ver, 1992) the resulting hourly average noise level would be estimated to reach as high as 75 dBA for the following assumed construction activity scenario:

- Treated as a single point source, up to eight (8) pieces of diesel engine powered construction equipment, each with an average rating of 200 HP and operating no more than 50% of the time during any given construction hour.

Should the actual construction activity involve more equipment, the aggregate noise level could be greater than the 75 dBA hourly L_{eq} estimate and might thus require some form of noise abatement, such as temporary construction noise barriers or other methods considered typical for construction sites.

The noise levels generated by construction would be greater than existing pre-upgrade ambient noise levels measured at four locations in March 2010 and summarized in Table 2.12-1. The existing noise levels measured range from 51 to 58 dBA. Therefore, construction of the SWWTF upgrades associated with the Proposed Project would result in a temporary increase in ambient noise levels in the project vicinity above levels existing without the project. At or below 75 dBA, the construction noise level would comply with the County's General Plan Noise Element standards, which require that a single piece of equipment or a combination of equipment not exceed 75 dBA L_{eq}, when averaged over an eight hour period, and measured at the nearest sensitive receptor. Furthermore, construction activities will be limited to the County's allowable time periods. Predicted construction noise impacts under these conditions and assumptions would thus be considered less than significant.

Table 2.12-1
Measured Noise Levels

Site	Monitor Location (adjacency)	Monitored Daytime Sound Level (dBA)	Audible Noise Sources
1	District's Eastern Property line	58	On-site equipment and traffic on S80
2	Residential Property line	51	On-site equipment, traffic on S80, dogs
3	District's Southeastern Property line	52	On-site equipment and traffic on S80
4	District's Southwestern Property line	54	Traffic on S80

Note: Temperature 55-60 degrees, clear sky, light variable wind.

Construction Traffic. The primary sources of traffic anticipated during construction consist of worker-owned vehicles, equipment deliveries, concrete trucks, debris-removal trucks, earthmoving trucks, and semi trailer trucks delivering equipment and material. The estimated traffic that would be generated during construction is 16 trips per day for trucks and 100 trips per day for worker vehicles (LLG 2010). Predicted construction traffic noise, based on these daily vehicle volumes occurring on New River Road, would generate noise levels of less than 51 dBA hourly L_{eq} at the nearest noise-sensitive receiver (i.e., measurement location #2) under the following conditions:

- Trucks are considered "heavy", with reference noise level at 20 meters, for 50 km/h speed, per Traffic Noise Model (TNM) Look-Up Table 5 (FHWA, 1998).

- Worker-owned cars are "automobiles", with reference noise level at 20 meters, for 50 km/h speed, per TNM Look-Up Table 1 (FHWA, 1998).

- Car and truck trips are dispersed evenly throughout the allowable 12-hour construction period (7 a.m. to 7 p.m.).

Since this estimated average hourly construction traffic noise level is approximately equal to the measured ambient level of 51 dBA at this location, and would thus create an increase in ambient no greater than 3 dBA, the resulting noise impact is considered less than significant.

Operational Noise. Sources of operational noise would include primarily powered fluid-handling mechanical equipment used in the daily functions of the SWWTP, corresponding with both existing systems and those associated with the proposed Tertiary Treatment Facility (i.e., the upgrades associated with the Proposed Project). Based on preliminary upgrade design information, the aggregate operational noise level from the tertiary treatment facility components (i.e., as depicted on Figure 1-7) at the nearest residential property line (e.g., sound measurement position #2) is expected to be 45 dBA or less. This prediction is based on several assumptions that include the following:

- Usage of a conservative, distance-only sound propagation model (i.e., no air or ground absorption, no meteorological effects, no terrain);
- Building HVAC, such as air-conditioning equipment for occupied rooms within the tertiary treatment complex, is not considered a dominant noise source (relative to other mechanical equipment onsite) and is thus excluded from the analysis;
- On average, individual pumps are no greater than 15kW in rated power, have speed ranging from 1,600-3,600 rpm, and thus a reference sound pressure level of 87 dBA L_{eq} at one meter (Bies & Hansen, 1996); and,
- Each of the system subgroups listed in Table 2.12-2 (and appearing in Figure 1-7) is contained within some form of sound attenuating enclosure, structure or building that yields a field-measurable noise reduction (NR) level of 20 dBA.

Table 2.12-2 Operational Noise

Proposed Treatment Plant Feature	Quantity of Pumps	Distance to Nearest Receiver (Measurement Location 2)	Contributing Predicted Sound Pressure Level (dBA, L_{eq})
Tertiary Treatment Complex	3	500 feet	28
Grit Removal Facility	2	220	33
Recycled Water Pump Station	2	250	32
Fine Screen and Interstage Pump Station	2	350	29
Aeration Equipment Building	4	350	32
Waste/sludge Pump Station	1	360	26
Biological Reactor Ponds - East	12	200	42
Biological Reactor Ponds - West	12	280	39
Aggregate of operating SWWTF upgrade noise contributors:			45

Since measured ambient noise level at the closest residential property line, including contributions from the existing SWWTF influent pump station and other existing facility components, is already measured to be 51 dBA, the addition of the operating upgrade-related equipment would not be expected to cause a substantial permanent increase in ambient noise levels and would thus not be considered a significant impact.

2.12.3 Cumulative Impacts

Both construction noise and operational noise would occur in localized areas. Cumulative projects are not anticipated to occur concurrently or in relative close proximity to each other or the Proposed Project. Therefore, cumulative noise impacts would be less than significant. No additional cumulative impacts to noise have been identified for the SWWRF upgrades related to the Imperial Valley Solar Project beyond those identified in Section 2.12.3 of the AFC.

2.12.4 Mitigation Measures

The mitigation measures for temporary impacts related to construction are presented in Section 5.12.4 of the Project AFC and Section 2.12.4 of the Supplemental Filing. No additional mitigation measures for noise are recommended based on the SWWRF upgrades related to the Imperial Valley Solar Project.

2.12.5 LORS Compliance

The LORS presented in Section 5.12.5 of the Project AFC and Section 2.12.5 of the Supplemental Filing are applicable to the SWWRF upgrades related to the Imperial Valley Solar Project and no additional LORS are recommended. Reflecting an understood change in staffing, the agency contact information for the CEC as presented in Section 5.12.5.4 of the Project AFC should be modified: Erin Bright is the current contact. The SWWRF upgrades related to the Imperial Valley Solar Project do not affect the

required permits or Project schedule presented in Section 5.12.5.5 of the Project AFC. The Project will comply with all LORS.

2.12.6 References

Beranek, L. and Ver, I., ed., *Noise and Vibration Control Engineering*, John Wiley & Sons, 1992.

Bies, D., and C. Hansen, ed., *Engineering Noise Control*, E & FN Spon, 1996.

U.S. Department of Transportation, Federal Highway Administration (FHWA), *FHWA Traffic Noise Model Look-Up Tables*, Final Report, DOT-VNTSC-FHWA-98-5, July 1998.

2.13 VISUAL RESOURCES

This section presents a discussion of the potential impacts related to visual resources during construction and operations of the SWWRF upgrades related to the Imperial Valley Solar Project.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.13.1 Affected Environment

The affected environment includes visual resources associated with the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site in Imperial County.

2.13.1.1 Regulatory Framework

2.13.1.1.1 State Regulations

California Scenic Highway Program

The California Scenic Highway Program was created to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of adjacent lands. The program defines the process for the designation of official scenic highways. A legislatively appointed body, the Departmental Transportation Advisory Committee (DTAC), recommends program criteria, reviews applications and advises the Caltrans Director to revoke scenic highways that are no longer in compliance with the program. According to the California Scenic Highway Mapping System there are no eligible or officially designated state scenic highways within the project vicinity (Caltrans 2010).

California Street and Highways Code

The California Street and Highways Code establishes standards for the development and designation of official scenic highways and assigns the responsibility for the development of scenic highways to local jurisdictions. The Streets and Highways Code establishes the State Scenic Highway system, which includes highways that are either officially designated as State Scenic Highways or are eligible for such designation. Section 263 of the Street and Highways Code lists the highways that are officially designated or are eligible for designation. No State Scenic Highways are within the project vicinity.

Local Programs and Policies

Imperial County General Plan 2008

The Imperial County General Plan identifies several objectives and policies associated with protecting the visual quality of the County.

Land Use Element Goals and Objectives

Regional Vision

Goal 3: Achieve balanced economic and residential growth while preserving the unique natural, scenic, and agricultural resources of Imperial County.

> Objective 3.4: Protect/improve the aesthetics of Imperial County and its communities.

Conservation and Open Space Element Goals and Objectives

Preservation of Visual Resources

Goal 7: The aesthetic character of the region shall be protected and enhanced to provide a pleasing environment for residential, commercial, recreational, and tourist activity.

> Objective 7.1: Encourage the preservation and enhancement of the natural beauty of the desert and mountain landscape.

Circulation and Scenic Highway Element Goals and Objectives

Scenic Highways

Goal 4: The County shall make every effort to develop a circulation system that highlights and preserves the environmental and scenic amenities of the area.

> Objective 4.3: Protect areas of outstanding scenic beauty along any scenic highways and protect the aesthetics of those areas.

> Objective 4.5: Develop standards for aesthetically valuable sites. Design review may be required so that structures, facilities, and activities are properly merged with the surrounding environment.

2.13.1.2 Existing Visual Environment

Imperial County contains a wealth of scenic visual resources. These visual resources include desert areas, sand hills, mountains, and the Salton Sea (Imperial County 2008 COS-28 & 29).

The desert areas include the Yuha Desert, the West Mesa, lower Borrego Valley, East Mesa, and Pilot Knob Mesa. The Yuha Desert is located in the southwest portion of the County and can be viewed from Interstate 8. The Yuha Desert contains unique geologic features including sand chimneys and painted gorge formations. These features add beauty to this natural landscape. The barren landscape contrasts starkly against the backdrop of mountains. Other scenic deserts include the West Mesa area, which is bordered on the east by the Algodones Sand Dunes, the lower Borrego Valley, the East Mesa and Pilot Knob Mesa.

The Algodones Sand Dunes cover approximately 160 square miles stretching about 40 miles in width. They extend lengthwise in a northwest by southeast direction, and are situated between East Mesa and Pilot Knob Mesa. Consisting of shifting sands, the dunes attain a thickness of at least 200 feet in their

central parts. The dunes played a major role in early exploration, travel, and development in Imperial County. They are currently bisected east/west by Highway 78 between Brawley and Glamis, and by Interstate 8 between El Centro and Yuma. These dunes represent a unique visual resource of Imperial County.

Mountains make up another significant visual resource of Imperial County. On the west side of the County are the eastern foothills of the Peninsular Range. These foothills include the In-Ko-Pah or Jacumba Mountains, the Coyote Mountains, the Fish Creek Mountains, and in the northwesternmost corner, the Santa Rosa Mountains.

The Chocolate Mountains, so named because of their dark color, are located in the northeastern portion of the County, stretching northwest by southeast between Riverside County and the Colorado River. They are bisected by Highway 78 between Glamis and the Palo Verde area. These mountains reach an elevation of 2700 feet, and are highly visible from throughout the County. They are extremely rugged, virtually undeveloped, and used as a Naval Gunnery Range.

Prominent landmarks visible from much of Imperial County are the Superstition Mountains and Superstition Hills located in the west Mesa area, southeast of lower Borrego Valley and west of Westmorland and Brawley. These are clearly visible looking north from Interstate 8, west of El Centro, and from Highway 86 between El Centro and the Salton Sea. Perhaps the most significant landmark in the County is Mount Signal, located along the International Border on the eastern edge of the Yuha Desert, west of Calexico. This feature is visible from the entire Imperial Valley.

The Picacho State Recreation Area contains some prominent visual resources as well. Unique scenic values are created by volcanic formations and El Picacho itself, rising several hundred feet from the valley floor.

Irrigated agricultural areas comprise approximately 20 percent of the County's area. The majority of the agricultural activity is concentrated in the Imperial Valley area. These areas are characterized by square or rectangular fields, typically 40 to 80 acres in area, and are sometimes interspersed with scattered farmhouses and related agricultural structures. These agricultural regions are crossed by irrigation canals and drainages that are paralleled by dirt farm roads. Several cattle feedyards, other livestock ranches, and aquaculture farms are located throughout the Imperial Valley, as are a few agricultural processing/packaging plants including Holly Sugar, Calcot, cotton gins, fertilizer/chemical plants and other agricultural-related operations. Agricultural areas dominate the visual scenes along I-8, and sections of Routes 78, 86, 111, and 115.

Project Vicinity

The project site is located on the western edge of the Township of Seeley, an unincorporated community within Imperial County. The town is primarily residential; however, it includes a mix of commercial, industrial, public and open space areas as well. Within the town, as well as in the surrounding area, much of the land is undeveloped and vacant. The majority of the land surrounding Seeley is used for agriculture.

The project site is bordered by the New River to west and mostly undeveloped land to the north, east and south. A few residences border the property to the east, divided from the project site by New River Boulevard. Large tracts of agricultural land, currently growing alfalfa, lie to the north and west of the project. The County Highway S80, the San Diego and Arizona Eastern Railroad, and Interstate 8 all lie to the south of the project site. These transit corridors are approximately 0.15 miles, 0.30 miles and 1.3 miles from the project site, respectively. The railroad is a subsidiary of the Union Pacific Railroad; it supports freight service and is not used for any passenger services. Sunbeam Lake RV Resort, which includes a lake and aesthetic fields, is located approximately ¾ miles to the southeast of the project site and the Naval Air Facility is located approximately one and a half miles to the northeast.

Project Site

The project site is approximately five acres and is almost entirely enclosed by a standard chain link fence, except for a public parking area on the eastern edge of the site. The center of the site is occupied by the District's administrative building and two separate gravel-paved parking areas, one gated and one un-gated. Five treatment ponds occupy the southeastern portion of the project site, including two 0.21-acre "reactor" ponds and three 0.14-acre sedimentation ponds. Once treated, the existing WRF discharges effluent into an 800-foot-long by 50-foot-wide earthen, unlined drainage channel (often called the "Wildcat Drainage"). This drainage channel merges with the New River, which run immediately adjacent to the western side of the project site, approximately 900 feet from the existing pipe outfall. A partially graded, undeveloped area covers the southwestern portion of the site. This area contains miscellaneous equipment, patches of gravel and sparse scrub brush. The entire northern half of the project site is occupied by two large rectangular ponds. The western pond is currently dry, with vegetation growing on the pond floor. Figure 2.13-1, Existing Site Photos, provides a visual description of the treatment plant from both within the project site and from surrounding areas.

2.13.2 Environmental Consequences

The project site is not within the viewshed of a scenic vista in the Imperial Valley. Additionally, the project would not block any scenic vistas. Views immediately surrounding the project site include vacant land, residential homes, agricultural fields and the New River. The proposed project would be consistent with allowed land uses for sites zoned as Government/Special Public Use. Therefore, proposed project would not result in any substantial adverse effects on a scenic vista.

The Proposed Project site is currently occupied by the Seeley Water Reclamation Facility (WRF) and the facility's associated treatment ponds, administrative offices and equipment. The majority of the site is disturbed vacant land. There are no scenic resources such as trees, rock outcroppings, or historic buildings on the project site.

State scenic highways are designated by the California Department of Transportation (CalTrans) and are highways that maintain sensitive landscapes or valuable resources within the highway viewshed. According to the CalTrans State Scenic Highway Program Map, there are no state scenic highways within the project site vicinity. The closest state scenic highway to the project site is I-8, which is less than a mile and a half from the project site. However, the eligibility for scenic highway designation for I-8 ends where I-8 intersects with SR-98, almost 20 miles to the west of Seeley. All other eligible scenic highways

within the County are well outside of the viewshed of the Proposed Project. Therefore, the proposed project would not substantially damage scenic resources within a state scenic highway.

The project site is currently being used as a wastewater treatment facility. Existing facilities on site include treatment ponds, administrative buildings, treatment equipment and pumps, gravel parking lots and partially graded vacant areas. The entire site is surrounded by a chain link fence that interrupts views both into the property and across the property. The facilities currently occupying the site are not screened by any vegetation or structural components and are scattered discordantly across portions of the site.

The proposed project is consistent with existing land uses; however, it would result in the construction of additional facilities. These new facilities include new pump stations, a Tertiary Treatment Complex, an Aeration Equipment building, utilities, expanded electrical systems, paved access roads, and recycled water storage reservoirs. These facilities will be new and will be planned strategically on the site so that they provide a more orderly arrangement on the project site. The chain link fence will continue to create a visual obstruction that distorts views of the project site.

The site is primarily surrounded by vacant land. Few sensitive receptors are in close proximity to project site; a few residences border the eastern edge of the project; however, no recreational areas, schools, or attractions are within viewing distance of the project. Because the project site will be consistent with the existing visual character and would not result in a meaningful change over the existing appearance of a wastewater treatment plant, impacts to the visual quality of the site and its surroundings will be less than significant.

2.13.3 Cumulative Impacts

No additional cumulative impacts to visual resources have been identified as part of this analysis beyond those identified in Section 2.13.3 of the AFC.

2.13.4 Mitigation Measures

Mitigation measures for visual resources are described in Section 2.13.4 of the Project AFC. No additional mitigation measures are recommended based on this analysis for the upgrades to the SWWRF related to the Imperial Valley Solar Project.

2.13.5 LORS Compliance

The LORS presented in Section 5.13.6 of the Project AFC. Further, State and local LORS are summarized in Section 2.13.1 above. No additional LORS are recommended for the upgrades to the SWWRF related to the Imperial Valley Solar Project. The Project will comply with all LORS.

2.13.6 References

Dudek, 2009. *Draft Mitigated Negative Declaration for the Seeley Wastewater Reclamation Facility Improvements.* Prepared for Seeley County Water District, Imperial Valley, California. December 2009.

Imperial, County of. 2008. Conservation & Open Space Element of the Imperial County General Plan.

2.14 WASTE MANAGEMENT

This section presents a discussion of the potential impacts from waste management during construction and operation of the SWWRF upgrades.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.14.1 Affected Environment

The affected environment includes upgrades to the SWWRF, at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

2.14.1.1 Existing On-Site Conditions

A Phase I Environmental Site Assessment (ESA) has been prepared for the SWWRF property (Appendix 2.15-1) in accordance with ASTM Practice E 1527-05. The objective of the Phase I ESA was to identify "Recognized Environmental Conditions" (RECs) that may exist on the SWWRF property. The findings of this ESA are based upon a review of historical aerial photographs, historical topographic maps, Sanborn fire insurance maps, a radius search and records review, a site reconnaissance, a review of previous reports, and interviews. RECs were not identified on the SWWRF property.

The SWWRF project site consists of the southern portion of the SCWD property. The site includes unimproved land on the western portion; 5 aeration ponds on the eastern portion; a standby generator, a muffin monster, a septic tank drop off, and flow meters on the northeastern portion; and miscellaneous used equipment storage on the southern and central portions. In addition, five pole mounted transformers were observed on the northern portion of the site. The non-PCB containing transformers are owned by Imperial Irrigation District (IID).

Local agencies with files on the project site include the Imperial County Building and Planning Department and the Colorado River Basin Regional Water Quality Control Board (RWQCB). The County has building permits on file for the site. The RWQCB has 22 files on the project site. These files pertain to the NPDES permit held by the SCWD, and include an Administrative Civil Liability Order issued in 2008 due to NPDES permit violations.

An environmental database review was conducted by Environmental Data Resources (EDR) in March 2010 to identify sites within a one-mile radius of the SWWRF property for potential environmental concerns. The SCWD site was identified on three databases: National Pollutant Discharge Elimination System (NPDES), California Waste Discharge System (CA WDS), and Facility Index System (FINDS). The facility was identified on the NPDES, CA WDS, and FINDS listings based on land use and not documented unauthorized releases. The NPDES database reported the maintenance of a permit to discharge the treated wastewater effluent to the New River. The CA WDS database reported domestic sewage treatment and discharge of the treated wastewater to the New River. The Permit Compliance System tracks NPDES permit holding facilities, the permit compliance, and enforcement status and reports the information to FINDS.

According to the Phase I ESA, non-hazardous solid waste generated on-site is transported off-site by Allied Waste to a permitted Class III landfill.

Broken and used equipment was observed to be stored on the southern and central portions of the project site. Debris pumps, pipe, fence, and light ballasts were observed in the equipment storage areas

2.14.1.2 Existing Off-Site Conditions

Existing Adjacent and Surrounding Areas. The remaining portions of the SWWRF adjacent to the project site contain the Administrative offices with equipment storage, the UV filtration system, one treatment pond in service, one out of service treatment pond, outfall for the wastewater treated effluent, and miscellaneous debris. During the site visit, tires, telephone poles, mattresses, bottles, plates, etc. were observed among the debris.

The project site is bordered by the New River Boulevard to the east, the New River to the west, unimproved land to the south, and the SCWD onsite building and the two facultative ponds to the north. The treated effluent outfall is located north of the facultative ponds. Miscellaneous debris was observed north of the facultative ponds.

Evidence of dumping exists on the SWWRF north of the project site in the form of scattered debris. It has also been indicated that the area was used as a community dump in the 1940's and 1950's. However, there is no record of evidence of the dump having been observed during the excavation of the facultative ponds located between the former dump and the project site. These ponds were excavated in the 1960s and the western pond was excavated further in the 1990s. The total depth of the ponds is 10 to12 feet below ground surface. Additionally, there is no record of evidence of the dump having been observed during the recent excavation of the aeration ponds (between 2002 and 2005). Finally, a 2009 geotechnical study included four soil borings on the project site to depths of up to 50 feet and no trash debris or voids were logged in the lithology log. Based on this information, it appears that the former dump was limited to the area north of the project site.

EDR identified two facilities in the site vicinity with the potential to impact the property. The former Seeley Camp was located approximately 1.2 miles north of the project site. Additionally, the existing El Centro Naval Air Facility is located approximately 2 miles northwest of the project site. The groundwater in the area generally flows to the northwest away from the project site. Based in this information and the regulatory status of these facilities, there is low potential for the spread of hazardous materials from these sites to the SWWRF project site.

2.14.2 Environmental Consequences

Small amounts of non-hazardous and hazardous wastes could be generated during construction of the SWWRF upgrades. Waste generated during construction will be segregated, where practical, for recycling. Non-hazardous waste that cannot be recycled will be placed in covered dumpsters and removed on a regular basis by a certified waste handling contractor for disposal at a Class III landfill. Hazardous waste generated during construction will be taken offsite for recycling or disposal by a permitted hazardous waste transporter to a permitted treatment, storage, and disposal facility or Class I landfill.

. Operation of the SWWRF will generate dried sludge. The dried sludge biosolids may be disposed of at landfills or applied to land including agricultural land, forest lands, reclamation sites, and public contact sites. For application of biosolids as a soil amendment (offsite), the USEPA has established ceiling concentrations for metals and pathogen and vector attraction reduction standards (Table 5.8-1 Pollutant Limits for Land Applied Biosolids); management criteria for the protection of water quality and public health; and annual and cumulative discharge limitations of persistent pollutants to land for the protection of livestock, crop, and human health and water quality protection (40 CFR Part 503).

Due to restrictions on land application of Class II Biosolids (such as would be produced as a result of the proposed tertiary treatment process), dried sludge wastes would be hauled out of state (likely to Arizona) and deposited on lands used for non-food producing agriculture (Cornejo, pers. comm..).

2.14.3 Biosolids Transportation

The SWWRF project involves biosolids transportation offsite. Since biosolids are non-hazardous and non-toxic, the transportation is not designated a hazard class and is not regulated by the DOT. However, in order to transport the biosolids offsite, the operational controls including quantity of material, solids concentration of materials, distance to final destination, number and capacity of vehicles, vehicle maintenance and appearance, and accident and spill control programs need to be considered prior to offsite transportation (USEPA, 2000). Cumulative Impacts

Class I and Class III landfills and recycling facilities in the Project site area have adequate recycling and disposal capacities for the SWWRF Project. Out of state landfills, or land uses such as non-food agricultural operators, currently accept Class II Biosolids. Therefore, cumulative impacts from the SWWRF upgrades and other projects in the region are not expected to be significant.

2.14.4 Mitigation Measures

Mitigation measures as described in the Project AFC would be implemented by the District. These mitigation measures provide waste management procedures for handling non-hazardous and hazardous wastes. No additional mitigation measures are recommended based on the SWWRF upgrades related to the Imperial Valley Solar Project.

2.14.5 LORS Compliance

Section 5.14.5 of the Project AFC summarizes the applicable LORS that govern the handling of non-hazardous and hazardous wastes, as well as the applicable permits that will be required for the Project. The LORS presented in Section 5.14.5 of the Project AFC are applicable to the SWWRF upgrades related to the Imperial Valley Solar Project and no additional LORS are recommended. The Project will comply with all LORS.

2.14.6 References

Cornejo, Frank. 2010. Personal Communication with Tom Falk, Dudek (email). March 17, 2010.

Dudek, 2009. *Draft Mitigated Negative Declaration for the Seeley Wastewater Reclamation Facility Improvements*. Prepared for Seeley County Water District, Imperial Valley, California. December 2009.

2.15 HAZARDOUS MATERIALS HANDLING

This section presents a discussion of the potential impacts hazardous materials handling during construction and operation of the SWWRF upgrades. The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.15.1 Affected Environment

The affected environment includes upgrades to the SWWRF, at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

The SWWRF project site consists of the southern portion of the SCWD property. The site includes unimproved land on the western portion; 5 aeration ponds on the eastern portion; a standby generator, a muffin monster, a septic tank drop off, and flow meters on the northeastern portion; and miscellaneous used equipment storage on the southern and central portions. In addition, five pole mounted transformers were observed on the northern portion of the site. The non-PCB containing transformers are owned by Imperial Irrigation District (IID).

2.15.1.1 Existing On-Site Conditions

Chemical Storage or Use. Chemical storage on the property is limited to 393 gallons of diesel fuel within the built-in tank of the standby generator. The diesel standby generator is located on the northeastern portion of the project site. The generator was installed in late 2009 as part of a USDA grant. No staining was observed on the concrete pad surrounding the standby generator. Chemical storage and use on the remainder of the SWWRF site is currently limited to small quantities of household cleaning supplies, motor oil, paint, and spray paint. These chemicals are stored on concrete slabs in the building located north of the project site.

One gasoline 55-gallon drum and one diesel 55-gallon drum were formerly located on the northwestern portion of the project site (50 to 100 feet west of the SWWRF building). However, approximately five years ago the 55-gallon drums were removed from the site. The undocumented fill, which was placed in the western portions of the project site, currently covers the former location of the 55-gallon drums.

Chemical storage and use on the remainder of the SWWRF site consists of 1- gallon containers of paint, motor oil, spray paint, caulk, and household cleaning supplies in the onsite building. Gasoline is no longer stored on the project site due to theft and is instead currently stored at the Water Treatment Plant located northeast of the SWWRF.

2.15.2 Environmental Consequences

2.15.2.1 Project Operational Hazards

Hazardous Materials Storage

The project includes on-site storage of the chemicals shown in Table 2.15-4, Hazardous Materials:

Table 2.15-4
Hazardous Materials

Hazardous Material Type	Existing Quantity Stored	Proposed Change in Quantity Stored	Proposed Storage Container(s)	Frequency of Delivery (existing)	Frequency of Delivery (proposed)
Sodium Hypochlorite	N/A	1,000	Dual Containment Tank	N/A	6 times per year (1,000 gallons)
Citric Acid	N/A	N/A	Neat Tote	N/A	2 times per year (26 gallons)

Source: Dudek 2010

Note: The above quantities include a worse-case analysis for hazardous materials that would be required for the treatment processes being considered as part of the proposed project.

It is assumed that sodium hypochlorite will be stored in a 1,000 gallon aboveground storage tank. Intermittent chemicals such as citric acid will be used for membrane cleaning. The intermittent chemicals will be used for "clean in place" recovery and will consist of 26 gallons of citric acid. The citric acid will be used upon delivery; no on-site storage is anticipated.

The sodium hypochlorite tank system shall be designed in accordance with the California Fire Code, Uniform Fire Code, International Fire Code, and other applicable Federal, State, and local regulations. Accordingly, the tank system shall be designed with secondary containment. Chemical storage shall be conducted in accordance with these regulations and in accordance with a Hazardous Materials Business Plan approved by the Imperial County Certified Unified Program Agency (CUPA) Department of Toxic Substances Control (DTSC) Office.

The hazardous substance status, according to federal and state regulations, of the chemicals to be stored is described in Table 2.15-5, Hazardous Substance Status:

Table 2.15-5
Hazardous Substance Status

Hazardous Material Type	Hazardous material [1]	Extremely hazardous substance [2] (threshold planning quantity)	Federal or state regulated substance [3] (threshold quantity)
Sodium Hypochlorite	Yes	No	No
Citric Acid	No	No	No

Notes:
1 Title 8 Section 339 of the California Code of Regulations
2 Code of Federal Regulations, Title 40, Chapter 1, Part 355, Appendix A
3 Code of Federal Regulations Title 40, Chapter 1, Section 68.130 or the California Code of Regulations Title 19, Section 2770.5

The DTSC inspects businesses or facilities that handle or store hazardous materials, generate hazardous waste, and own or operate underground storage tanks. The DTSC also oversees the California Accidental Release Program (CalARP) and hazardous materials disclosure (Emergency Planning Community Right to Know Act), including hazardous materials business plans Imperial County.

Hazardous Materials Business Plan/Inventory

On-site chemical storage will include storage of more than 55 gallons of sodium hypochlorite. Mitigation is provided to ensure proper employee safety training and emergency response procedures for a release or threatened release of sodium hypochlorite.

A memorandum prepared by Dudek to evaluate public safety issues associated with the planned chemical storage associated with the SWWRF project (Appendix 2.15-2).

Hazardous Materials Transportation

The proposed project involves transportation of the chemicals listed above to the site. The delivery of the sodium hypochlorite will be concurrent with the delivery of chemicals to the SCWD Water Treatment Facility located 0.2 miles northeast of the WWTP. The delivery route to the site from the Water Treatment Facility is anticipated to be from Alamo Street to Laguna Avenue to Rio Vista Street. The one-way travel distance from Alamo Street is 0.2 miles. The delivery of citric acid was not considered in the following calculations of risk of incident during transportation as citric acid is not regulated by the Department of Transportation (CFR 49 Section 172.3 Subpart B).

The delivery route for sodium hypochlorite passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods. An alternate delivery route is from Alamo Street to Laguna Street to Main Street to New River Boulevard. The one-way travel distance from Alamo Street is 0.33 miles. This delivery route also passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods.

According to the report, “Comparative Risks of Hazardous and Non-Hazardous Materials Truck Shipment Accidents/Incidents,” (Battelle 2001), the hazardous materials transport accident/incident risk per mile is estimated at 0.507 in a million for all types of hazardous materials, including leak enroute incidents. The route from Alamo Street to the site is approximately 0.2 miles each way, thus the probability of a hazardous material incident occurring on this route is 0.101 in a million per delivery, for all types of hazardous materials.

The hazardous materials transport accident/incident risk per mile specific to the specific hazard class for sodium hypochlorite is shown in Table 2.16-6, Risk of Incident. The risk of incident for sodium hypochlorite deliveries is 0.082 in a million. This risk for incidents during sodium hypochlorite deliveries is less than significant risk of one in a million.

Transportation of hazardous materials will comply with all DOT, California Department of Transportation (Caltrans), US EPA, DTSC, California Highway Patrol, and California State Fire Marshal regulations.

Table 2.16-6
Risk of Incident

Hazardous Material Type	Hazard Class	Risk per Mile, Specific to the Hazard Class	Risk, Specific to the Hazard Class
Sodium Hypochlorite	8	0.409 in a million	0.082 in a million
Citric Acid	Not Regulated by DOT	N/A	N/A

Impacts related to the on-site storage and use of hazardous materials are anticipated to be less than significant with mitigation measures incorporated. Impacts related to the transport and disposal of hazardous materials associated with the proposed project are anticipated to be less than significant.

2.15.3 Cumulative Impacts

No additional cumulative impacts to hazardous materials handling have been identified as part of this analysis beyond those identified in Section 2.15.3 of the AFC.

2.15.4 Mitigation Measures

Mitigation consists of preparing a Hazardous Materials Business Plan and Hazardous Materials Inventory pursuant to Chapter 6.95, Division 20 of the California Health and Safety Code. The HMBP will be submitted to the CUPA and will identify hazardous substances, details that facilitate coordination and emergency planning with on and off site response officials and facilities in the event of an emergency. The plan shall also include handling and waste disposal procedures. .

2.15.5 LORS Compliance

Section 5.15.5 of the Project AFC summarizes the applicable LORS that govern the use and storage of hazardous materials, as well as the applicable permits that will be required for the Project. No additional LORS are recommended. The Project, including the changes discussed herein, will comply with all LORS.

2.15.6 References

2.16 PUBLIC HEALTH

This section presents a discussion of the potential impacts related to public health during construction and operation of the SWWRF upgrades.

The discussion below includes the affected environment, environmental consequences, cumulative impacts, mitigation measures, and applicable LORS.

2.16.1 Affected Environment

The affected environment for public health was originally discussed in Section 5.16.1 of the Imperial Valley Solar AFC. The affected environment resulting from the upgrades at the SWWRF is unchanged from that presented in the AFC, and it includes public health related to the SWWRF, located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the Imperial Valley Solar Project site.

2.16.2 Environmental Consequences

This section describes the potential public health impacts from the upgrade to the SWWRF. A discussion of the potential emission sources during construction and operation of the upgrade to the SWRF is presented in this section. The SWWRF upgrade and associated activities will result in minor changes that will not cause significant construction or operations related impacts to public health.

2.16.2.1 Project Construction Emissions

The only source of toxic air contaminants (TAC) emissions from the construction of the upgrades to the SWWRF would be the diesel particulate matter (DPM) in the exhaust from the diesel construction equipment. Due to the relatively short duration of the SWWRF upgrade construction phase (less than one year), and the expected small construction equipment roster, significant public health effects are not expected.

2.16.2.2 Project Operations Emissions

Operation of the proposed project would result in emissions of toxic air contaminants from a 275-kilowatt (kW) diesel emergency generator. An analysis of emissions resulting from the emergency generator is included below.

The proposed project would utilize a 275-kW (422 horsepower) diesel engine-generator set. To estimate the ambient concentrations of diesel particulate matter (DPM) resulting from operation of the emergency generator at the nearest sensitive receptors, a dispersion modeling analysis was performed using the Lakes Environmental Software Screen View air quality dispersion model, Version 3.0.0 (Lakes Environmental Software 2009), which uses the U.S. EPA's SCREEN3 model.

It is conservatively assumed that the emergency generator would be operated approximately 50 hours per year, and a maximum of two hours on any given day for required testing. Based on the applicable CARB emission standard for new off-road engines, an emission rate of 0.15 gram per brake-horsepower hour

(g/bhp-hr) was conservatively assumed.[2] Utilizing these assumptions, an emission rate of 1.0×10^{-4} gram per second (g/s) (annualized average) was calculated.

Based on both the manufacturer's specifications (Kohler 2009) and sound enclosure drawings provided by the manufacturer (Kohler 2006), Screen View was run using the following stack parameters:

- Exhaust flow rate: 1890 actual cubic feet per minute
- Exhaust temperature: 860ºF
- Stack height: 11 feet
- Stack diameter: 5.5 inches
- Emission Rate: 1.0×10^{-4} gram per second

The sound enclosure was modeled as a building for purposes of estimating building downwash conditions in Screen View.

A receptor was placed at the nearest residential property (corner of Main Street and New River Boulevard). The private residence is located approximately 225 feet (69 meters) east of the proposed generator. For the purposes of modeling, both the generator and the receptor were assumed to be at the same elevation. Additionally, the model utilizes a "flagpole receptor height" of 1.5 meters (Hernandez 2010b).

The results of the Screen View modeling are provided in Appendix 2.16. Per EPA guidance (EPA 1992), the 1-hour concentrations were multiplied by 0.1 to simulate the annual averages. One-hour and annual averages are shown below in Table 2.16-1. Importantly, the maximum 1-hour concentration was modeled at various distances between 69 meters and 300 meters, and the highest concentration occurred at 69 meters.

Table 2.16-1
Summary of Average DPM Concentrations

Receptor	DPM 1-hr Concentration µg/m³	DPM Annual Concentration µg/m³
Private residence	9.0×10^{-2}	9.0×10^{-3}

Source: Screen View Model results. See Appendix 2.16 for complete results.
Note:
Values are expressed in scientific notation ($X.X \times 10^{-X}$) (e.g., 9.0×10^{-3} is 0.009).

[2] Depending on when the emergency generator is purchased and potential revisions to the ATCM for stationary diesel engines, the engine may subject to the Tier 3 or Tier 4 Interim standards. The allowable PM emission rate for a Tier 3 engine for the applicable engine rating range is 0.15 g/bhp-hr. This value was used in the analysis because it would result in a more conservative (i.e., health protective) analysis than assuming the use of a Tier 4 Interim engine, which has a PM limit ten times lower.

The cancer risk calculations were performed by multiplying the predicted annual DPM concentrations from Screen View 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).

The potential exposure pathway for DPM includes inhalation only. To be conservative (i.e., health protective), the cancer risk calculations for all exposures assume that a receptor is exposed continuously for 70 years. Cancer risks were evaluated using the inhalation Cancer Potency Factors published by the OEHHA and CARB (CARB 2009). The Cancer Potency Factor for DPM is 1.1 per milligram per kilogram of body weight per day (mg/kg-day). The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for diesel exhaust are not known for these pathways. The Cancer Potency Factor also assumes that a person is exposed continuously for 70 years. This approach is intended to result in conservative (i.e., health protective) estimates of health impacts and is used for the receptors previously identified.

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 microgram per cubic meter ($\mu g/m^3$)

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)

In accordance with CARB policy (CARB 2003), the breathing rate equal to the 80th percentile, or 302 liters per kilogram of body weight per day, was used for the cancer risk calculations. In order to directly calculate risk from the modeled concentrations, a multiplying factor was derived based on the information discussed above. This multiplying factor, when multiplied by the concentration that the dispersion model

calculates, results in a risk in one million at a particular receptor. The multiplying factor was calculated as follows:

Multiplying factor = $CPF*(DBR*A*EF*ED*10^{-6}/AT)*10^{6}$

= 1.1 $(mg/kg\text{-}day)^{-1}$ * (302 L/kg body weight–day * 1 * 350 day/yr * 70 yr * 10^{-6} / 25,550 days) * 10^{6}

= 318.55 $(\mu g/m^3)^{-1}$.

Table 2.16-2 shows the maximum modeled annual DPM concentrations for the nearest sensitive receptor and the associated cancer risk. The cancer risk at the receptor (2.9 in one million) is less than the threshold of 10 in one million for cancer impacts.

Table 2.16-2
Summary of Maximum Modeled Cancer Risks

Receptor	DPM Annual Concentration µg/m³	Cancer Risk
Private residence	9.0×10^{-3}	2.9 in one million

Note:
Values are expressed in scientific notation ($X.X \times 10^{-X}$) (e.g., 9.0×10^{-3} is 0.009).

In addition to the potential cancer risk, DPM has chronic (i.e., long-term) noncarcinogenic health impacts. The chronic hazard indices were evaluated using the OEHHA/CARB inhalation Reference Exposure Levels (REL) (CARB 2010). The REL is the concentration (inhalation) or daily dosage (noninhalation) at or below which no adverse health effects are anticipated. The chronic noncarcinogenic inhalation hazard index for the proposed project was calculated by dividing the modeled annual average concentrations of DPM by its Reference Exposure Level (REL), which is 5 micrograms per cubic meter.

Table 2.16-3 shows the maximum modeled annual DPM concentration for the sensitive receptor and the maximum chronic hazard index. The chronic hazard index at the nearest sensitive receptor (1.8 × 10-3) is less than the threshold of 1.0 for noncarcinogenic health impacts.

Table 2.16-3
Summary of Maximum Chronic Hazard Indices

Receptor	DPM Concentration µg/m³	Chronic Hazard Index
Private residence	9.0×10^{-3}	1.8×10^{-3}

Note:
Values are expressed in scientific notation ($X.X \times 10^{-X}$) (e.g., 1.8×10^{-3} is 0.0018).

In summary, the maximum anticipated cancer risk associated with the proposed project is 2.9 in one million at the nearest sensitive receptor, based on a 70-year lifetime exposure. The assessment also finds that the chronic hazard index for noncancer health impacts is well below 1.0 at the sensitive receptor. As such, the exposure of project-related health impacts to sensitive receptors during operation of the proposed project would be less than significant.

2.16.2.3 Project Operational Hazards

Hazardous Materials Storage

The project includes on-site storage of the chemicals shown in Table 2.16-4, Hazardous Materials:

Table 2.16-4
Hazardous Materials

Hazardous Material Type	Existing Quantity Stored	Proposed Change in Quantity Stored	Proposed Storage Container(s)	Frequency of Delivery (existing)	Frequency of Delivery (proposed)
Sodium Hypochlorite	N/A	1,000	Dual Containment Tank	N/A	6 times per year (1,000 gallons)
Citric Acid	N/A	N/A	Neat Tote	N/A	2 times per year (26 gallons)

Source: Dudek 2010

Note: The above quantities include a worse-case analysis for hazardous materials that would be required for the treatment processes being considered as part of the proposed project.

It is assumed that sodium hypochlorite will be stored in a 1,000 gallon aboveground storage tank. Intermittent chemicals such as citric acid will be used for membrane cleaning. The intermittent chemicals will be used for "clean in place" recovery and will consist of 26 gallons of citric acid. The citric acid will be used upon delivery; no on-site storage is anticipated.

The sodium hypochlorite tank system shall be designed in accordance with the California Fire Code, Uniform Fire Code, International Fire Code, and other applicable Federal, State, and local regulations. Accordingly, the tank system shall be designed with secondary containment. Chemical storage shall be conducted in accordance with these regulations and in accordance with a Hazardous Materials Business Plan approved by the Imperial County CUPA Office.

The hazardous substance status, according to the various federal and state regulations, of the chemicals to be stored is described in Table 2.16-5, Hazardous Substance Status:

Table 2.16-5
Hazardous Substance Status

Hazardous Material Type	Hazardous Material [1]	Extremely hazardous substance [2] (threshold planning quantity)	Federal or state regulated substance [3] (threshold quantity)
Sodium Hypochlorite	Yes	No	No
Citric Acid	No	No	No

Notes:
1 Title 8 Section 339 of the California Code of Regulations
2 Code of Federal Regulations, Title 40, Chapter 1, Part 355, Appendix A
3 Code of Federal Regulations Title 40, Chapter 1, Section 68.130 or the California Code of Regulations Title 19, Section 2770.5

The Certified Unified Program Agency (CUPA) is the local administrative agency that oversees regulation of hazardous materials. In Imperial County, the CUPA is the Department of Toxic Substances Control (DTSC). The DTSC inspects businesses or facilities that handle or store hazardous materials, generate hazardous waste, and own or operate underground storage tanks. The DTSC also oversees the California Accidental Release Program (CalARP) and hazardous materials disclosure (Emergency Planning Community Right to Know Act), including hazardous materials business plans Imperial County.

Risk Management Plan

CalARP requires businesses that store, handle, or use more than threshold quantities of a regulated substance to develop a plan (risk management plan) and prepare supporting documentation that summarizes the facility's potential risk to the local community and identifies safety measures to reduce potential risks to the public. The Risk Management Plan provides information on the potential impact zone of a worst-case release and present plans and programs designed to minimize the probability of a release and mitigate potential impacts.

The facility does not maintain a Risk Management Plan since there is currently no existing chemical storage. The estimated amount of sodium hypochlorite to be stored on-site is 1,000 gallons. Since sodium hypochlorite is not a regulated substance, the facility is not required to maintain a Risk Management Plan/California Accidental Release Plan under the proposed project (EPA 40 CFR Part 68, March 2009).

Hazardous Materials Business Plan/Inventory

On-site chemical storage will include storage of more than 55 gallons of sodium hypochlorite. Mitigation is provided to ensure proper employee safety training and emergency response procedures for a release or threatened release of sodium hypochlorite.

Hazardous Materials Transportation

The proposed project involves transportation of the chemicals listed above to the site. The delivery of the sodium hypochlorite will be concurrent with the delivery of chemicals to the SCWD Water Treatment Facility located 0.2 miles northeast of the WWTP. The delivery route to the site from the Water Treatment Facility is anticipated to be from Alamo Street to Laguna Avenue to Rio Vista Street. The one-way travel distance from Alamo Street is 0.2 miles. The delivery of citric acid was not considered in the following calculations of risk of incident during transportation as citric acid is not regulated by the Department of Transportation (CFR 49 Section 172.3 Subpart B).

The delivery route for sodium hypochlorite passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods. An alternate delivery route is from Alamo Street to Laguna Street to Main Street to New River Boulevard. The one-way travel distance from Alamo Street is 0.33 miles. This delivery route also passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods.

According to the report, "Comparative Risks of Hazardous and Non-Hazardous Materials Truck Shipment Accidents/Incidents," (Battelle 2001), the hazardous materials transport accident/incident risk per mile is estimated at 0.507 in a million for all types of hazardous materials, including leak enroute

incidents. The route from Alamo Street to the site is approximately 0.2 miles each way, thus the probability of a hazardous material incident occurring on this route is 0.101 in a million per delivery, for all types of hazardous materials.

The hazardous materials transport accident/incident risk per mile specific to the specific hazard class for sodium hypochlorite is shown in Table 2.16-6, Risk of Incident. The risk of incident for sodium hypochlorite deliveries is 0.082 in a million. This risk for incidents during sodium hypochlorite deliveries is less than the *de minimus* risk of one in a million.

Transportation of hazardous materials will comply with all DOT, California Department of Transportation (Caltrans), USEPA, DTSC, California Highway Patrol, and California State Fire Marshal regulations.

Table 2.16-6
Risk of Incident

Hazardous Material Type	Hazard Class	Risk per Mile, Specific to the Hazard Class	Risk, Specific to the Hazard Class
Sodium Hypochlorite	8	0.409 in a million	0.082 in a million
Citric Acid	Not Regulated by DOT	N/A	N/A

Biosolids Transportation

The proposed project involves biosolids transportation offsite. Since biosolids are non-hazardous and non-toxic, the transportation is not designated a hazard class and is not regulated by the DOT. However, in order to transport the biosolids offsite, the operational controls including quantity of material, solids concentration of materials, distance to final destination, number and capacity of vehicles, vehicle maintenance and appearance, and accident and spill control programs need to be considered prior to offsite transportation (USEPA, 2000). In addition, proper communication to the community regarding the increased traffic from operations must be considered in preparing the operational controls.

The biosolids may be disposed of at landfills or applied to land including agricultural land, forest lands, reclamation sites, and public contact sites. For application of biosolids as a soil amendment (offsite), the USEPA established ceiling concentrations for metals and pathogen and vector attraction reduction standards (Table 5.8-4 Pollutant Limits for Land Applied Biosolids); management criteria for the protection of water quality and public health; and annual and cumulative discharge limitations of persistent pollutants to land for the protection of livestock, crop, and human health and water quality protection (40 CFR Part 503).

Table 2.16-7
Pollutant Limits for Land Applied Biosolids[a]

Constituent	Ceiling Concentration[b] (mg/kg dry weight)	Pollution Concentration[c] (mg/kg dry weight)
Arsenic	75	41
Cadmium	85	39
Copper	4,300	1,500
Lead	840	300
Mercury	57	17
Molybdenum	75	--[d]
Nickel	420	420
Selenium	100	100
Zinc	7,500	2,800

Notes:

a 40 CFR Part 503 Chapter 2

b Land applied biosolids cannot exceed the listed concentrations

c Biosolids below the listed concentrations do not need a permit if other regulatory requirements are met.

d The February 25, 1994 Part 503 Rule Amendment deleted the molybdenum limits, but retained the molybdenum CCL.

Impacts related to the on-site storage and use of hazardous materials are anticipated to be less than significant with the mitigation measure below incorporated. Impacts related to the transport and disposal of hazardous materials associated with the proposed project are anticipated to be less than significant.

2.16.3 Cumulative Impacts

Since the SWWRF is located approximately 13 miles from the Imperial Valley Solar Project, the potential public health impacts from each portion of the project will not be additive. Thus, no additional cumulative analysis will be conducted for the SWWRF project. The AFC and subsequent responses to Data Requests determined that no significant cumulative impacts are associated with the Imperial Valley Solar Project, and none are identified as a part of this analysis.

2.16.4 Mitigation Measures

The mitigation measure for temporary impacts related to construction presented and operations in Section 5.2.4 of the Project AFC and the responses to Data Requests, March 2009, are applicable to the proposed Project. Mitigation measures associated with fugitive dust are discussed in Section 2.2, Air Quality. Mitigation related to preparing a Hazardous Materials Business Plan and Hazardous Materials Inventory pursuant to Chapter 6.95, Division 20 of the California Health and Safety Code, shall be included. This plan shall identify hazardous substances, details that facilitate coordination and emergency planning with on and off site response officials and facilities in the event of an emergency. The plan shall also include handling and waste disposal. No additional mitigation measures are recommended based on the SWWRF upgrades associated with the Imperial Valley Solar Project.

2.16.5 LORS Compliance

The LORS presented in Section 5.16.5 of the Imperial Valley Solar AFC are applicable to the upgrades to the SWWRF and no additional LORS are recommended. Similarly, the agency contact information presented in Section 5.16.5 of the Imperial Valley Solar AFC is unchanged and the proposed SWWRF upgrades do not affect the required permits or Project schedule presented in Section 5.16.5 of the Project AFC. The Project, including the changes discussed herein, will comply with all LORS.

2.16.6 References

The following additional references beyond those presented in Section 5.16.6 of the Project AFC were used for this analysis.

Battele, (March 2001), "Comparative Risks of Hazardous Materials and Non-Hazardous Materials Truck Shipment Accident/Incidents"

CARB (California Air Resources Board). 2003. Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk. October.

CARB (California Air Resources Board). 2009. "Table 1: Consolidated Table of OEHHA/ARB-Approved Risk Assessment Health Values." February 9, 2009. Accessed March 30, 2010, at: http://www.arb.ca.gov/toxics/healthval/healthval.htm

Hernandez, J. 2010b. Flagpole Receptor Height. Personal communication between J. Hernandez (ICAPCD) and D. Deckman (Dudek) on March 30, 2010.

OEHHA (California Environmental Protection Agency Office of Environmental Health Hazard Assessment). 2003. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August.

United States Environmental Protection Agency, (July 2000), "Guide to Field Storage of Biosolids" EPA/832-B-00-007

2.17 WORKER SAFETY

This section addresses safety and health issues and describes or outlines systems and procedures that provide occupational safety and health protection for the Project workers, proposed worker safety mitigation methods to minimize impacts to workers, and applicable LORS. Applicable elements of the Title 8 California Code of Regulations (CCR), General Industry Safety Orders (GISO), Construction Safety Orders (CSO), and Electrical Safety Orders (ESO), as summarized in the Project AFC will be addresses for the Project.

2.17.1 Affected Environment

The affected environment for worker safety includes the SWWRF, at the 1898 West Main Street, in Seeley, California, approximately 13 miles east Imperial Valley Solar Project site.

2.17.2 Environmental Consequences

Construction, operation, and maintenance activities may expose workers to the hazards identified in Table 5.17.1 of the Project AFC. Further, once operational, workers or treatment plant operators may be exposed to safety issues related to storage, use, transport or disposal of chemicals that would be utilized during the wastewater treatment process. Exposure to these hazards can be minimized through adherence to appropriate engineering, design criteria and administrative controls, use of applicable personal protective equipment (PPE), and compliance with all applicable health and safety LORS. The District would be required to implement a comprehensive health and safety program as described in the Project AFC. The health and safety . In addition, the District would prepare and submit Hazardous Materials Business Plan (HMBP) to the Department of Toxic Substances Control of Imperial County (pursuant to Chapter 6.95, Division 20 of the California Health and Safety Code). This plan would identify hazardous substances, details that facilitate coordination and emergency planning. The upgrades to the SWWRF would not create additional construction or operation related impacts to worker safety.

To protect the health and safety of workers during construction and operation activities, the SWWRF upgrade Project will ensure compliance with a Health and Safety Program, and all federal, state and local health standards that pertain to worker health and safety.

2.17.3 Cumulative Impacts

As the various projects described in the cumulative impact evaluation in the AFC will be responsible for complying individually with applicable worker safety requirements, no cumulative impacts on worker safety are expected as a result of upgrades to the SWWRF.

2.17.4 Mitigation Measures

Environmental consequences related to worker safety are not foreseen at this time, therefore, additional measures are not considered necessary.

2.17.5 LORS Compliance

Section 5.17.5 of the Project AFC summarizes the applicable LORS that govern worker safety, as well as the applicable permits that will be required for the Project. No additional LORS are recommended. The Project will comply with all LORS.

2.18 CUMULATIVE IMPACTS

Section 15126.2(d) of the CEQA Guidelines states that an cumulative impact should consider "…the ways in which the proposed project could foster economic or population growth, or the construction additional housing either directly or indirectly, in the surrounding environment." For NEPA, the purpose of cumulative impact analysis is to identify past, present, and reasonably foreseeable actions in the vicinity of the SWWRF that could affect the set of resources examined for direct and indirect impacts.

2.18.1 Affected Environment

The affected environment for Cumulative Impacts was originally discussed in Section 5.18.1 of the AFC and Supplemental Cumulative Analysis (April 21, 2009). The Supplemental Cumulative Analysis includes an estimate of impacts for Projected Urban Development for eastern San Diego and Imperial County completed by the California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program (Cal DLRP [2009]). The CA DLRP projections are based on extrapolations of current population and urban development trends. In the supplemental cumulative analysis, results from the Cal DLRP study are used to illustrate past, present and future urban development from 1984 to 2020 in the area surrounding the SWWRF. The forecast of urban development was used to define the past, present, and future geographic extent of "urban" types of development including residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures such as the SWWRF upgrade.

Description of Applicable Cumulative Projects

The following projects summarized below have been determined to have a potential cumulative impact with the SWWRF Project.

(1) Amended and Restated Addendum to Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Imperial Irrigation District (IID) Water Conservation and Transfer Project. September, 2003. This Addendum evaluated impacts associated with minor modifications described from the Final EIR/EIS and for the IID Water Conservation and Transfer Project and Habitat Conservation Plan certified in June, 2002 as well as amending and replacing the December 2002 Addendum which assessed minor changes as of that date. This document specifically addressed changes to the HCP and the Salton Sea Habitat Conservation Strategy and changes to the IID Water and Conservation Transfer Project as reflected in changes to the terms of the agreements comprising the QSA.

Applicable changes to the Final EIR/EIS include provisions for mitigation water to the Salton Sea to offset the reduction caused by that project for the first 15 years, and to maintain the Salton Sea's salinity level at or below 60 parts per thousand (ppt) until approximately the year 2019.

(2) Draft and Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Imperial Irrigation District (IID) Water Conservation and Transfer Project/Draft Habitat Conservation Plan. June, 2002. This project from the IID involved the implementation of a long-term water conservation program within IID's water service area in Imperial County, California to conserve up to 300 thousand acre-feet of water per year (KAFY) of Colorado River water, which IID would otherwise divert for use within its water service area. The IID's water service area consisted of approximately 500,000 acres. The Draft EIR/EIS evaluated the following two scenarios:

● IID/SDCWA Transfer Agreement Implementation Only: Up to 300 KAFY are transferred to SDCWA pursuant to the terms of the IID/SDCWA Transfer Agreement. This scenario will apply if the QSA is not approved and implemented in its entirety.

● QSA Implementation: SDCWA would be limited to 130 to 200 KAFY from IID; CVWD would have the option of acquiring up to 100 KAFY of water conserved by IID, in two increments of 50 KAFY each, for use within CVWD's service area. In addition, the QSA grants to MWD an option to acquire all or any portion of this 100 KAFY that CVWD does not acquire, for use in MWD's service area. Under the proposed QSA, the terms of the transfer to SDCWA (130 to 200 KAFY) are governed by the IID/SDCWA Transfer Agreement; and the terms of the proposed water transfers to CVWD and MWD are set forth in acquisition agreements to be executed between IID and each recipient. This scenario will apply if the QSA is approved and implemented in its entirety.

The final document determined that under either scenario, water conserved by IID would be transferred to SDCWA, CVWD, and/or MWD, for use within the recipients' respective service areas. Neither option changed the findings regarding cumulative impacts as discussed in this environmental document.

The EIR/EIS also identified within the cumulative impacts section a number of related projects that were evaluated cumulatively with the project. Some of these projects, while not discussed as part of the Water Conservation and Transfer Project, were part of the QSA Implementation and therefore discussed cumulatively. Such projects included: (1) the Coachella Canal Lining Project; (2) All American Canal Lining Project; and (3) the Metropolitan Water District (MWD) and Coachella Valley Water District (CVWD) State Water Project Water Transfer and Exchange. The importance of these projects to the cumulative analysis in the IID Water Conservation and Transfer Project EIR/EIS as they relate to the SWWRF project focus on the overall cumulative effects of removing water seepage for the two lining projects from the Salton Sea, as well as potential increases in water drainage to the Salton Sea from the MWD/CVWD transfer and exchange.

(2) Amended and Restated Addendum

<u>Incorporation by Reference</u>

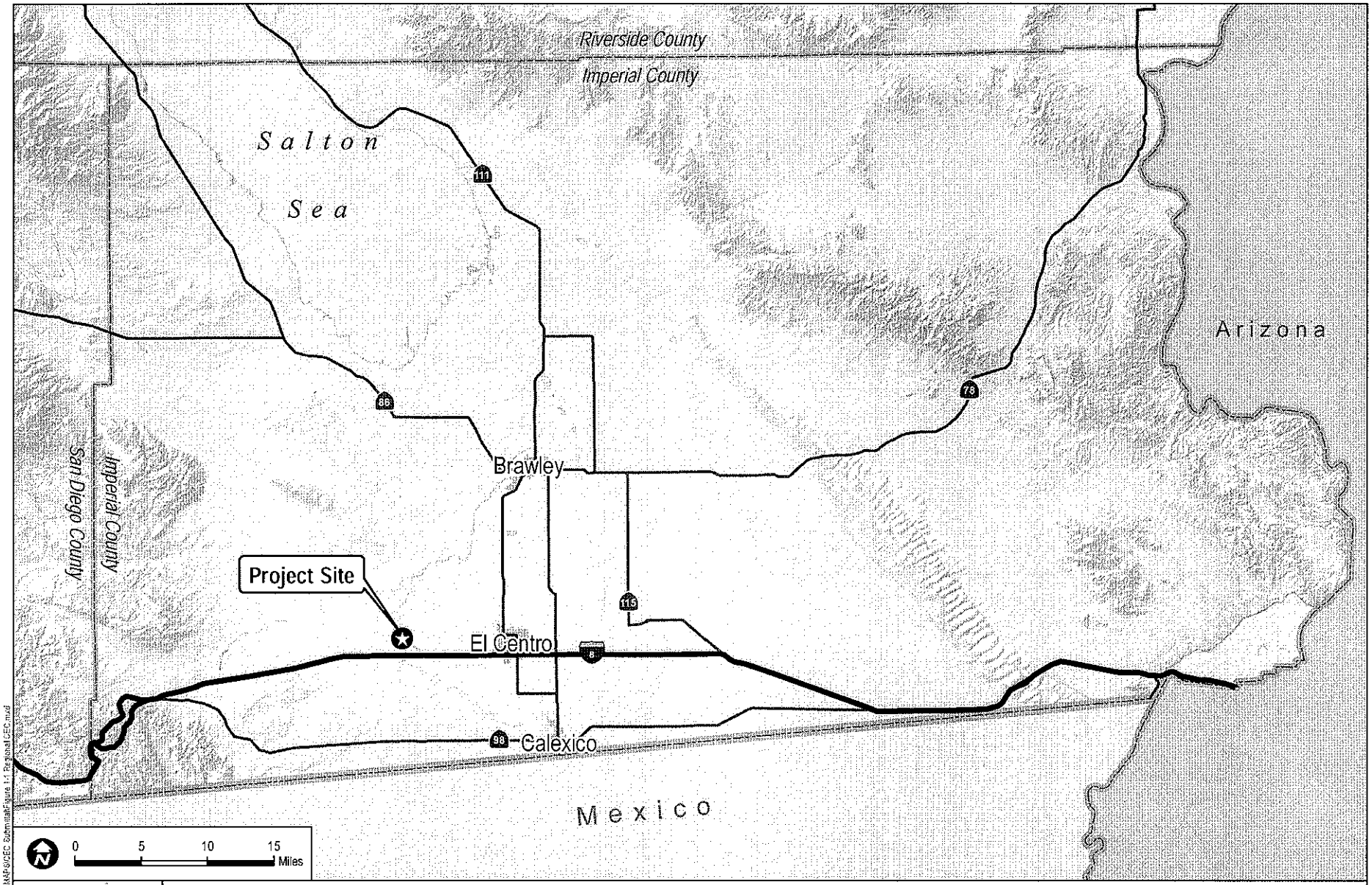

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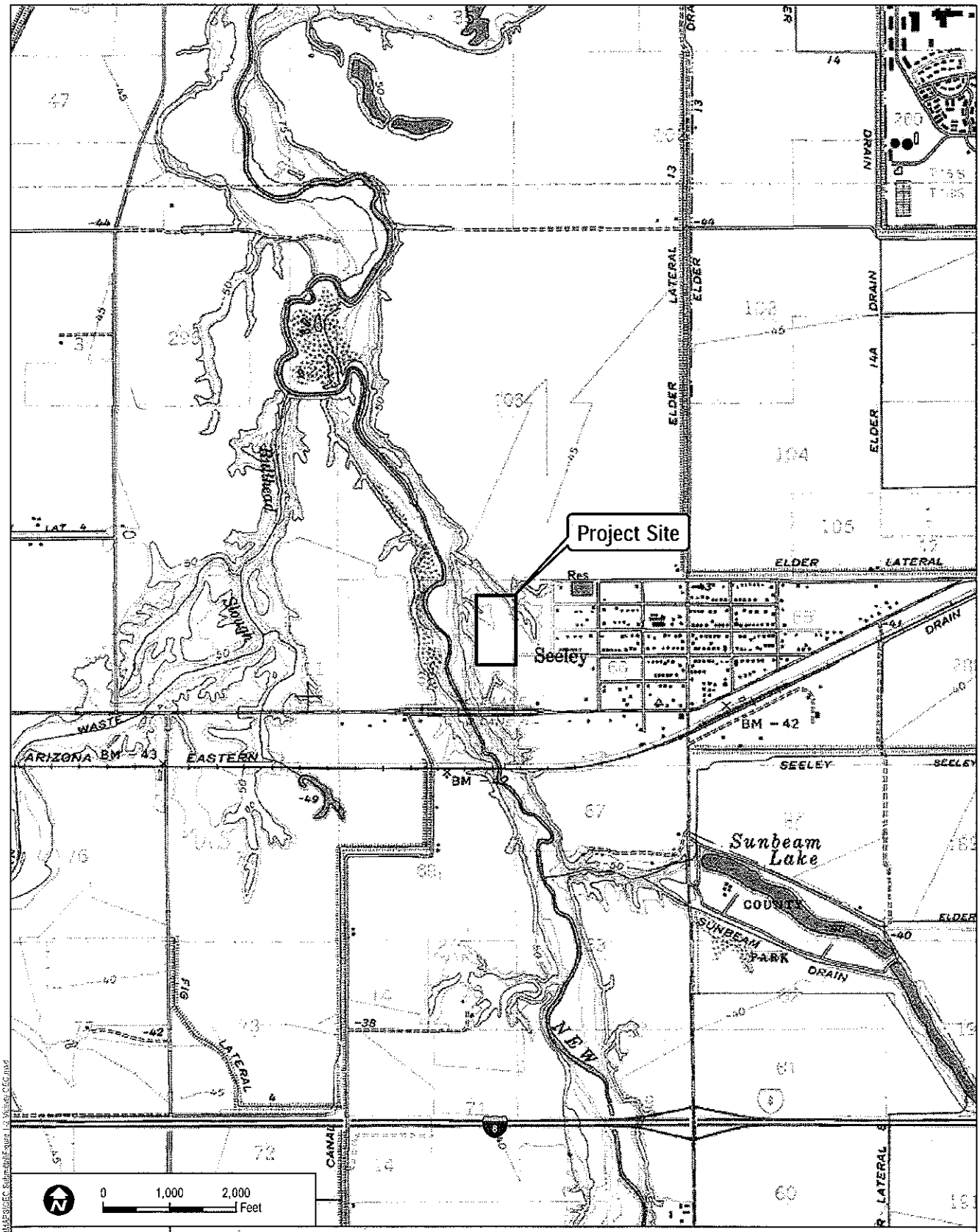
FIGURE 1-1

Regional Map

Seeley County Water District Wastewater Treatment Plant Upgrade Project



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SOURCE: USGS 7.5-Minute Series Seeley Quadrangle.

FIGURE 1-2

Vicinity Map

Seeley County Water District Wastewater Treatment Plant Upgrade Project

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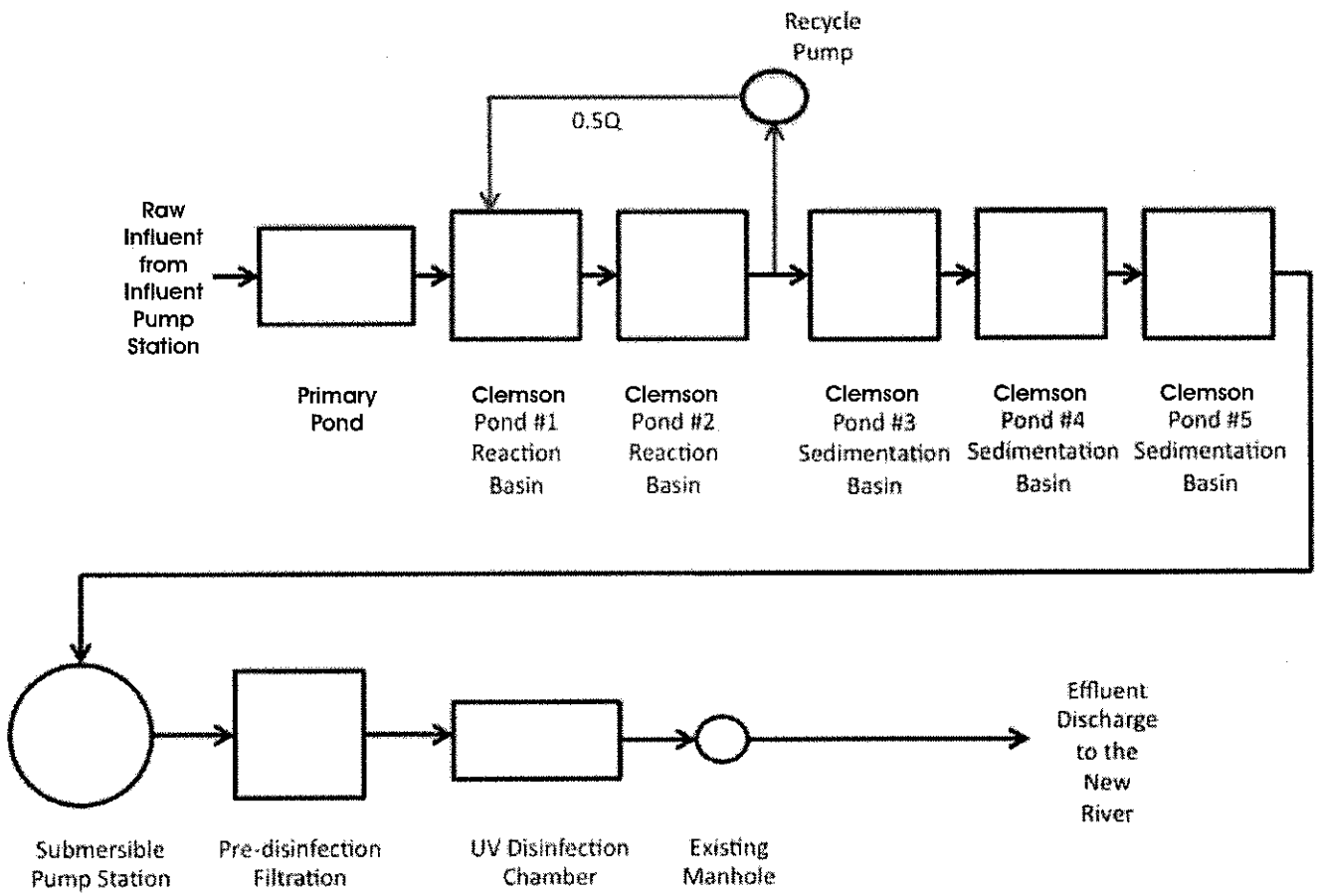
AERIAL AND ROAD SOURCE: Bing Maps 2010.

FIGURE 1-3

Site Location Map

Seeley County Water District Wastewater Treatment Plant Upgrade Project



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SOURCE: DUDEK 2010

FIGURE 1-4

Existing Treatment Process Flow

Seeley County Water District Wastewater Treatment Plant Upgrade Project

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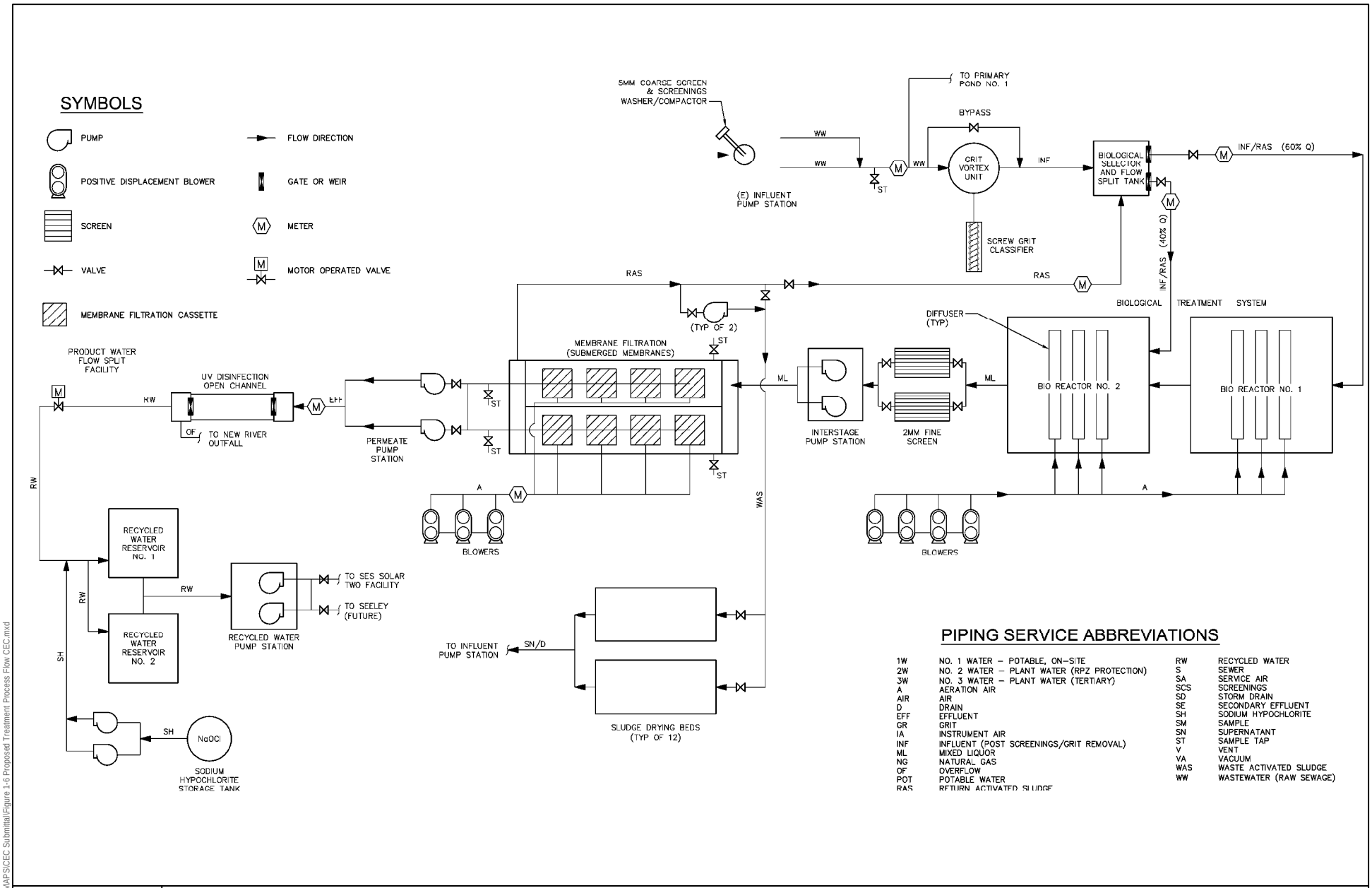
AERIAL AND ROAD SOURCE: Bing Maps 2010; TOPO AND TREATMENT PLANT SOURCE: DUDEK March 9, 2010.

FIGURE 1-5

Existing Treatment Plant Features

Seeley County Water District Wastewater Treatment Plant Upgrade Project



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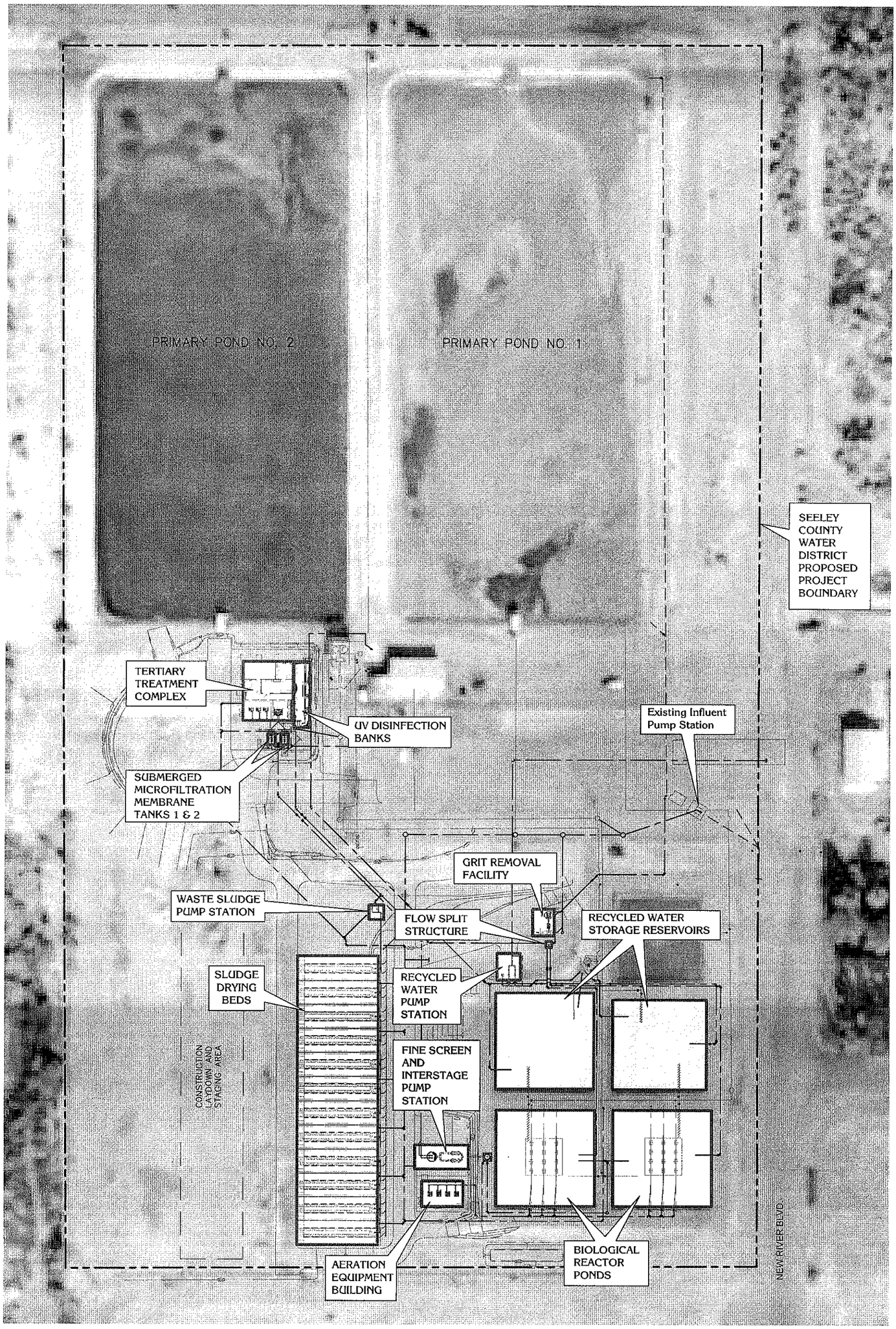
SOURCE: DUDEK March 9, 2010.

FIGURE 1-6

Proposed Treatment Process Flow

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\6\MAPDOC\MAPS\CEC Submittal\Figure 1-6 Proposed Treatment Process Flow CEC.mxd



0 80 Scale in Feet

PROPOSED TREATMENT PLANT FEATURE

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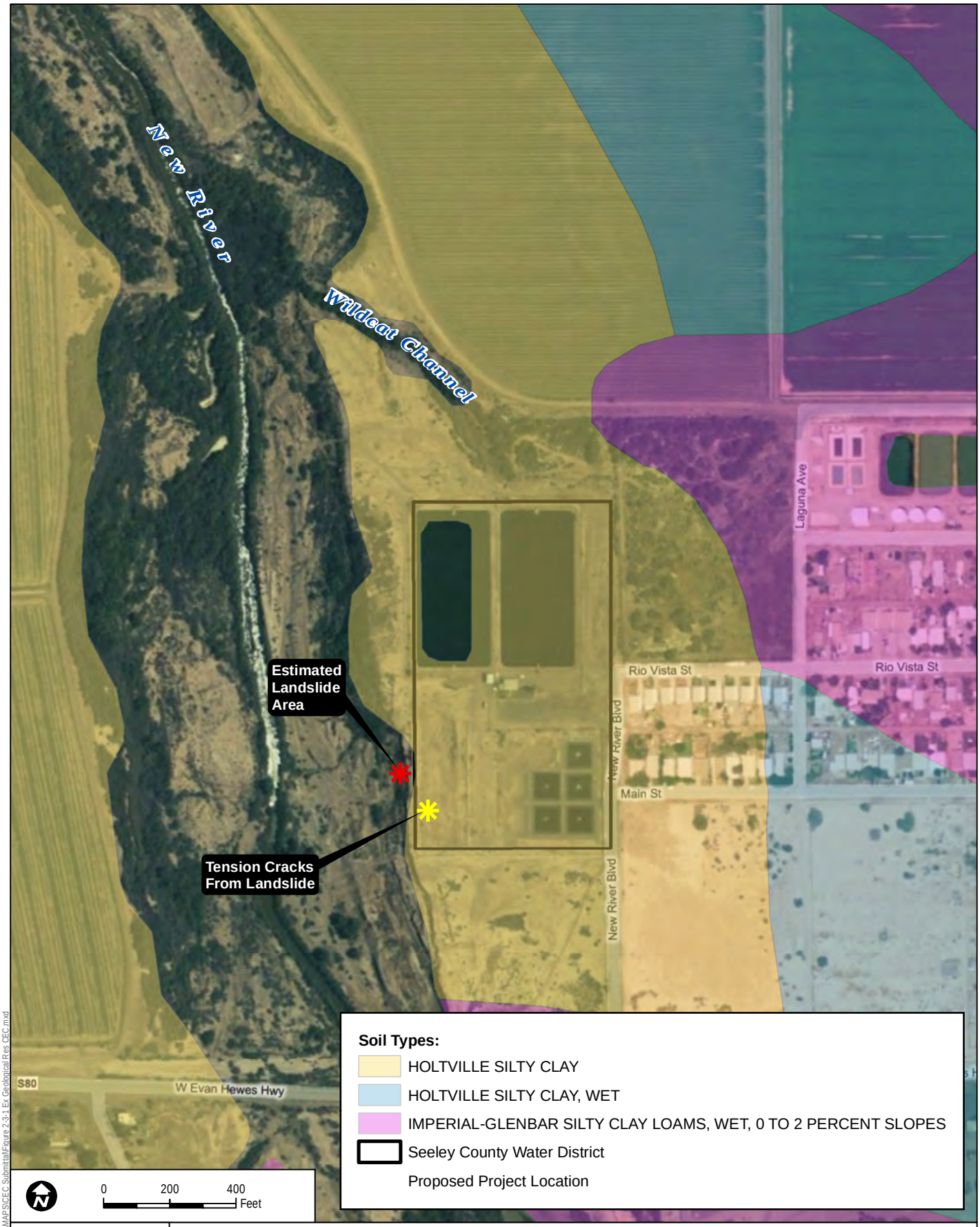
AERIAL SOURCE: DIGITALGLOBE 2006; TREATMENT PLANT SOURCE: DUDEK MARCH 2010

FIGURE 1-7

Proposed Treatment Plant Features

Seeley County Water District Wastewater Treatment Plant Upgrade Project



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AERIAL AND ROAD SOURCE: Bing Maps 2010; SOIL SOURCE: USDA SSURGO 2008; GEOLOGY SOURCE: Geotechnics Inc. May 12, 2003.

FIGURE 2.3-1

Existing Geological Resources

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\638205\MAP\DOC\MAPS\CEC Submittal\Figure 2.3-1 Ex Geological Res CEC.mxd

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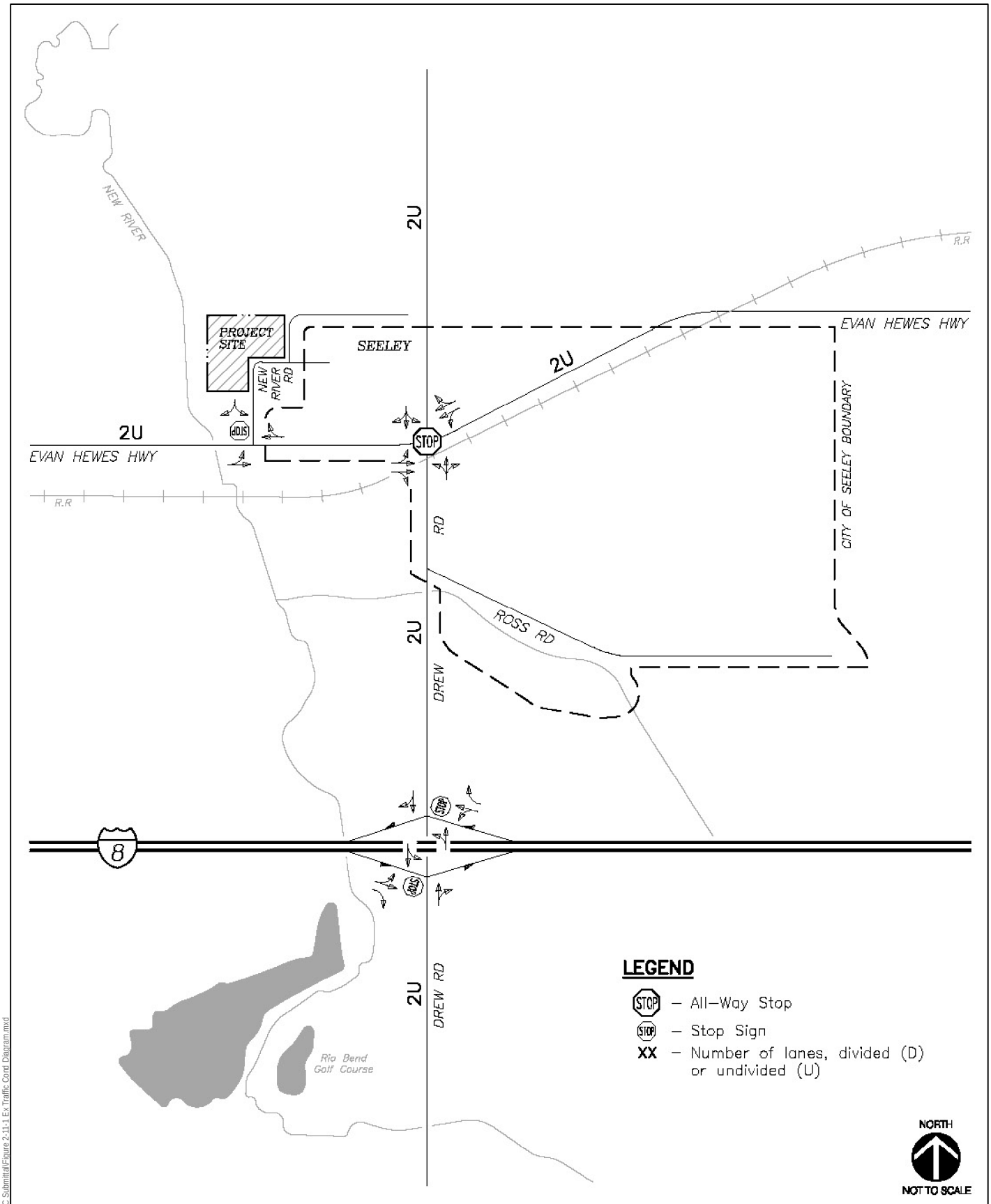
AERIAL AND ROAD SOURCE: Bing Maps 2010; VEGETATION SOURCE: DUDEK 2010.

FIGURE 2.6-1

Existing Vegetation Communities

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\638205\MAPDOC\MAPS\CEC Submittal\Figure 2.6-1 Veg Comms CEC.mxd



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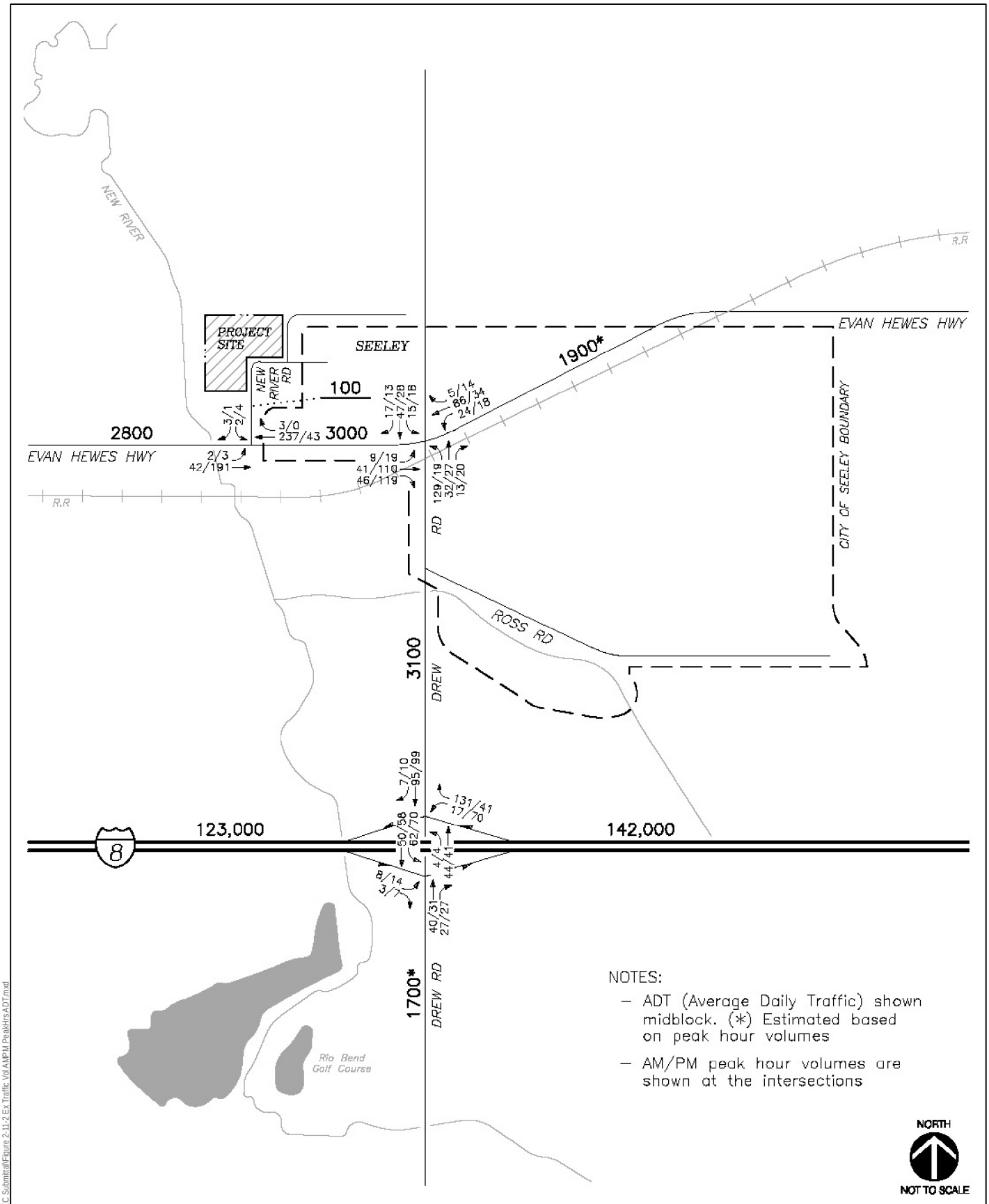
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-1

Existing Traffic Conditions Diagram

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2-11-1 Ex Traffic Cond Diagram.mxd



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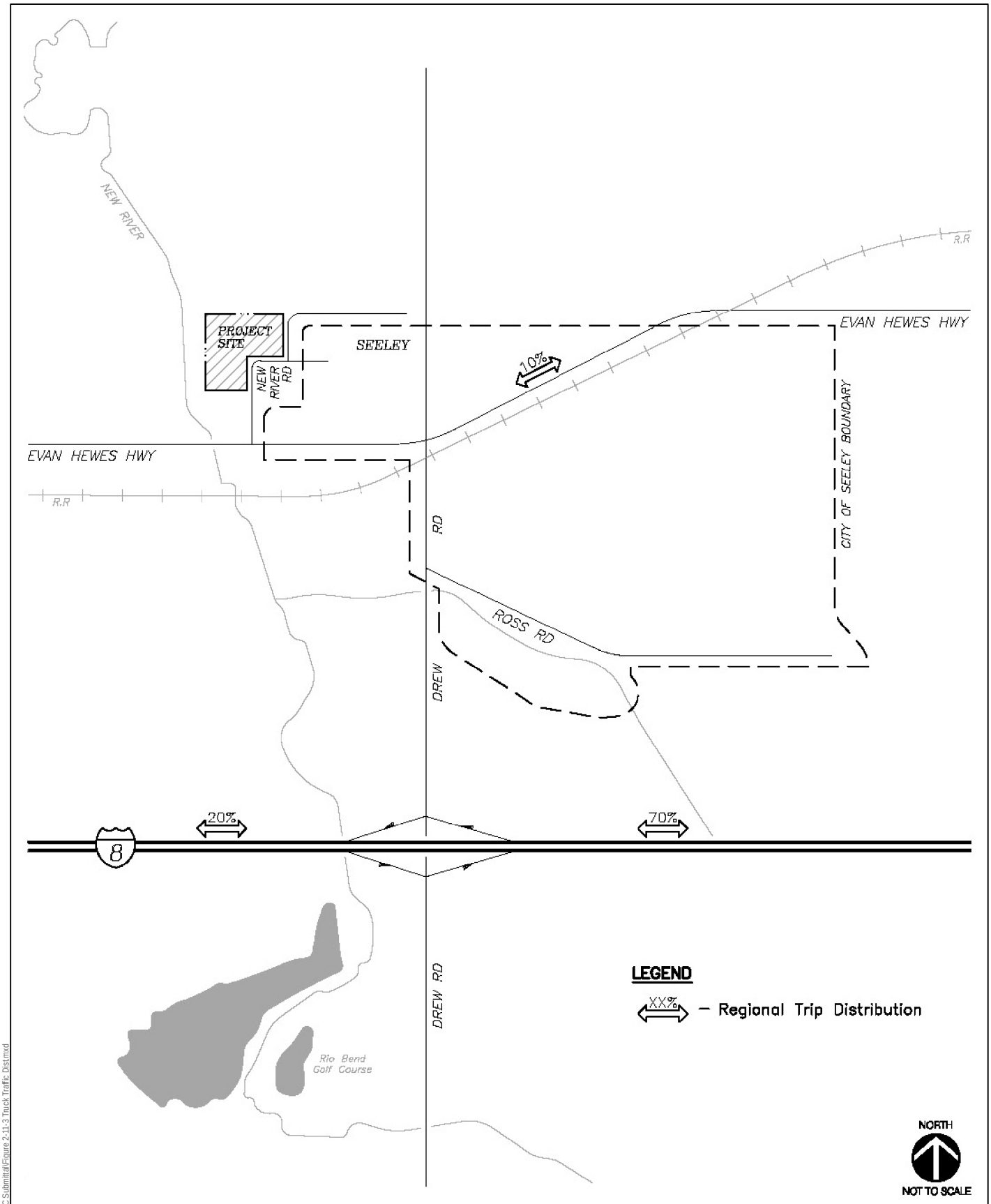
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-2

Existing Traffic Volumes (AM/PM Peak Hours & ADT)

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2.11-2 Ex Traffic Vol AMPM PeakHrs ADT.mxd



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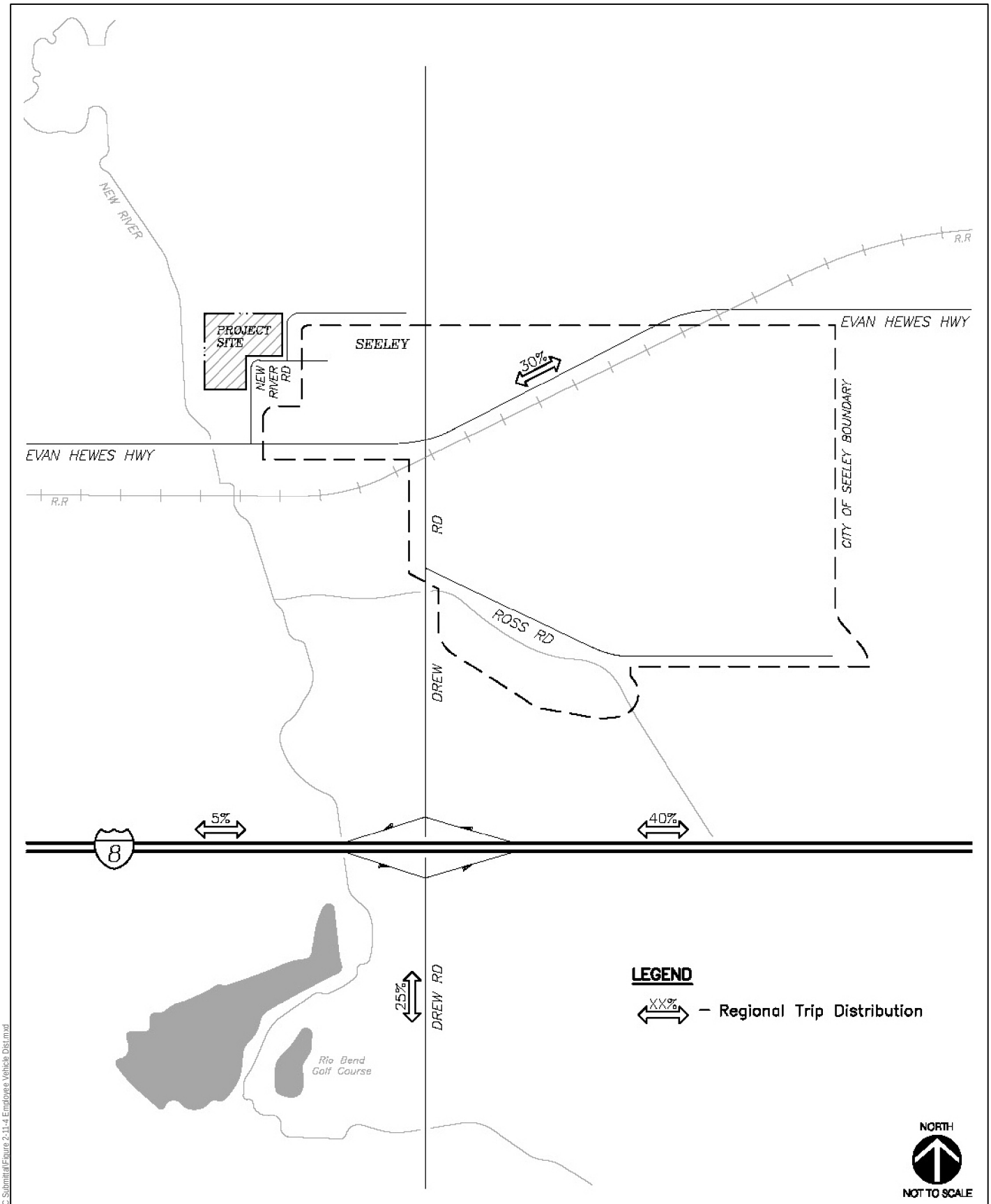
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-3

Truck Traffic Distribution

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2-11-3 Truck Traffic Dist.mxd



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APRIL 2010

SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-4

Employee Vehicle Distribution

Seeley County Water District Wastewater Treatment Plant Upgrade Project

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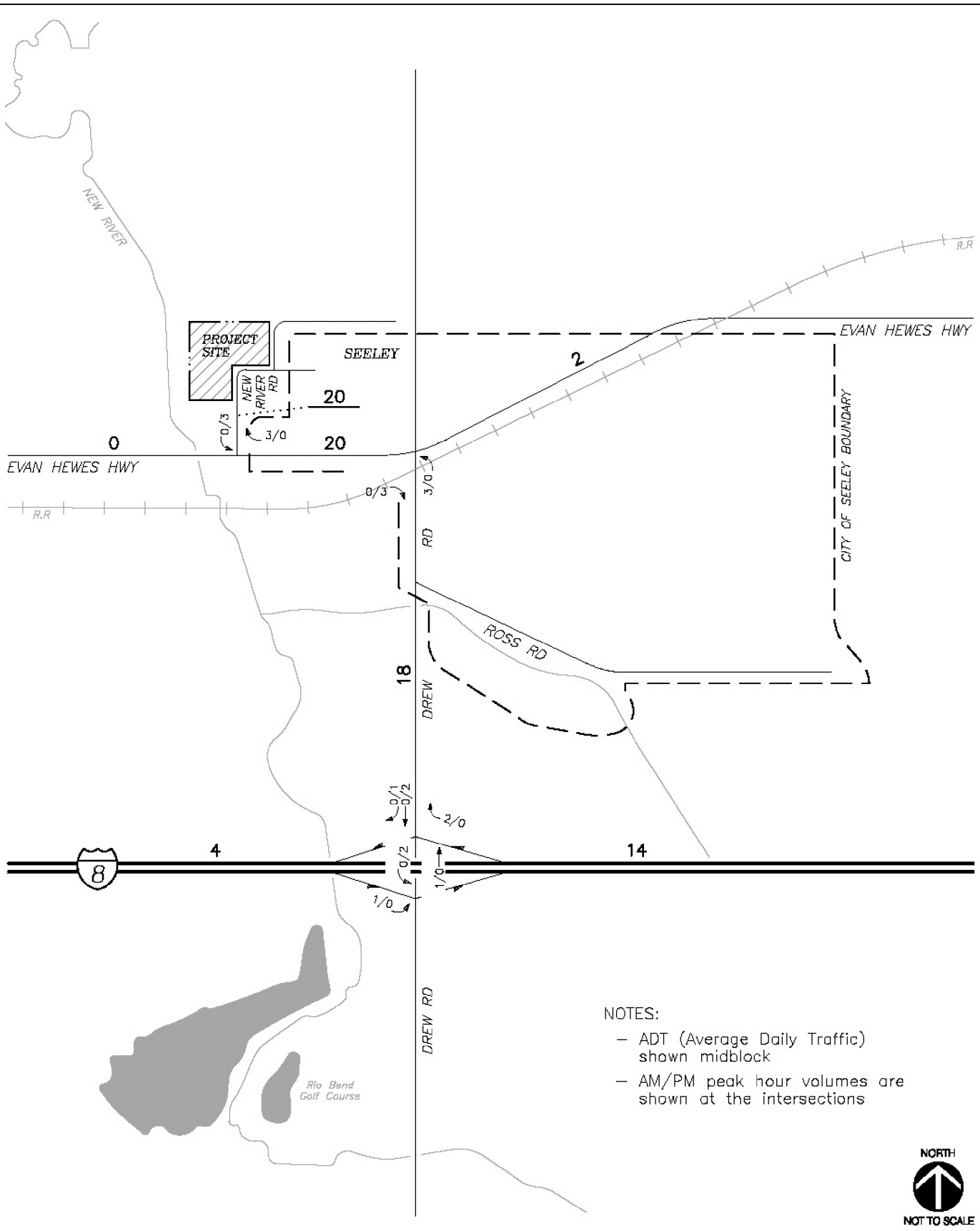

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APRIL 2010

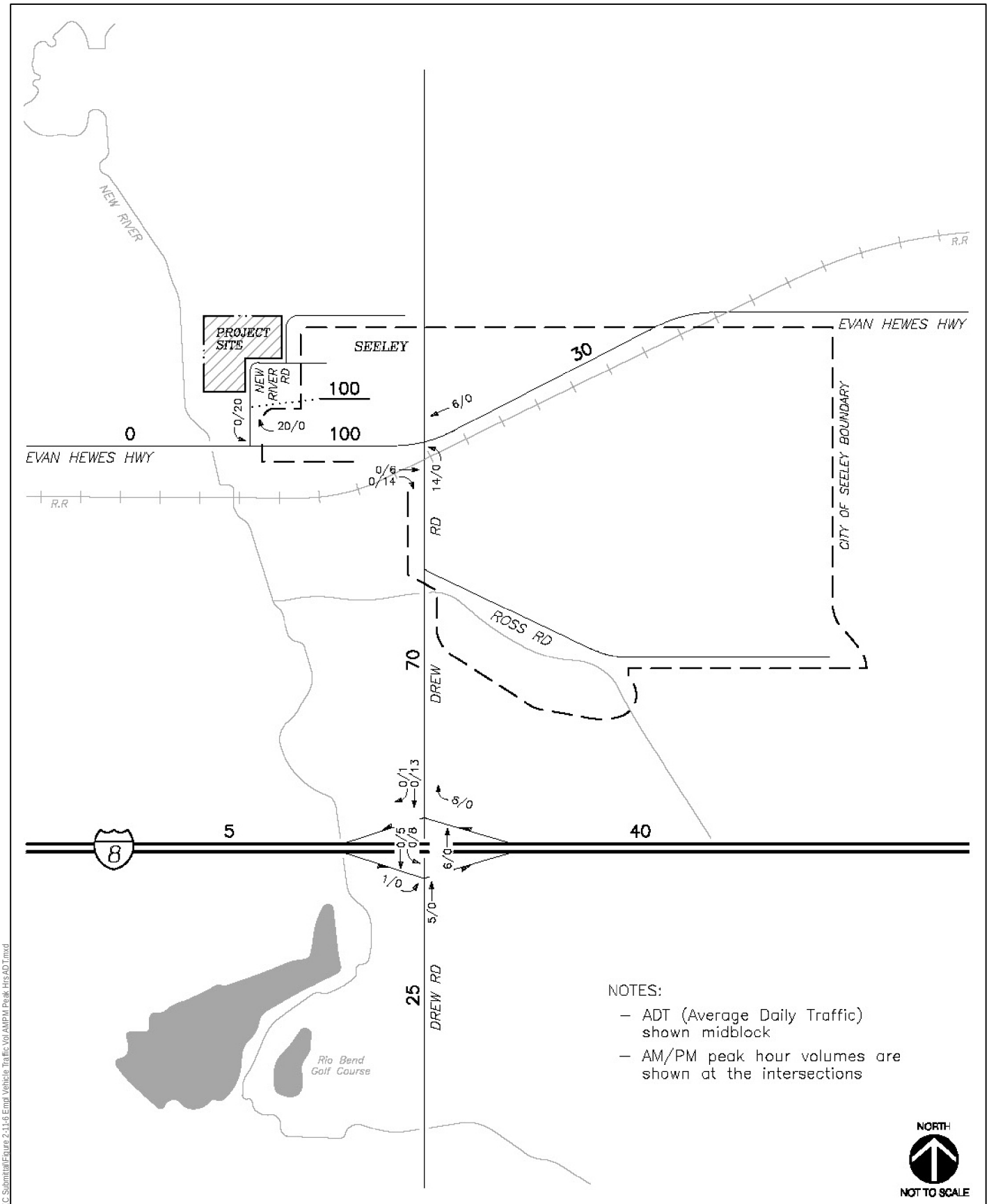
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-5

Construction Truck Traffic Volumes (AM/PM Peak Hours & ADT)

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2.11-5 Const Truck Traffic Vol AMPM Peak Hrs ADT.mxd



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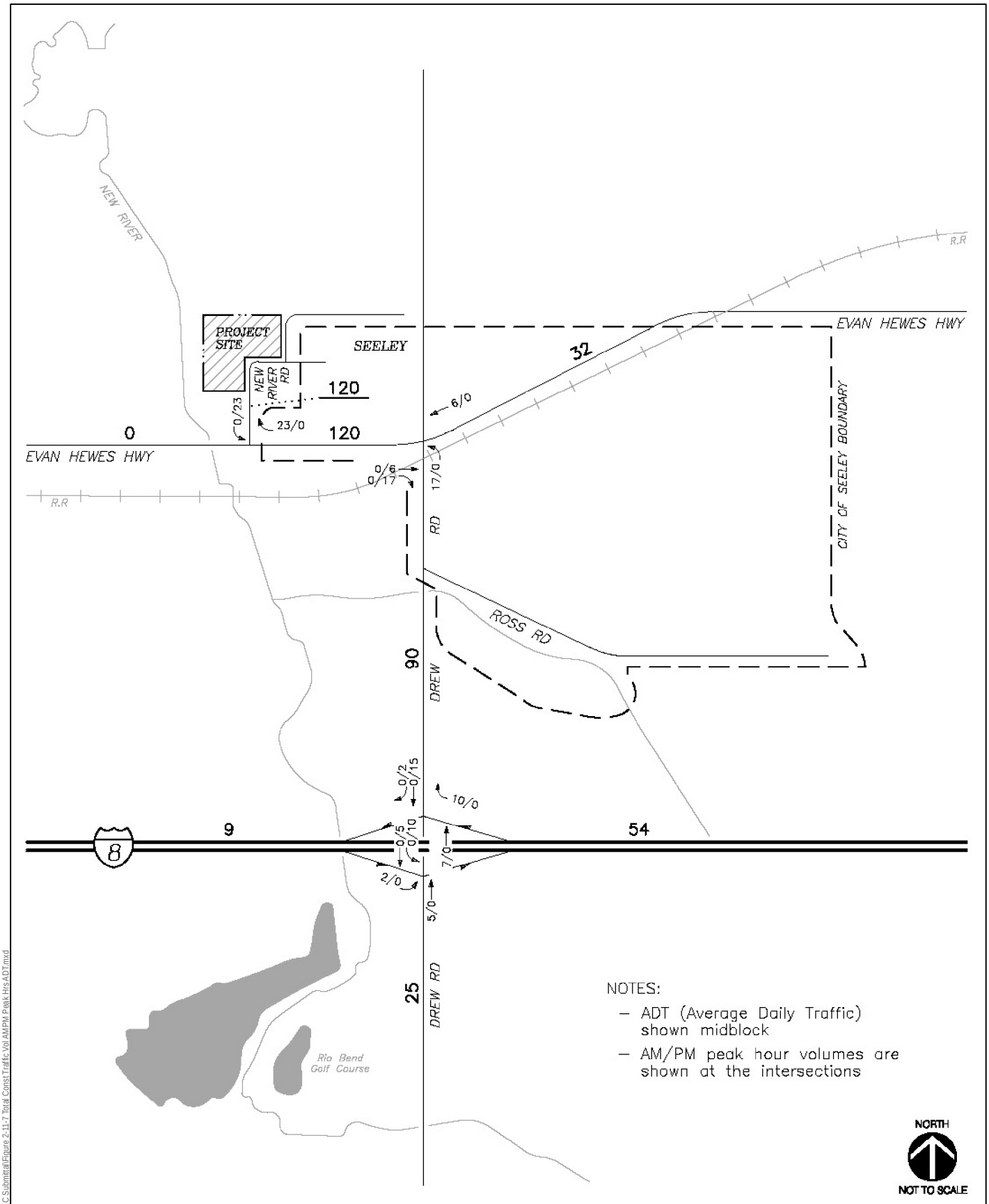
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-6

Employee Vehicle Traffic Volumes (AM/PM Peak Hours & ADT)

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2-11-6 Empl Vehicle Traffic Vol AMPM Peak Hrs ADT.mxd



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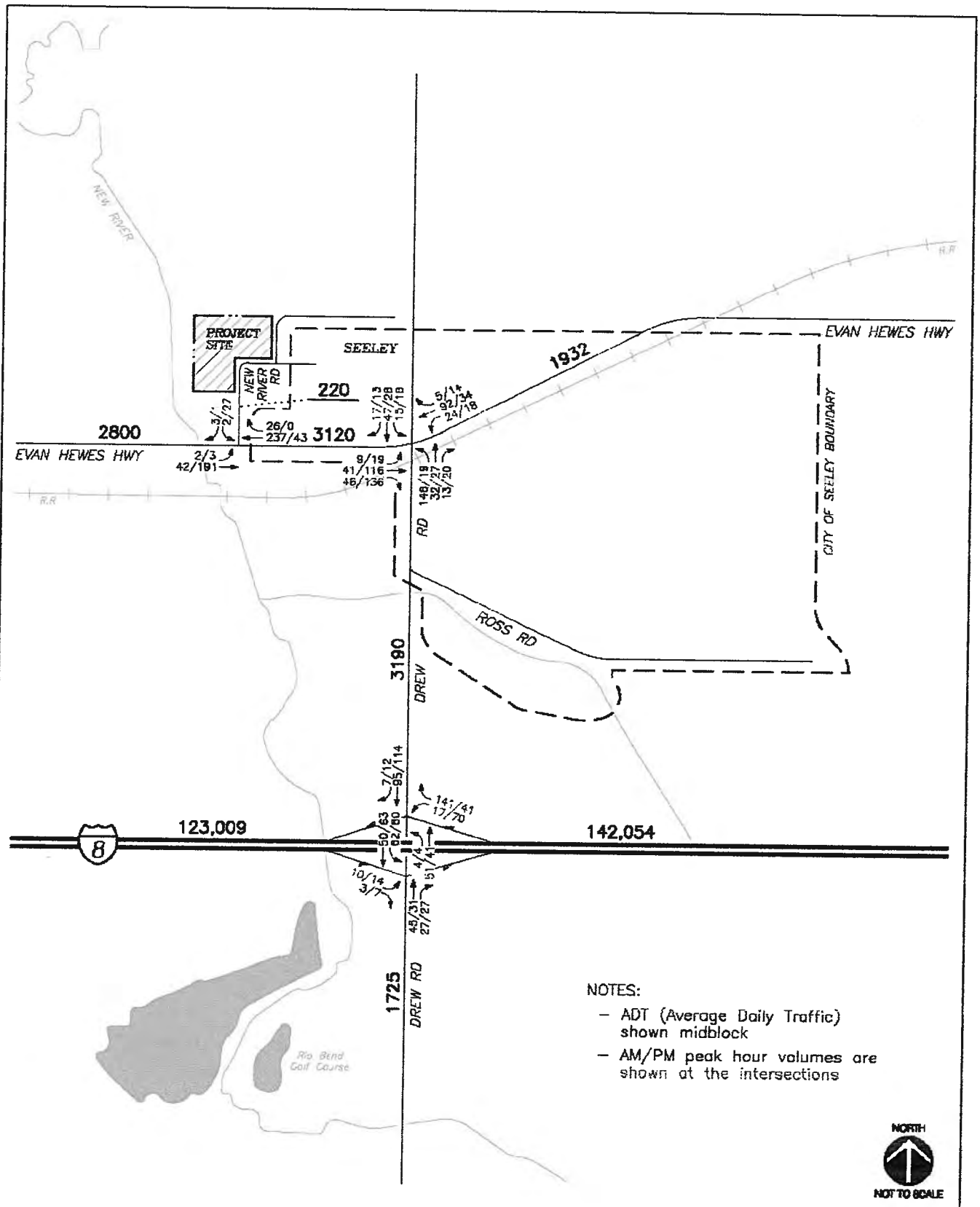
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-7

Total Construction Traffic Volumes (AM/PM Peak Hours & ADT)

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Z:\Projects\6382\05\MAP\DOC\MAPS\CEC Submittal\Figure 2.11-7 Total Const Traffic Vol AMPM Peak Hrs ADT.mxd



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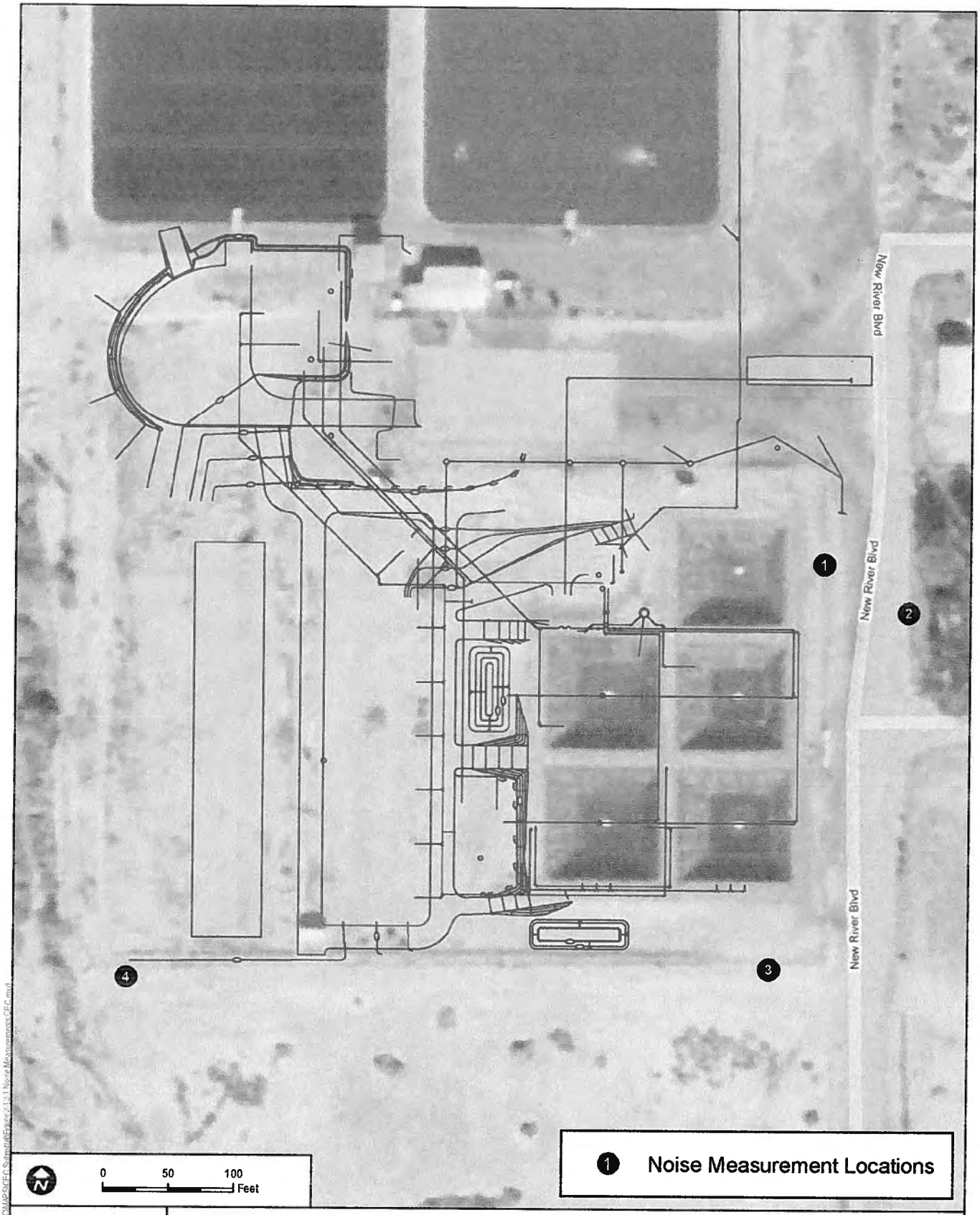
SOURCE: Linscott Law & Greenspan Engineers April 20, 2010.

FIGURE 2.11-8

Existing + Construction Traffic Volumes (AM/PM Peak Hours & ADT)

Seeley County Water District Wastewater Treatment Plant Upgrade Project



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AERIAL AND ROADS SOURCE: Bing Maps 2010; PROPOSED SITE PLAN SOURCE: DUDEK March 9, 2010;
NOISE MEASUREMENT LOCATIONS SOURCE: DUDEK 2010

FIGURE 4

Existing Noise Measurements

Seeley County Water District Wastewater Treatment Plant Upgrade Project

Photo A: View of Project site from intersection of New River Blvd and Rio Vista Street.

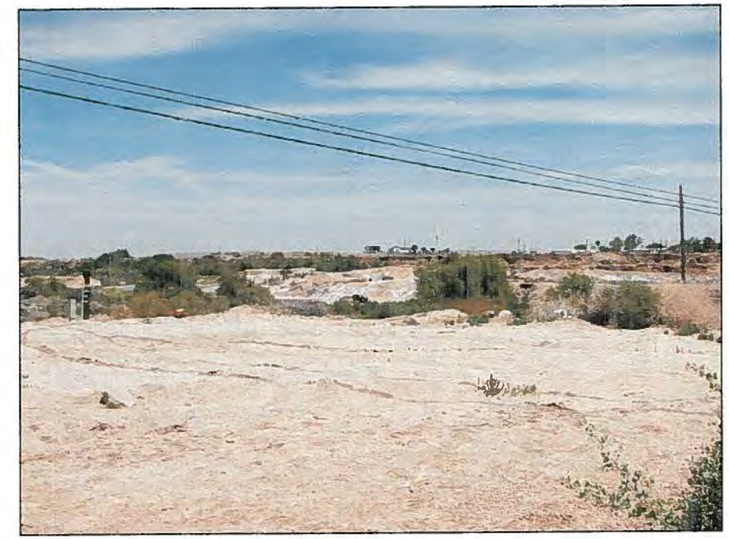

Photo B: Looking northeast towards Project site from County Hwy S80.

Photo C: View of treatment ponds from parking lot on Project site.

Photo D: Looking east from western edge of Project site.

Photo E: Looking southeast from western edge of Project site.

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Seeley County Water District Wastewater Treatment Plant Upgrade Project

FIGURE 2.13-1

Existing Site Photographs

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: P:\300.Environmental\6382-05 Seeley CWD\Work Products\Documents\Technical Reports\Air Quality\Seeley.urb924

Project Name: Seeley Wastewater Reclamation Facility Improvements

Project Location: Imperial County APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5
2010 TOTALS (lbs/day unmitigated)	8.77	58.56	41.48	0.01	50.03	3.72	53.74	10.45	3.42	13.87
2010 TOTALS (lbs/day mitigated)	8.77	58.56	41.48	0.01	22.53	3.72	26.24	4.71	3.42	8.12
2011 TOTALS (lbs/day unmitigated)	10.61	42.55	32.97	0.01	25.03	2.80	27.83	5.23	2.57	7.80
2011 TOTALS (lbs/day mitigated)	10.61	42.55	32.97	0.01	12.97	2.80	15.61	2.71	2.57	5.14

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

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Time Slice 11/15/2010-11/26/2010 Active Days: 10	7.44	49.93	35.66	0.01	25.93	3.07	29.00	5.42	2.82	8.24
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Demolition 11/15/2010-12/06/2010	0.05	0.79	0.24	0.00	0.91	0.03	0.94	0.19	0.03	0.22
Fugitive Dust	0.00	0.00	0.00	0.00	0.91	0.00	0.91	0.19	0.00	0.19
Demo Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo On Road Diesel	0.05	0.79	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	25.00	0.76	25.77	5.22	0.70	5.93
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 11/29/2010-12/6/2010 Active Days: 6	8.77	58.56	41.48	0.01	25.94	3.72	29.66	5.42	3.42	8.84
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demolition 11/15/2010-12/06/2010	0.05	0.79	0.24	0.00	0.91	0.03	0.94	0.19	0.03	0.22
Fugitive Dust	0.00	0.00	0.00	0.00	0.91	0.00	0.91	0.19	0.00	0.19
Demo Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo On Road Diesel	0.05	0.79	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	25.00	0.76	25.77	5.22	0.70	5.93
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 12/7/2010-12/27/2010 Active Days: 15	8.76	58.31	41.40	0.01	**50.03**	3.71	**53.74**	**10.45**	3.41	**13.87**

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Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	25.00	0.76	25.77	5.22	0.70	5.93
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.54	0.16	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.54	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 12/28/2010-12/31/2010 Active Days: 4	7.03	45.36	33.47	0.01	25.02	2.96	27.98	5.23	2.72	7.95
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.54	0.16	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.54	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.88	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/3/2011-1/13/2011 Active Days: 9	6.57	42.40	32.43	0.01	25.02	2.79	27.82	5.23	2.57	7.80
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/14/2011-1/21/2011 Active Days: 6	6.59	42.55	32.90	0.01	25.03	2.80	27.83	5.23	2.57	7.80
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/24/2011-1/24/2011 Active Days: 1	**10.61**	42.55	32.97	0.01	25.03	2.80	27.83	5.23	2.57	7.80

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Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/25/2011-2/7/2011 Active Days: 10	10.47	41.52	31.92	0.01	25.02	2.74	27.77	5.23	2.52	7.75
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 2/8/2011-2/14/2011 Active Days: 5	9.37	34.42	27.27	0.00	25.02	2.19	27.21	5.23	2.01	7.24
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010- 02/14/2011	0.03	0.48	0.15	0.00	25.00	0.02	25.02	5.22	0.02	5.24
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 2/15/2011-3/18/2011 Active Days: 24	5.32	33.94	27.05	0.00	0.02	2.17	2.19	0.01	1.99	2.00
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 3/21/2011-3/21/2011 Active Days: 1	6.25	39.37	30.85	0.00	25.02	2.64	27.66	5.23	2.43	7.66
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Fine Grading 03/21/2011-04/18/2011	0.93	5.43	3.80	0.00	25.00	0.47	25.47	5.22	0.43	5.66
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.90	5.39	3.07	0.00	0.00	0.47	0.47	0.00	0.43	0.43
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 3/22/2011-4/18/2011 Active Days: 20	4.82	29.08	22.78	0.00	25.02	2.03	27.04	5.23	1.86	7.09
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Fine Grading 03/21/2011-04/18/2011	0.93	5.43	3.80	0.00	25.00	0.47	25.47	5.22	0.43	5.66
Fine Grading Dust	0.00	0.00	0.00	0.00	25.00	0.00	25.00	5.22	0.00	5.22
Fine Grading Off Road Diesel	0.90	5.39	3.07	0.00	0.00	0.47	0.47	0.00	0.43	0.43
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 4/19/2011-4/22/2011 Active Days: 4	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Demolition 11/15/2010 - 12/6/2010 - Demolition

Building Volume Total (cubic feet): 0

Building Volume Daily (cubic feet): 2162.69

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On Road Truck Travel (VMT): 30.04

Off-Road Equipment:

Phase: Fine Grading 11/15/2010 - 12/27/2010 - Rough Grading

Total Acres Disturbed: 5

Maximum Daily Acreage Disturbed: 1.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Crawler Tractors (147 hp) operating at a 0.64 load factor for 8 hours per day

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Plate Compactors (8 hp) operating at a 0.43 load factor for 8 hours per day

Phase: Fine Grading 12/7/2010 - 2/14/2011 - Sludge Drying Beds

Total Acres Disturbed: 5

Maximum Daily Acreage Disturbed: 1.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 20.4

Off-Road Equipment:

Phase: Fine Grading 3/21/2011 - 4/18/2011 - Final Grading and Cleanup

Total Acres Disturbed: 5

Maximum Daily Acreage Disturbed: 1.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

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1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

Phase: Trenching 11/15/2010 - 3/21/2011 - Install Yard Piping

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

Phase: Trenching 12/28/2010 - 3/21/2011 - Electrical

Off-Road Equipment:

1 Plate Compactors (8 hp) operating at a 0.43 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Building Construction 11/15/2010 - 4/18/2011 - All-Encompassing Phase for Equipment

Off-Road Equipment:

1 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

1 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 11/29/2010 - 1/24/2011 - Structural Work - Buildings

Off-Road Equipment:

1 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

Phase: Building Construction 11/29/2010 - 2/7/2011 - Structural Work - Concrete

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

2 Pumps (53 hp) operating at a 0.74 load factor for 8 hours per day

Phase: Building Construction 1/14/2011 - 4/22/2011 - Mechanical Work

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Off-Road Equipment:

Phase: Architectural Coating 1/24/2011 - 2/14/2011 - Structural Work - Coatings

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

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Time Slice 11/15/2010-11/26/2010 Active Days: 10	7.44	49.93	35.66	0.01	12.18	3.07	15.25	2.55	2.82	5.37
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Demolition 11/15/2010-12/06/2010	0.05	0.79	0.24	0.00	0.91	0.03	0.94	0.19	0.03	0.22
Fugitive Dust	0.00	0.00	0.00	0.00	0.91	0.00	0.91	0.19	0.00	0.19
Demo Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo On Road Diesel	0.05	0.79	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	11.25	0.76	12.02	2.35	0.70	3.05
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 11/29/2010-12/6/2010 Active Days: 6	8.77	58.56	41.48	0.01	12.19	3.72	15.91	2.55	3.42	5.97
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demolition 11/15/2010-12/06/2010	0.05	0.79	0.24	0.00	0.91	0.03	0.94	0.19	0.03	0.22
Fugitive Dust	0.00	0.00	0.00	0.00	0.91	0.00	0.91	0.19	0.00	0.19
Demo Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo On Road Diesel	0.05	0.79	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	11.25	0.76	12.02	2.35	0.70	3.05
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 12/7/2010-12/27/2010 Active Days: 15	8.76	58.31	41.40	0.01	22.53	3.71	26.24	4.71	3.41	8.12

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Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 11/15/2010-12/27/2010	1.78	13.10	8.80	0.00	11.25	0.76	12.02	2.35	0.70	3.05
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	1.71	13.01	7.23	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.07	0.09	1.57	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.54	0.16	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.54	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 12/28/2010-12/31/2010 Active Days: 4	7.03	45.36	33.47	0.01	11.27	2.96	14.23	2.36	2.72	5.08
Building 11/15/2010-04/18/2011	4.17	25.13	19.28	0.00	0.01	1.63	1.65	0.01	1.50	1.51
Building Off Road Diesel	3.87	24.62	12.88	0.00	0.00	1.62	1.62	0.00	1.49	1.49
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.29	0.36	6.29	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.16	1.13	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06
Building Off Road Diesel	0.13	0.97	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.17	7.50	4.73	0.00	0.00	0.59	0.59	0.00	0.54	0.54
Building Off Road Diesel	1.14	7.33	4.22	0.00	0.00	0.58	0.58	0.00	0.54	0.54
Building Vendor Trips	0.01	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Building Worker Trips	0.02	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.54	0.16	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.54	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Trenching 11/15/2010-03/21/2011	1.45	10.91	7.33	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Off Road Diesel	1.42	10.87	6.55	0.00	0.00	0.64	0.64	0.00	0.59	0.59
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.88	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Trenching Worker Trips	0.04	0.05	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/3/2011-1/13/2011 Active Days: 9	6.57	42.40	32.43	0.01	11.27	2.79	14.07	2.36	2.57	4.93
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/14/2011-1/21/2011 Active Days: 6	6.59	42.55	32.90	0.01	11.28	2.80	14.08	2.36	2.57	4.93
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/24/2011-1/24/2011 Active Days: 1	**10.61**	42.55	32.97	0.01	11.28	2.80	14.08	2.36	2.57	4.93

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Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Building 11/29/2010-01/24/2011	0.15	1.03	1.05	0.00	0.00	0.06	0.06	0.00	0.05	0.05
Building Off Road Diesel	0.12	0.89	0.57	0.00	0.00	0.05	0.05	0.00	0.05	0.05
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/25/2011-2/7/2011 Active Days: 10	10.47	41.52	31.92	0.01	11.27	2.74	14.02	2.36	2.52	4.88
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01

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Building 11/29/2010-02/07/2011	1.10	7.10	4.65	0.00	0.00	0.56	0.56	0.00	0.51	0.51
Building Off Road Diesel	1.07	6.95	4.17	0.00	0.00	0.55	0.55	0.00	0.51	0.51
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 2/8/2011-2/14/2011 Active Days: 5	9.37	34.42	27.27	0.00	11.27	2.19	13.46	2.36	2.01	4.37
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Coating 01/24/2011-02/14/2011	4.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading 12/07/2010-02/14/2011	0.03	0.48	0.15	0.00	11.25	0.02	11.27	2.35	0.02	2.37
Fine Grading Dust	0.00	0.00	0.00	0.00	11.25	0.00	11.25	2.35	0.00	2.35
Fine Grading Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading On Road Diesel	0.03	0.48	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02
Fine Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 2/15/2011-3/18/2011 Active Days: 24	5.32	33.94	27.05	0.00	0.02	2.17	2.19	0.01	1.99	2.00
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 3/21/2011-3/21/2011 Active Days: 1	6.25	39.37	30.85	0.00	12.97	2.64	15.61	2.71	2.43	5.14
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Fine Grading 03/21/2011-04/18/2011	0.93	5.43	3.80	0.00	12.95	0.47	13.43	2.71	0.43	3.14
Fine Grading Dust	0.00	0.00	0.00	0.00	12.95	0.00	12.95	2.71	0.00	2.71
Fine Grading Off Road Diesel	0.90	5.39	3.07	0.00	0.00	0.47	0.47	0.00	0.43	0.43
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 11/15/2010-03/21/2011	1.38	10.13	7.25	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Off Road Diesel	1.35	10.09	6.51	0.00	0.00	0.61	0.61	0.00	0.56	0.56
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 12/28/2010-03/21/2011	0.05	0.15	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Trenching Off Road Diesel	0.02	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 3/22/2011-4/18/2011 Active Days: 20	4.82	29.08	22.78	0.00	12.97	2.03	15.00	2.71	1.86	4.57
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building 11/15/2010-04/18/2011	3.86	23.50	18.50	0.00	0.01	1.55	1.56	0.01	1.42	1.43
Building Off Road Diesel	3.58	23.04	12.51	0.00	0.00	1.53	1.53	0.00	1.41	1.41
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.27	0.34	5.88	0.00	0.01	0.01	0.02	0.00	0.01	0.01
Fine Grading 03/21/2011-04/18/2011	0.93	5.43	3.80	0.00	12.95	0.47	13.43	2.71	0.43	3.14
Fine Grading Dust	0.00	0.00	0.00	0.00	12.95	0.00	12.95	2.71	0.00	2.71
Fine Grading Off Road Diesel	0.90	5.39	3.07	0.00	0.00	0.47	0.47	0.00	0.43	0.43
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.04	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 4/19/2011-4/22/2011 Active Days: 4	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building 01/14/2011-04/22/2011	0.03	0.15	0.48	0.00	0.00	0.01	0.01	0.00	0.00	0.01
Building Off Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Building Worker Trips	0.02	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/15/2010 - 12/27/2010 - Rough Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

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For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Fine Grading 12/7/2010 - 2/14/2011 - Sludge Drying Beds

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Fine Grading 3/21/2011 - 4/18/2011 - Final Grading and Cleanup

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

LINSCOTT
LAW &
GREENSPAN
engineers

TRAFFIC IMPACT ANALYSIS

SEELEY COUNTY WATER DISTRICT
WWTP UPGRADE

County of Imperial, California
April 20, 2010

Prepared for:
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LLG Ref. 3-10-1950

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TRAFFIC IMPACT ANALYSIS

SEELEY COUNTY WATER DISTRICT WWTP UPGRADE

County of Imperial, California
April 20, 2010

1.0 INTRODUCTION

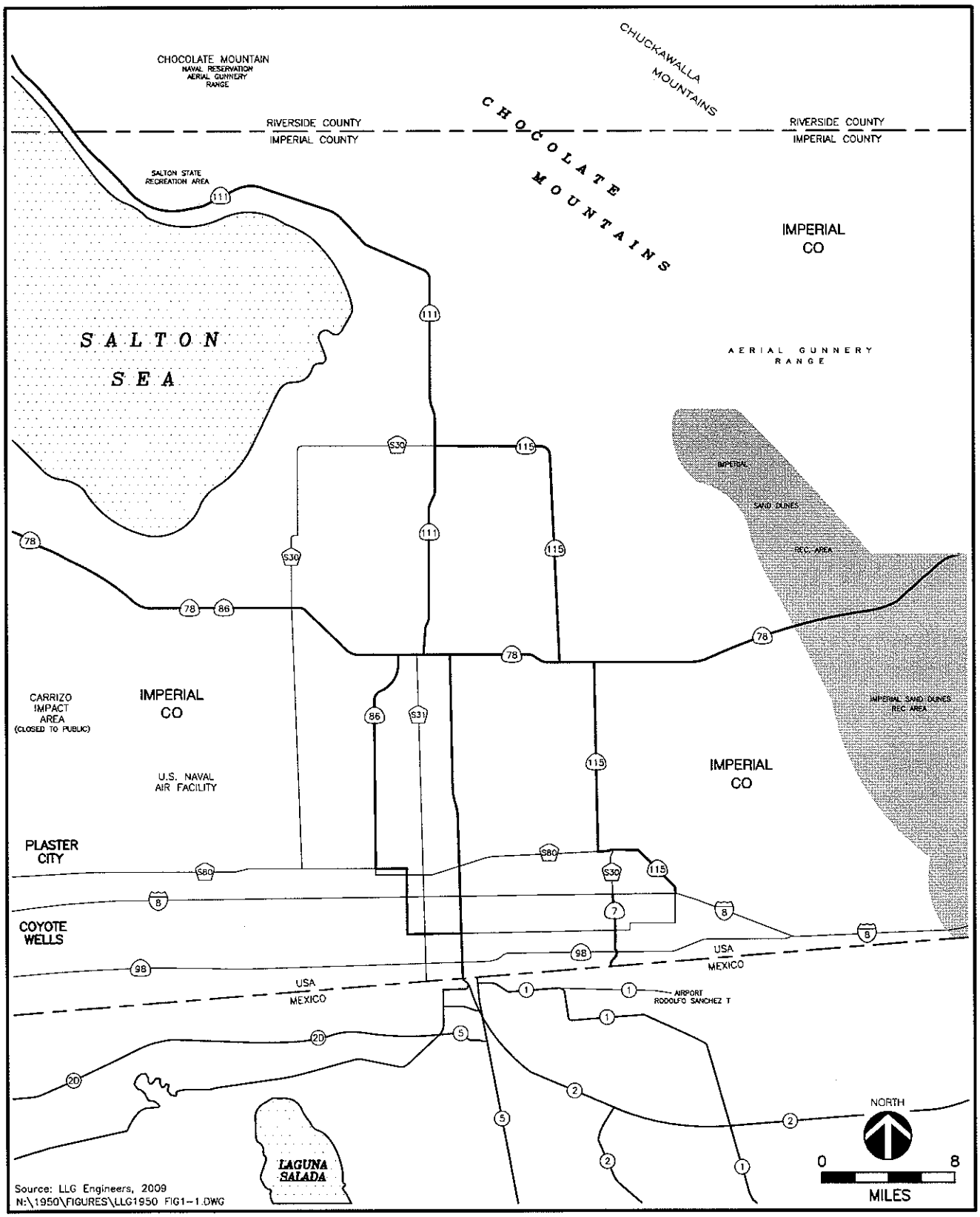
The Seeley County Water District (District) currently operates a complete wastewater collection system, including an existing Wastewater Treatment Plant (WWTP) serving the unincorporated community of Seeley, in the County of Imperial. The existing WWTP is located north of Evan Hewes Highway, west of Drew Road.

The District is planning to upgrade the existing treatment plant to a tertiary treatment process, resulting in a facility that meets water recycling criteria. This upgrade is intended to prevent future National Pollutant Discharge Elimination System (NPDES) permit violations by providing a robust and reliable treatment system that does not exceed established and permitted effluent limits. The District would also be able to meet the Seeley community's existing and future recycled water needs, thereby preserving fresh water resources in the Imperial Valley.

This study will address the operations of intersections and segments during the construction due to construction truck and employee traffic. The report includes the following sections:

- Project Description
- Existing Conditions
- Analysis Approach and Methodology
- Significance Criteria
- Analysis of Existing Condition
- Trip Generation / Distribution / Assignment
- Analysis of Construction Year Conditions
- Significance of Impacts and Mitigation Measures

Figure 1-1 depicts the project vicinity.



Source: LLG Engineers, 2009
N:\1950\FIGURES\LLG1950 FIG1-1.DWG

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Figure 1-1

Vicinity Map

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Seeley County Water District (District) currently operates a complete wastewater collection system, including an existing Wastewater Treatment Plant (WWTP) serving the unincorporated community of Seeley, which is located within Imperial County, California, north of Evan Hewes Highway at Drew Road. The existing WWTP is located along the northwestern boundary of the unincorporated Town of Seeley, immediately east of the New River and west of New River Road. The District currently serves the Seeley community's sewage collection and treatment service needs.

Figure 2-1 shows the site plan.

2.2 Project Description

Prior to 2004, the WWTP consisted of two 2.4-acre facultative treatment ponds. In 2004, as part of the District's updated wastewater master plan, this system was updated and partially replaced by secondary treatment facilities. Design and construction of replacement secondary treatment facilities were completed in 2004 and consisted of a lift station, a drum screen, a bar screen, a Clemson aerated pond system with surface aerators, pressure sand filters, and an ultraviolet disinfection system. The pond system included five treatment ponds, including two 0.12-acre "reactor" ponds and three 0.14-acre sedimentation ponds.

In 2005, one of the original 2.4-acre facultative treatment ponds was retrofitted to serve as a primary oxidation pond that precedes the series of five treatment ponds. The drum screen and bar screen were no longer in service. In July 2009, the existing influent pump station was replaced as and a new 15-inch diameter gravity sewer main and influent pump station were installed on the WWTP site.

The existing WWTP has the permitted capacity to treat up to 250,000 gallons per day (gpd) of wastewater to secondary standards; however, the WWTP currently treats approximately 120,000 gpd. The WWTP currently includes a series of five treatment ponds, including two 0.12-acre "reactor ponds" (Nos. 1 and 2) and three 0.14-acre sedimentation ponds (Nos. 3, 4, and 5). Once treated, the effluent is piped to a drainage ditch located immediately northwest of the WWTP property, which then discharges into the New River.

The District is currently planning to upgrade the existing treatment plant to a tertiary treatment process, resulting in a facility that meets water recycling criteria as established in the California Code of Regulations Title 22 for unrestricted reuse. This upgrade is intended to prevent future National Pollutant Discharge Elimination System (NPDES) permit violations by providing a robust and reliable treatment system that does not exceed established and permitted effluent limits. In addition to improving water quality, by upgrading the facility's treatment process to tertiary Title 22 standards, the District would be able to meet the Seeley community's existing and future recycled water needs, thereby preserving fresh water resources in the Imperial Valley.

During project design, several engineering analyses were performed to determine how to meet Title 22 treatment requirements while also re-using existing infrastructure to the maximum extent practical. The proposed design addresses both of these issues through an activated sludge system. Various improvement designs were analyzed and compared through a cost/benefit analysis. To upgrade the existing WWTP to a Title 22 tertiary treatment facility, the Proposed Project will retrofit the existing WWTP with a modified Biolac® process, followed by membrane microfiltration, and resulting in a membrane bioreactor process. This will be followed by an ultraviolet disinfection process to reliably produce Title 22 recycled water for unrestricted uses.

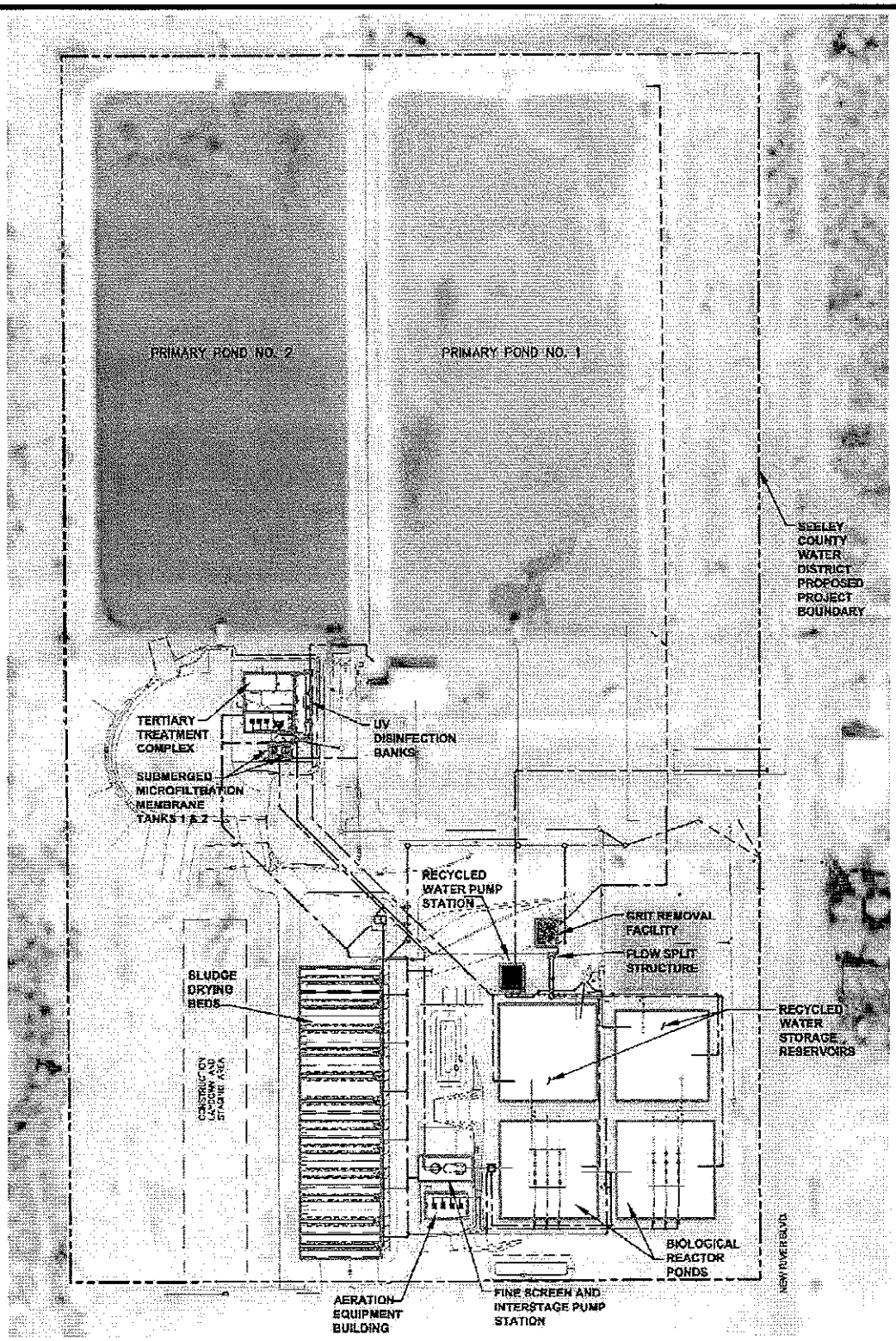
The Proposed Project design comprises the following major components:

- Modification of two of the five existing treatment ponds (Nos. 3 and 4) to a modified Biolac® process, conversion of two of the five treatment ponds (Nos. 2 and 5) to in-ground earthen basins lined with a synthetic flexible membrane and a floating cover for storage of at least 300,000 gallons of recycled water, and abandonment of the final pond (No. 1);
- Upgrade in-plant pumping facilities, including an upgraded influent pump station, new interstage pump station, new permeate pump station, new waste sludge pump station, and a new recycled water pump station;
- Installation of new grit removal system, fine screens upstream of the interstage pump station, and two new submerged microfiltration membranes;
- Installation of an open channel ultraviolet disinfection system;
- Installation of skid-mounted sodium hypochlorite system and on-site sludge-drying beds;
- Construction of a Tertiary Treatment Complex and Aeration Equipment Building; and
- Installation of facility utilities (process piping and water system), expanded electrical system, and paved access roads.

2.3 Operations and Maintenance Considerations

The project site contains an existing wastewater treatment facility and also serves as the Seeley County Water District administration facility (main office and board room). All District staff (collections, distribution, water treatment, wastewater treatment, admin, management, etc.), report to the facility throughout the course of the typical daily routine. Public access for bill payment or attendance at board meetings takes place at the project site. It is anticipated that the District may need to increase staff by up to two dedicated staff specific to the upgraded (Tertiary) SWWTP operations and maintenance requirements.

The project does not expand treatment capacity but does add sophistication to the process. The existing plant is staffed between 7am and 5pm, Monday through Friday with designated staff "on-call" on the weekends for emergencies. The upgraded plant will contain necessary monitoring and alarm systems such that remote monitoring will be feasible. The need for an increased operational schedule is not anticipated.



Source: DigitalGlobe 2006; Treatment Plant Source: Dudek, March 2010
N:\1950\Figures\LLG1950 FIG 2-1

LINSCOTT LAW & GREENSPAN engineers

Figure 2-1

Site Plan

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

3.0 EXISTING CONDITIONS

3.1 Existing Street Network

Following is a brief description of the street segments within the project area. ***Figure 3-1*** illustrates the existing conditions, including the lane geometry, for the key intersections in the study area.

Drew Road is classified as a four-lane collector on the Imperial County Circulation Element. It is currently constructed as a two-lane undivided north-south roadway, providing one lane of travel per direction. No bike lanes or bus stops are provided along the roadway and no parking is permitted along either side of the roadway. The posted speed limit is 55 mph.

Evan Hewes Highway is a two-lane undivided east-west roadway, providing one lane of travel per direction on the Imperial County Circulation Element, in the project vicinity. No bike lanes or bus stops are provided along the roadway and no parking is permitted along either side of the roadway. The posted speed limit is 55 mph.

New River Road is an unclassified two-lane undivided roadway serving industrial and residential streets. No bike lanes or bus stops are provided along the roadway. For analysis purposes and to be conservative, the capacity of a residential street was utilized.

3.2 Existing Traffic Volumes

3.2.1 *Peak Hour Intersection Turning Movement Volumes*

AM and PM peak hour intersection turning movement volume counts were conducted in March 2010 by LLG Engineers. ***Figure 3-2*** depicts the peak hour intersection turning movement volumes at all the study area intersections.

3.2.2 Segment Volumes

Daily traffic (ADT) volume counts were conducted by LLG Engineers during March 2010. ***Figure 3-2*** depicts the segment ADT volumes at all the study area segments. ***Table 3-1*** summarizes the segment ADT volumes on all the study area segments. ***Appendix A*** contains the manual count sheets.

TABLE 3-1
EXISTING TRAFFIC VOLUMES

Street Segment	Source	Date	ADT[a]
New River Road			
North of Evan Hewes Highway	LLG Engineers	March 17, 2010	100
Drew Road			
I-8 WB Ramps to Evan Hewes Highway	LLG Engineers	March 17, 2010	3,100
Evan Hewes Highway			
West of New River Road	LLG Engineers	March 17, 2010	2,800
New River Road to Drew Road	LLG Engineers	March 17, 2010	3,000

Footnotes
a. Average Daily Traffic Volume.

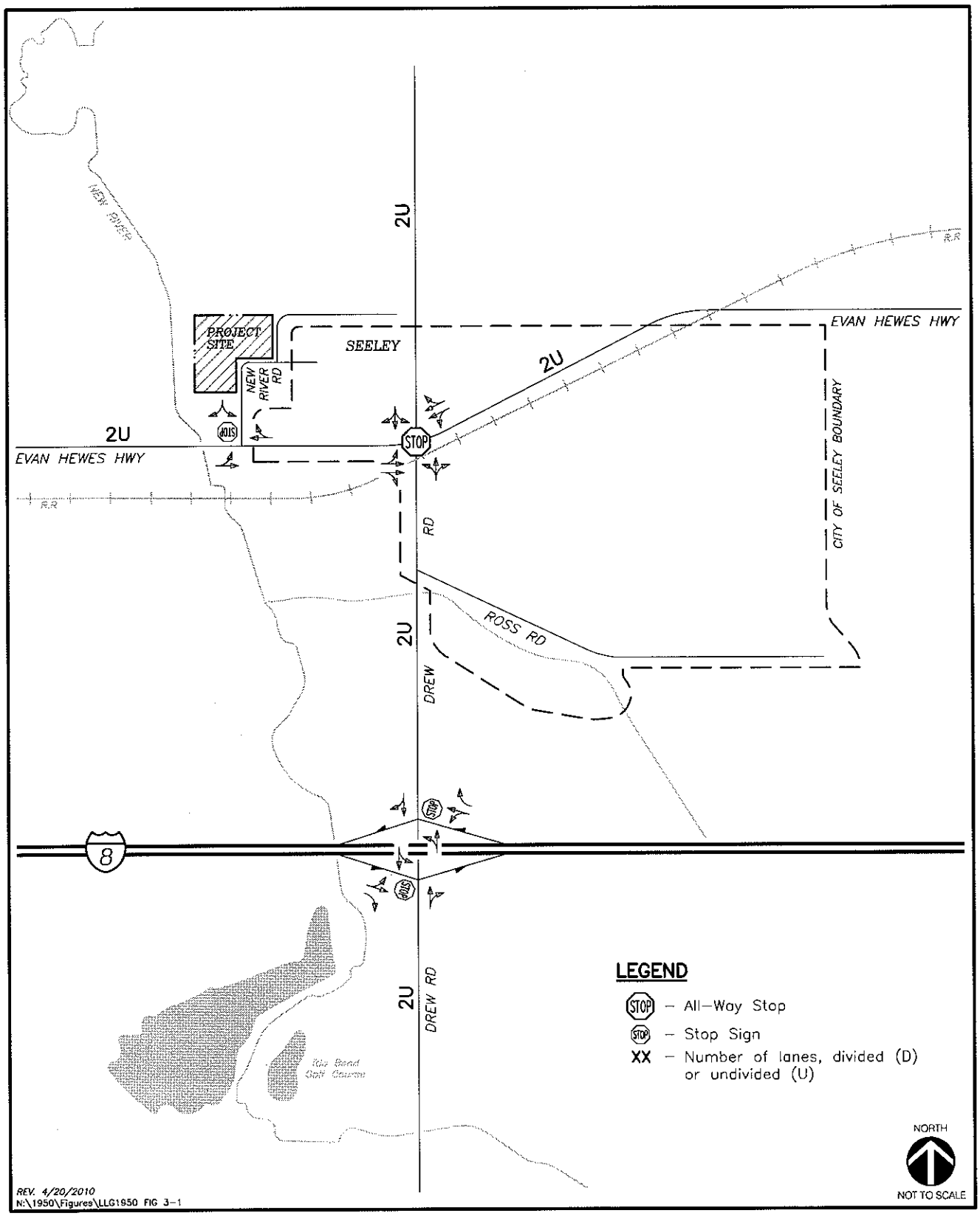


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Figure 3-1

Existing Conditions Diagram

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

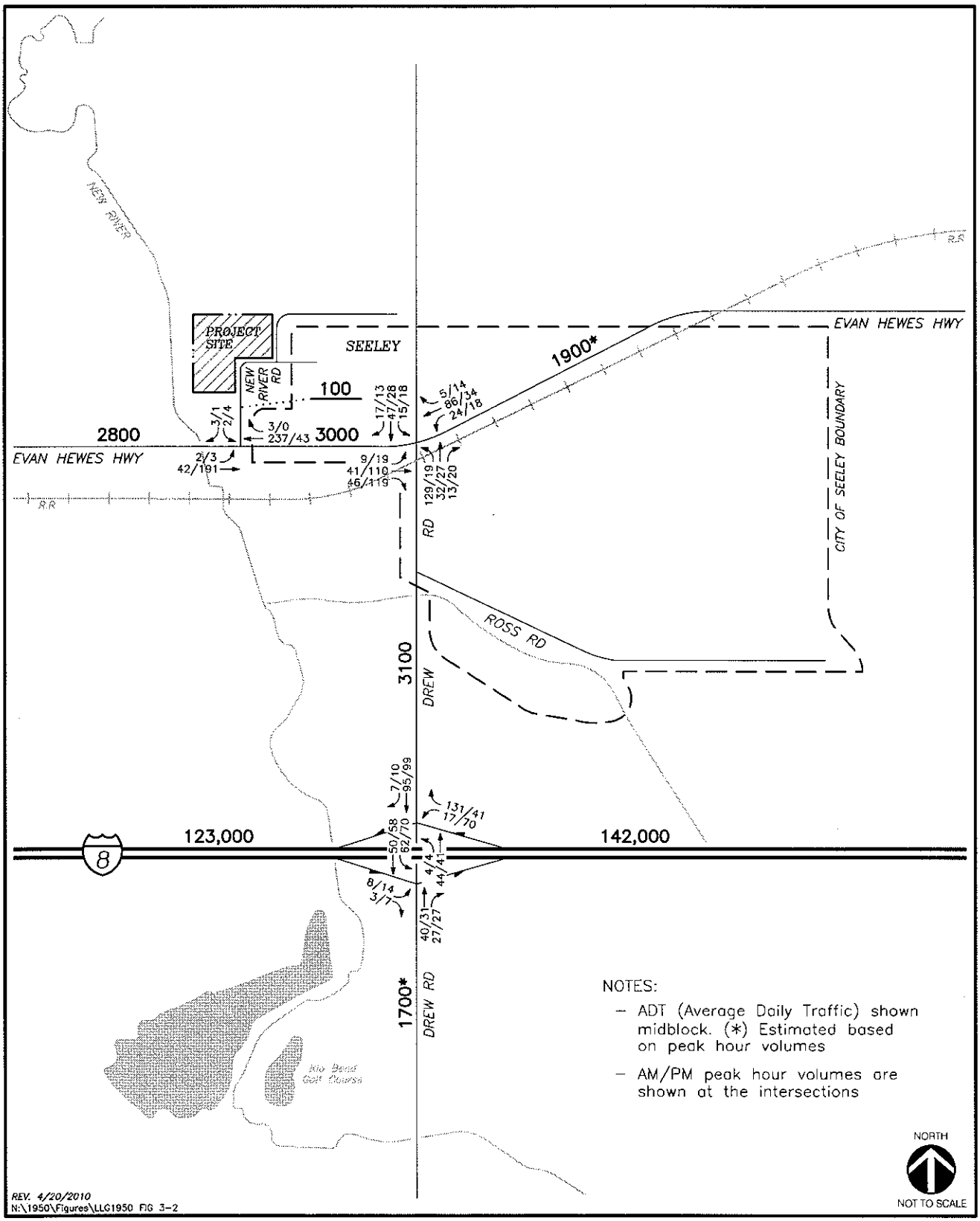

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Figure 3-2

Existing Traffic Volumes

AM/PM Peak Hours & ADT

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

4.0 ANALYSIS APPROACH AND METHODOLOGY

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A through F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments. ***Table 4–1*** summaries the description for each level of service.

4.1 Unsignalized Intersections

For unsignalized intersections, level of service is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. ***Table 4–2*** depicts the criteria, which are based on the Average control delay for any particular minor movement.

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This level of service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits.

LOS F may also appear in the form of side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

TABLE 4-1
INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Description
A	Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.
F	Considered to be unacceptable to most drivers. This condition often occurs with over saturation i.e. when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume-to-capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

TABLE 4-2
LEVEL OF SERVICE THRESHOLDS FOR UNSIGNALIZED INTERSECTIONS

Average Control Delay Per Vehicle (Seconds/Vehicle)	Level of Service	Expected Delay to Minor Street Traffic
0.0 ≤ 10.0	A	Little or no delay
10.1 to 15.0	B	Short traffic delays
15.1 to 25.0	C	Average traffic delays
25.1 to 35.0	D	Long traffic delays
35.1 to 50.0	E	Very long traffic delays
≥ 50.0	F	Severe congestion

4.2 Street Segments

Street segments were analyzed based upon the comparison of ADT to the County of Imperial *Roadway Classifications, Levels of Service (LOS) and Average Daily Traffic (ADT)* table (see ***Table 4-3*** below). *Table 4-3* provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. Segment analysis is a comparison of ADT volumes and an approximate daily capacity on the subject roadway.

TABLE 4-*3*
IMPERIAL COUNTY STANDARD STREET CLASSIFICATION AVERAGE DAILY VEHICLE TRIPS

Road		Level of Service W/ADT**				
Class	**X-Section**	**A**	**B**	**C**	**D**	**E**
Expressway	128 / 210	30,000	42,000	60,000	70,000	80,000
Prime Arterial	106 / 136	22,200	37,000	44,600	50,000	57,000
Minor Arterial	82 / 102	14,800	24,700	29,600	33,400	37,000
Collector	64 / 84	13,700	22,800	27,400	30,800	34,200
Local Collector	40 / 70	1,900	4,100	7,100	10,900	16,200
Residential Street	40 / 60	*	*	< 1,500	*	*
Residential Cul-de-Sac / Loop Street	40/60	*	*	< 1,500	*	*
Industrial Collector	76 / 96	5,000	10,000	14,000	17,000	20,000
Industrial Local Street	44 / 64	2,500	5,000	7,000	8,500	10,000

* Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

5.0 SIGNIFICANCE CRITERIA

5.1 County of Imperial

The significance criteria summarized in ***Table 5–1*** developed by Linscott, Law and Greenspan, Engineers is based upon the County of Imperial's goal for intersections and roadway segments to operate at LOS C or better.

TABLE 5-1
SIGNIFICANCE CRITERIA

Intersections			
Existing	**Existing + Project**	**Existing + Project + Cumulative Projects**	**Impact Type**
LOS [a] C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS D or worse	—	Direct
LOS D	LOS D and adds 2.0 seconds or more of delay	—	Cumulative
LOS D	LOS E or F	—	Direct
LOS E	LOS F	—	Direct
LOS F	LOS F and delay increases by ≥ 10.0 seconds	—	Direct
Any LOS	Project does not degrade LOS and adds 2.0 to 9.9 seconds of delay	LOS E or worse	Cumulative
Any LOS	Project does not degrade LOS and adds < 2.0 seconds of delay	Any LOS	None
Segments			
Existing	**Existing + Project**	**Existing + Project + Cumulative Projects**	**Impact Type**
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS C or better and v/c [b] > 0.02	LOS D or worse	Cumulative
LOS C or better	LOS D or worse	—	Direct [c]
LOS D	LOS D and v/c > 0.02	—	Cumulative
LOS D	LOS E or F	—	Direct
LOS E	LOS F	—	Direct
LOS F	LOS F and v/c [c] increases by > 0.09	—	Direct
Any LOS	LOS E or worse and v/c 0.02 to 0.09	LOS E or worse	Cumulative
Any LOS	LOS E or worse and v/c < 0.02	Any LOS	None

Source: Linscott, Law & Greenspan, Engineers

Footnotes:

a. Level of Service
b. Volume to Capacity Ratio
c. Exception: post-project segment operation is LOS D and intersections along segment are LOS D or better results in no significant impact.

In general, a LOS C or better that degrades to a LOS D or worse is considered a significant direct impact. A cumulative impact can occur if the intersection or segment level of service is already operating below City / County standards and the project increases the delay by more than 2 seconds or the v/c ratio by more than 0.02.

The desirable operation for freeway mainline segments is LOS D or better. Should the mainline level of service degrade to LOS E or F with the addition of project traffic, and increase the volume to capacity ratio (v/c) by more than 0.01, the impact is considered to be direct and significant. An impact is considered cumulative if the mainline is already operating at LOS E or F and the v/c increase is greater than 0.01.

5.2 Caltrans

A project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds for roadway segments and intersections are defined in ***Table 5–2*** below. If the project exceeds the thresholds in *Table 5–2*, then the project may be considered to have a significant project impact. A feasible mitigation measure will need to be identified to return the impact within the thresholds (pre-project + allowable increase) or the impact will be considered significant and unmitigated.

TABLE 5–2
TRAFFIC IMPACT SIGNIFICANT THRESHOLDS

Level of Service with Project [a]	Allowable Increase Due to Project Impacts[b]					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D, E & F (*or ramp meter delays above 15 minutes*)	0.01	1	0.02	1	2	2[c]

Footnotes:

a. All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

b. If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigations (within the Traffic Impact Study [TIS] report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see note a above), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

General Notes:

1. V/C = Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters.
4. LOS = Level of Service

6.0 ANALYSIS OF EXISTING CONDITIONS

6.1 Peak Hour Intersection Levels of Service

The project study area is located in a rural setting and all intersections are unsignalized. As seen in ***Table 6-1,*** all study area intersections are calculated to currently operate at LOS B or better conditions.

Appendix B contains the peak hour intersection analysis worksheets.

TABLE 6–1
EXISTING INTERSECTION OPERATIONS

Intersection	Traffic Control	Peak Hour	Delay [a]	LOS [b]
1. Evan Hewes Highway / New River Road	MSSC [c]	AM	10.0	B
		PM	9.8	A
2. Evan Hewes Highway / Drew Road	AWSC [d]	AM	8.5	A
		PM	7.9	A
3. I-8 Westbound Ramps / Drew Road	MSSC [c]	AM	9.3	A
		PM	9.6	A
4. I-8 Eastbound Ramps / Drew Road	MSSC [c]	AM	10.0	B
		PM	10.0	B

Footnotes

a. Delay per vehicle in seconds
b. LOS - Level of service
c. MSSC - Minor street STOP Controlled intersection. Minor street left-turn delay is reported.
d. AWSC - All-Way STOP Controlled intersection.

UNSIGNALIZED	
Delay	LOS
0.0 < 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
> 50.1	F

6.2 Daily Street Segment Levels of Service

As described above, the project study area is located in a rural setting and all segments are two-lane facilities. As seen in ***Table 6-2***, all study area segments are calculated to currently operate at LOS C or better.

TABLE 6-2
EXISTING SEGMENT OPERATIONS

Street Segment	Roadway Classification [a]	LOS E Capacity [b]	ADT[c]	V/C [d]	LOS [e]
New River Road					
North of Evan Hewes Highway	Residential Street	[f]	100	[f]	C
Drew Road					
I-8 WB Ramps to Evan Hewes Highway	2-Lane Collector [g]	16,200	3,100	0.19	B
Evan Hewes Highway					
West of New River Road	2-Lane Highway [g]	16,200	2,800	0.17	B
New River Road to Drew Road	2-Lane Highway [g]	16,200	3,000	0.19	B

Footnotes

a. County of Imperial Valley roadway classification
b. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
c. Average Daily Traffic volumes
d. Volume / Capacity ratio.
e. Level of Service
f. Unclassified residential street. Volume of 1500 or less at level of service C is considered acceptable.
g. Currently built as a two-lane facility and has the equivalent LOS E capacity of a Local Collector and is therefore analyzed as such.

7.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

7.1 Passenger Car Equivalence

The traffic associated with the proposed construction activities at the project site includes trucks of varying sizes. Trucks potentially have greater impacts on a roadway network than passenger cars. A passenger-car equivalent factor was applied to the truck traffic to account for this fact. Exhibit 23-8, Passenger-Car Equivalents on Extended Freeway Segments in the *Highway Capacity Manual, 2000* recommends Passenger Car Equivalence of 2.5 for heavy vehicles on level terrain. Most of the study area is level terrain. Hence, this factor was applied to the truck trips.

7.2 Determination of the Maximum Construction Traffic

The amount of truck traffic associated with each construction activity was first determined. The number of construction staff for each phase of construction was also determined. As seen in ***Table 7-1***, the highest amount of truck activity (8 truck trips) is seen in Phases II and III. In most phases it is estimated that there will be a maximum of 100 employee trips.

7.3 Trip Generation – Construction Traffic

Applying the PCE factor of 2.5, it is estimated that a maximum of 120 daily trips will be generated during the proposed construction activities. A total of 23 trips (***Table 7-2***) are expected to be generated during the AM and PM peak hours.

It is likely that none of the daily 8 truck trips will occur during the peak hours, however, as a worst case, it is assumed that at least one truck trip would occur during each peak hour.

7.4 Trip Generation – Post Construction Operational Traffic

As described in Section 2.3 Post-Construction Operations and Maintenance, with the completion of the project, it is anticipated that there will be an increase in the staff by 2 employees. Assuming another 10 people needing access for bill payment and attendance at board meetings, the increase in trip generation post construction is estimated in *Table 7-1* (daily traffic) and *Table 7-2* (peak hour traffic). As seen in *Tables 7-1* and *7-2*, the increase in post construction traffic will be 24 daily trips and 4 trips during the AM and PM peak hours.

TABLE 7-1
MAXIMUM CONSTRUCTION TRAFFIC - DAILY

Activities	Trucks						Employee Vehicles		Total Trips
	Number			Trips [a]	PCE [b]	Trucks as Passenger Cars [c]	Number	Trips [d]	
	Const	Water	Total						
CONSTRUCTION [e]									
Phase I: Procurement and Mobilization	0	0	0	0	2.5	0	0	0	0
Phase II: General Civil	1	3	4	8	2.5	20	25	100	120
Phase III: Structural	2	2	4	8	2.5	20	25	100	120
Phase IV: Mechanical	0	0	0	0	2.5	0	25	100	100
Phase V: Electrical	0	0	0	0	2.5	0	25	100	100
Phase VI: Start-up, Testing, Commissioning and Training	0	0	0	0	2.5	0	12	48	48
Highest of the Above [f]				8	2.5	***20***	25	***100***	**120**
OPERATIONS AND MAINTENANCE									
Staff	0	0	0	0	0		2	4	4
Customers	0	0	0	0	0		10	20	20
Total Operations and Maintenance						***0***	12	***24***	**24**

Footnotes

a. Each truck generates two trip ends, one inbound trip to the site and one outbound trip from the site.
b. "Passenger Car Equivalence" (PCE) factor. The surrounding terrain is generally level and the PCE factor is 2.5 for level terrain per Exhibit 20-9 Highway Capacity Manual (HCM).
c. Applying the PCE factor to the truck trips, the passenger car equivalent trips is obtained.
d. Each staff member is assumed to generate four trips, to and from work and a midday trip to and from lunch.
e. The various construction phases will not occur simultaneously. Each construction phase shall begin upon the completion of the previous phase.
f. Since the Construction phases will not occur simultaneously, for a conservative analysis, the traffic that is highest of all the phases is selected as the construction traffic for analysis.

TABLE 7-2
AM / PM PEAK HOUR CONSTRUCTION TRAFFIC

Activities	Truck Traffic				Employee Vehicles		Total AM / PM Peak Hour Trips
	Daily Truck Trips [a]	AM / PM Peak Hour	PCE [b]	Trucks as Passenger Cars [c]	Daily [d]	AM / PM Peak Hour [e]	
CONSTRUCTION							
Highest of all Phases [f]	8	1	2.5	3	100	20	23
Total Construction				**3**	**100**		**23**
OPERATIONS AND MAINTENANCE							
Staff	0	0	2.5	0	4	3	3
Customers	0	0	2.5	0	20	1	1
Total Operations and Maintenance				**0**	**24**		**4**

Footnotes

a. Each truck generates two trip ends, one inbound trip to the site and one outbound trip from the site.
b. "Passenger Car Equivalence" (PCE) factor. The surrounding terrain is generally level and the PCE factor is 2.5 for level terrain per Exhibit 20-9 Highway Capacity Manual (HCM).
c. Applying the PCE factor to the truck trips, the passenger car equivalent trips is obtained.
d. Each staff member is assumed to generate four trips, to and from work and a midday trip to and from lunch.
e. 80 percent of the construction staff ((20 trips) is assumed to arrive for work during the AM peak hour and leave during the PM peak hour.
f. Since the Construction phases will not occur simultaneously, for a conservative analysis, the traffic that is highest of all the phases is selected as the construction traffic for analysis.

7.5 Trip Distribution

All excavated material is expected to be used on-site and no grading material will be required from off-site locations. Therefore, excavation and grading activities are not expected to generate truck traffic on a daily basis. Civil work will include pre-cast concrete structures and if concrete is needed, it will be hauled from nearby sources in Imperial Valley and will generally access the site via I-8 / Drew Road and Evan Hewes Highway. Most pre-cast slabs and mechanical and electrical equipment will be hauled in on I-8.

Based on the above, the trip distribution for construction truck traffic was estimated for construction truck traffic and is depicted on ***Figure 7-1***.

The population centers for employees are El Centro and Calexico. The distribution of employee traffic was determined based on the locations of population centers and is depicted on ***Figure 7-2***.

7.6 Project Trip Assignment

The truck and employee vehicle traffic were distributed based on the respective distribution percentages (*Figures 7-1* and *7-2*).

The construction truck assignment is depicted on ***Figure 7-3*** and ***Figure 7-4*** depicts the employee vehicle traffic assignment. ***Figure 7-5*** depicts the total construction traffic assignment, while ***Figure 7-6*** depicts the Construction year with project traffic volumes.

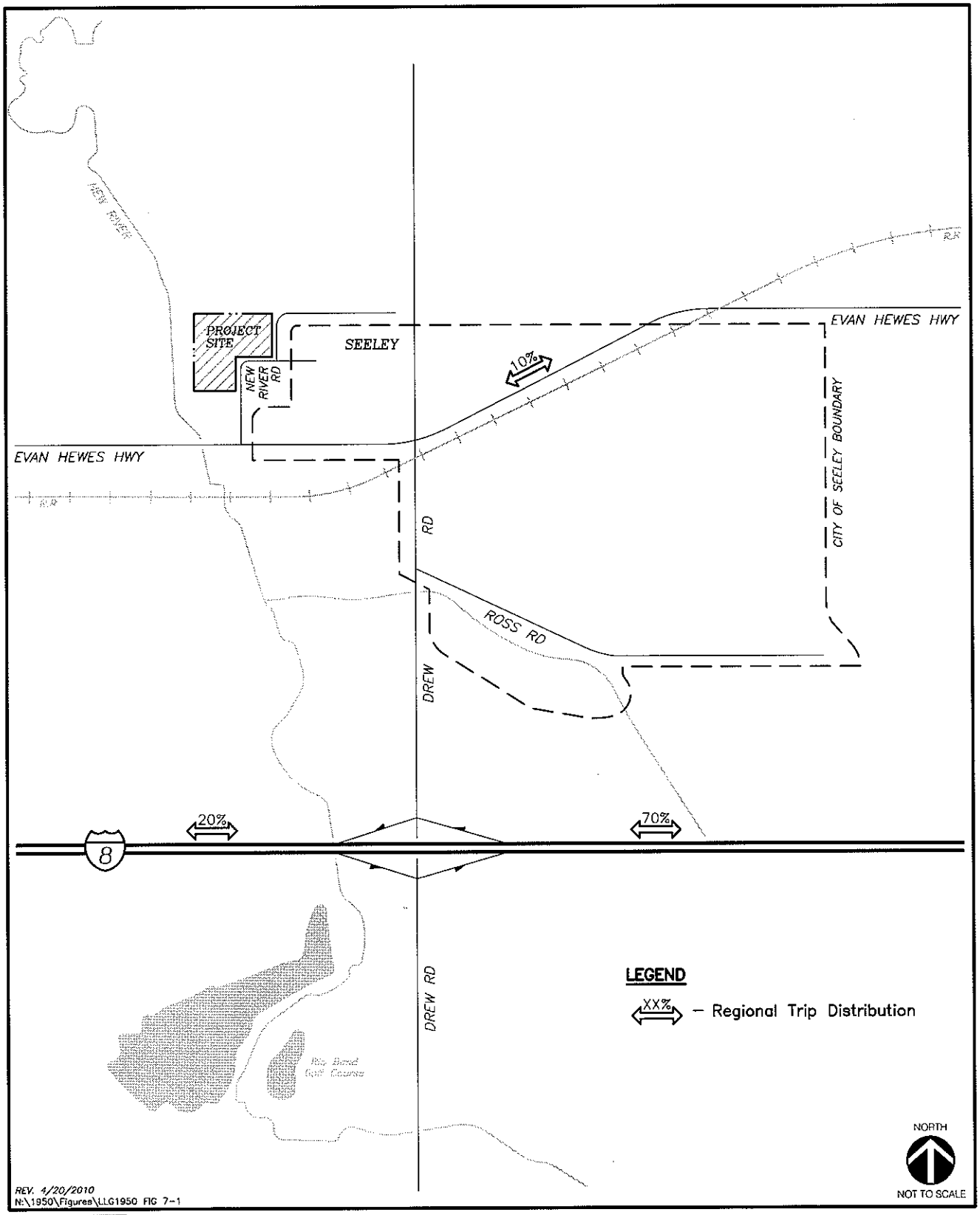

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Figure 7-1

Truck Traffic Distribution

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

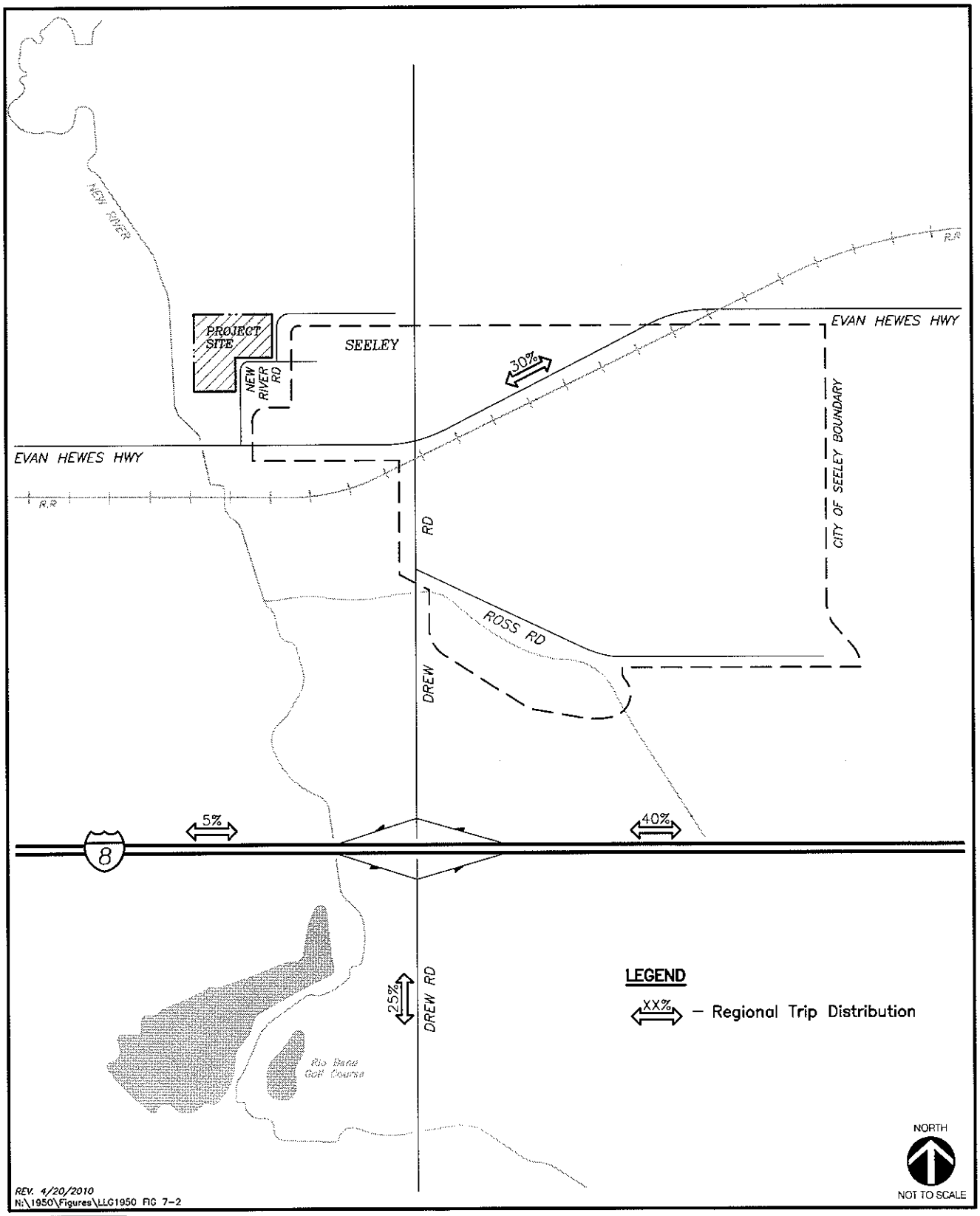

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Figure 7-2

Employee Vehicle Distribution

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

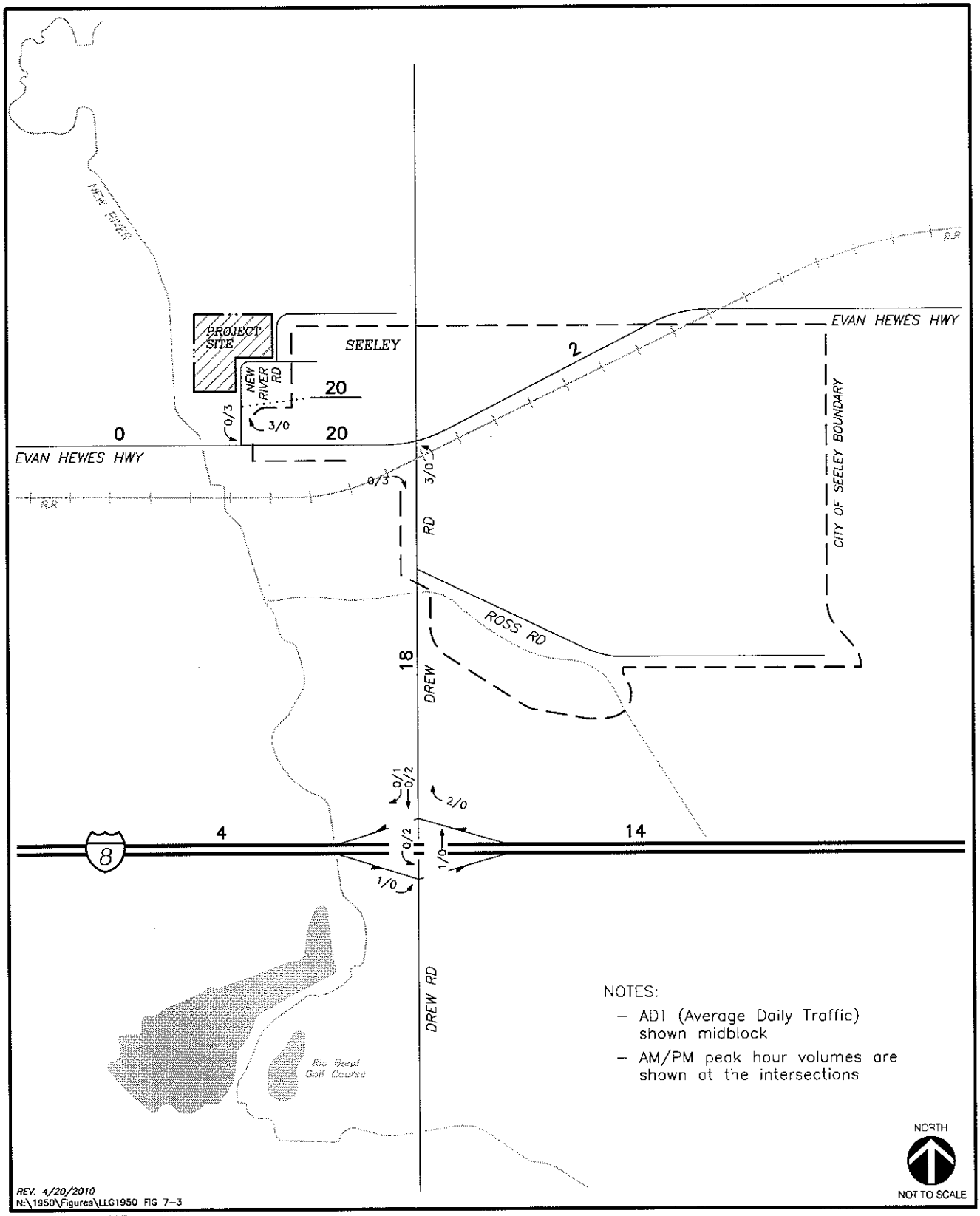

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Figure 7-3

Construction Truck Traffic Volumes

AM/PM Peak Hours & ADT

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

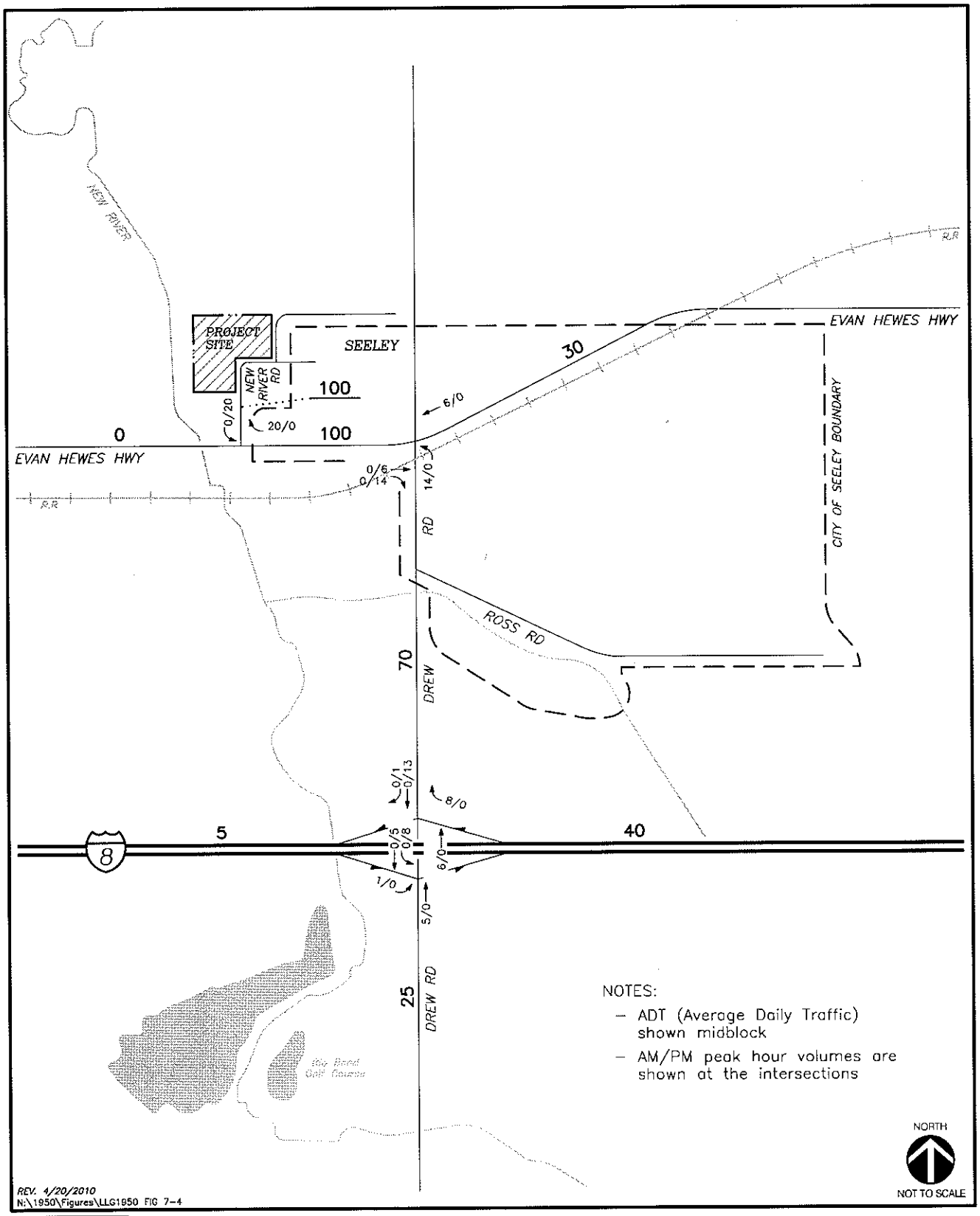

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Figure 7-4

Employee Vehicle Traffic Volumes

AM/PM Peak Hours & ADT

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

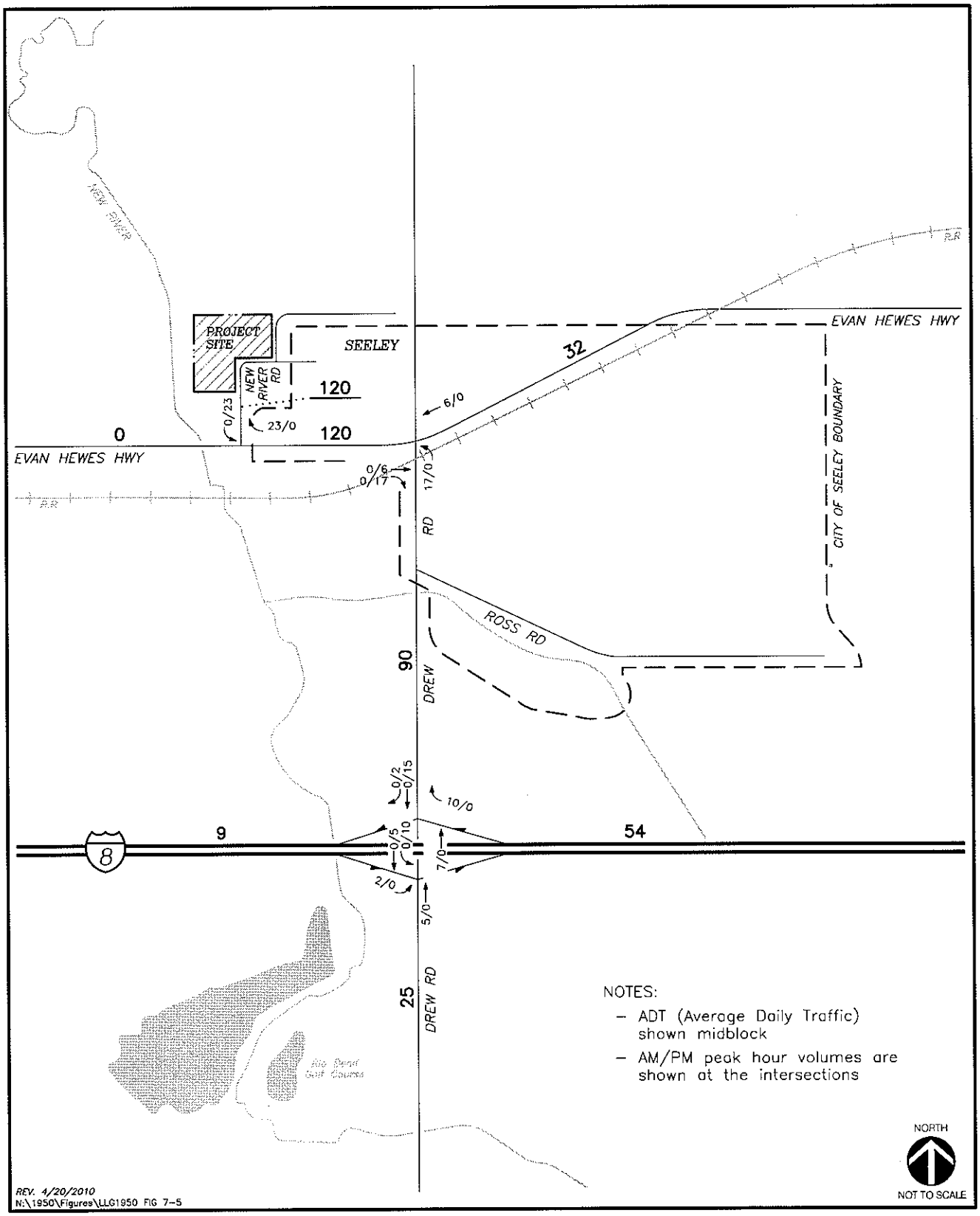

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Figure 7-5

Total Construction Traffic Volumes

AM/PM Peak Hours & ADT

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

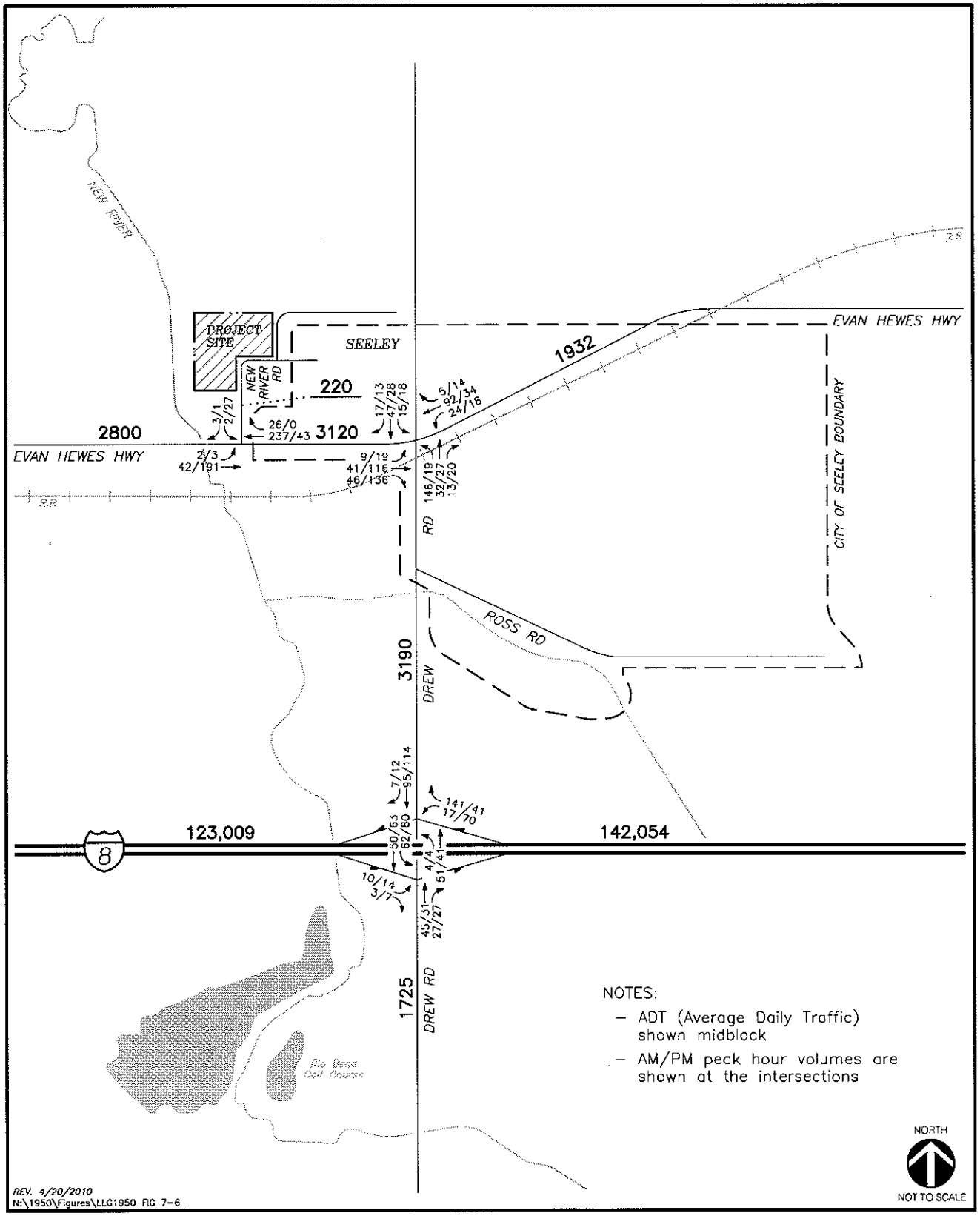

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Figure 7-6

Existing + Construction Traffic Volumes

AM/PM Peak Hours & ADT

SEELEY COUNTY WATER TREATMENT PLANT UPGRADE

8.0 CONSTRUCTION YEAR ANALYSIS

8.1 Construction Year Without Project Traffic

It is proposed to start construction by the end of 2010. Hence the construction Year without project condition is the same as the existing condition. As described in section 6.0 existing condition, all Study Area intersections are calculated to operate at an acceptable LOS B or better and all Study Area segments are calculated to operate at an acceptable LOS C or better.

8.2 Construction Year With Project Traffic

8.2.1 *Intersection Analysis*

Table 8-1 summarizes the construction year with project peak hour intersection operations. As seen in *Table 8-1*, all study area intersections are calculated to currently operate at LOS B or better with the addition of construction traffic. The increase in delay due to the construction traffic varies between 0.1 and 0.4 seconds at these intersections, which is not significant.

Appendix C contains the construction year with project peak hour intersection analysis worksheets.

TABLE 8-1
CONSTRUCTION YEAR INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing / Construction Year Without Project Traffic		Construction Year With Project Traffic		Δ [c] Delay
			Delay[a]	LOS[b]	Delay	LOS	
1. Evan Hewes Highway / New River Road	MSSC [d]	AM	10.0	B	10.1	B	0.1
		PM	9.8	A	10.2	A	0.4
2. Evan Hewes Highway / Drew Road	AWSC [e]	AM	8.5	A	8.7	A	0.2
		PM	7.9	A	8.0	A	0.1
3. I-8 Westbound Ramps / Drew Road	MSSC [d]	AM	9.3	A	9.4	A	0.1
		PM	9.6	A	9.7	A	0.1
4. I-8 Eatbound Ramps / Drew Road	MSSC [d]	AM	10.0	B	10.1	B	0.1
		PM	10.0	B	10.2	B	0.2

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project.
d. MWSC – Minor Street Stop Controlled intersection. Minor street left turn delay is reported.
e. WSC – All Way STOP Controlled intersection. Overall intersection delay is reported.

UNSIGNALIZED

Delay	LOS
0.0 < 10.0	A
10.1 to 15.0	B
15.1 to 25.0	C
25.1 to 35.0	D
35.1 to 50.0	E
> 50.1	F

8.2.2 *Segment Operations*

Table 8-2 summarizes the construction year with project study area segment operations. As seen in *Table 8-2*, all study area segments are calculated to continue to operate at LOS C or better with the addition of construction traffic. The increase in the V/C ratio due to the construction traffic is less than 0.01 on all segments, which is not significant.

8.3 Post-Construction Operational Traffic

With the completion of the project, it is anticipated that there will be an increase in the staff by 2 employees. As described previously in the Trip generation section, the increase in post construction traffic is minimal with 24 additional daily trips and 4 additional trips during the AM and PM peak hours. This increase is less than the trips generated by the construction traffic. It is therefore anticipated that the intersection and segment operations will continue to operate at acceptable levels of service post-construction.

TABLE 8–2
NEAR-TERM STREET SEGMENT OPERATIONS

Street Segment	Roadway Classification	Existing Capacity (LOS E)[a]	Construction Year Without Project Traffic			Construction Year With Project Traffic			Δ[e]
			ADT[b]	V/C[c]	LOS[d]	ADT	V/C	LOS	
New River Road									
North of Evan Hewes Highway	Residential Street	[f]	100	[f]	C	220	[f]	C	[f]
Drew Road									
I-8 WB Ramps to Evan Hewes Highway	2-Lane Collector	16,200	3,100	0.19	B	3,190	0.197	B	0.006
Evan Hewes Highway									
West of New River Road	2-Lane Highway	16,200	2,800	0.17	B	2,830	0.175	B	0.002
New River Road to Drew Road	2-Lane Highway	16,200	3,000	0.19	B	3,120	0.193	B	0.007

Footnotes

a. Roadway capacity corresponding to Level of Service E from Imperial County Standard Street Classification, Average Daily Vehicle Trips table.
b. Average Daily Traffic volumes
c. Volume / Capacity ratio.
d. Level of Service
e. Increase in V/C due to construction traffic.
f. Unclassified residential street. Volume of 1500 or less at level of service C is considered acceptable.

9.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

Based on the analysis in Section 8.0 Construction Year traffic analysis, the construction and post-construction operational traffic are not anticipated to result in any significant impacts at any of the study area intersections or segments. Therefore, it is concluded that no mitigation measures are required.

LINSCOTT
LAW &
GREENSPAN
engineers

TECHNICAL APPENDICES

SEELEY COUNTY WATER DISTRICT
WWTP UPGRADE

County of Imperial, California
April 20, 2010

LLG Ref. 3-08-1950

Linscott, Law & Greenspan, Engineers
4542 Ruffner Street
Suite 100
San Diego, CA 92111
858.300.8800 T
858.300.8810 F
www.llgengineers.com

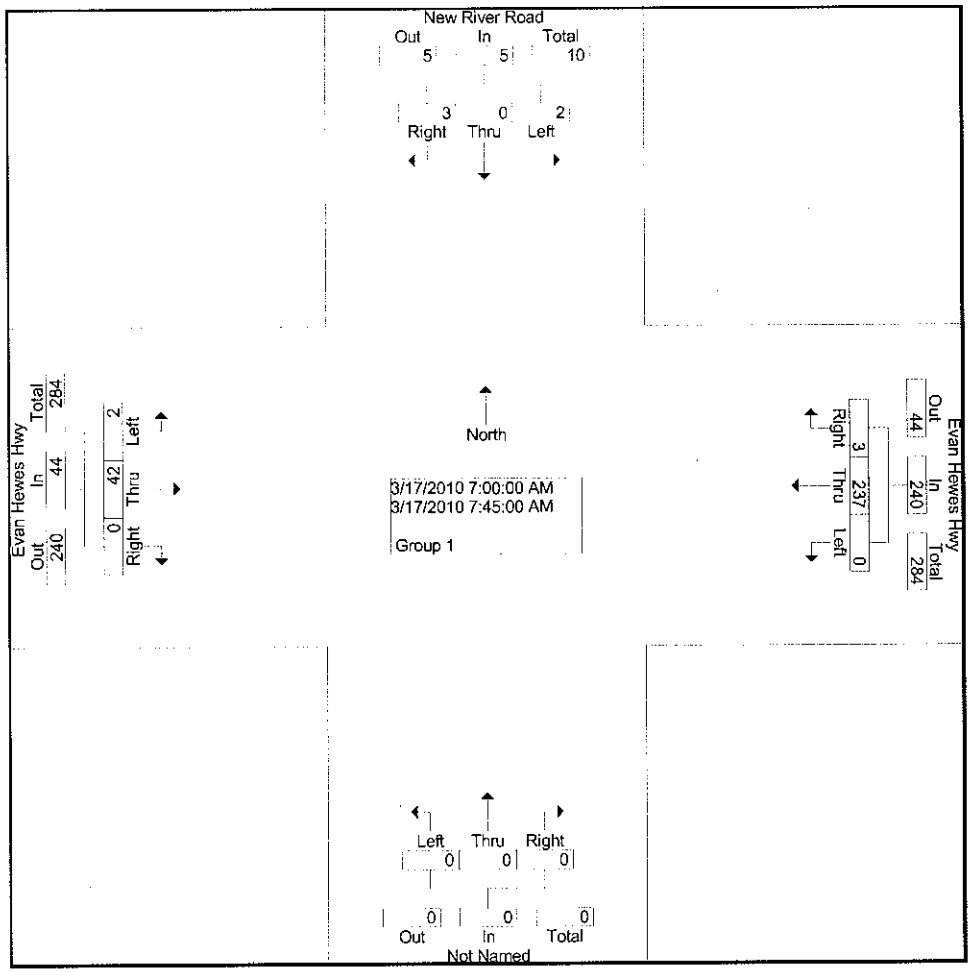
APPENDIX A

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS

TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: C. Hust
Board #: D1-2604
Loc: New River Road & Evan Hewes Hwy

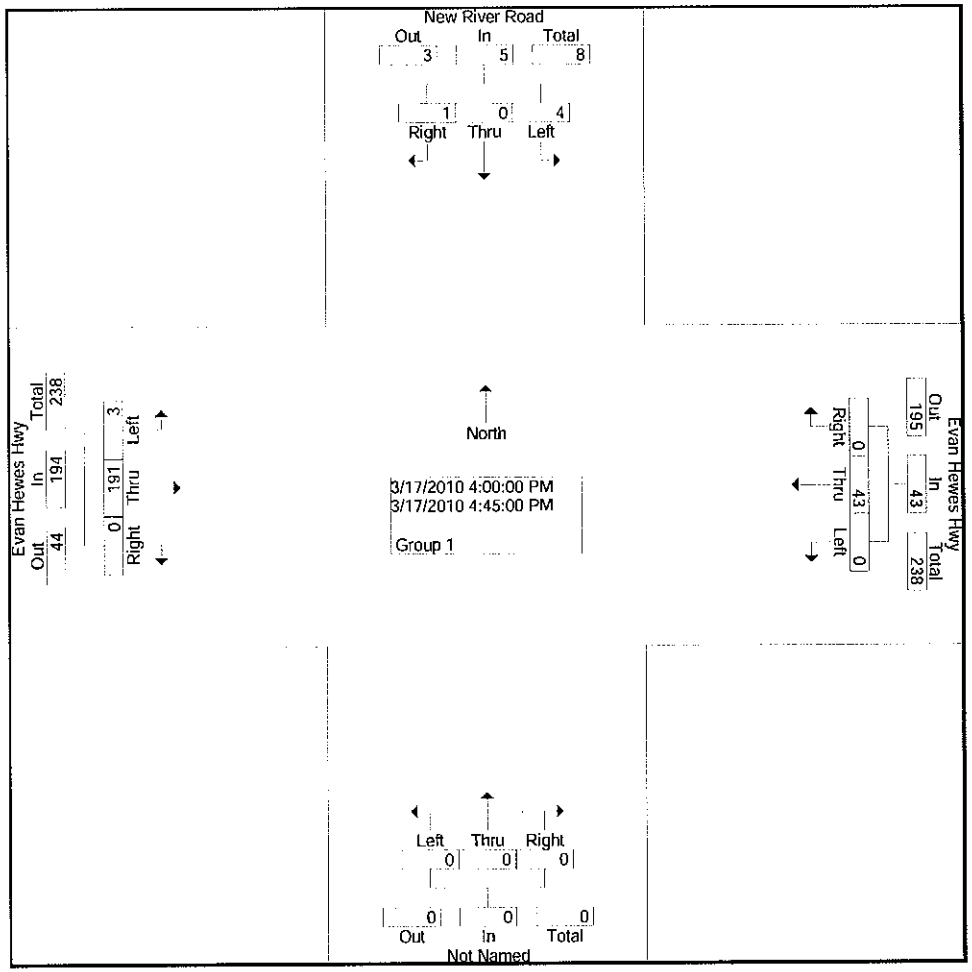
File Name : 10110040
Site Code : 00110040
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: C. Hust
Board #: D1-2604
Loc: New River Road & Evan Hewes Hwy

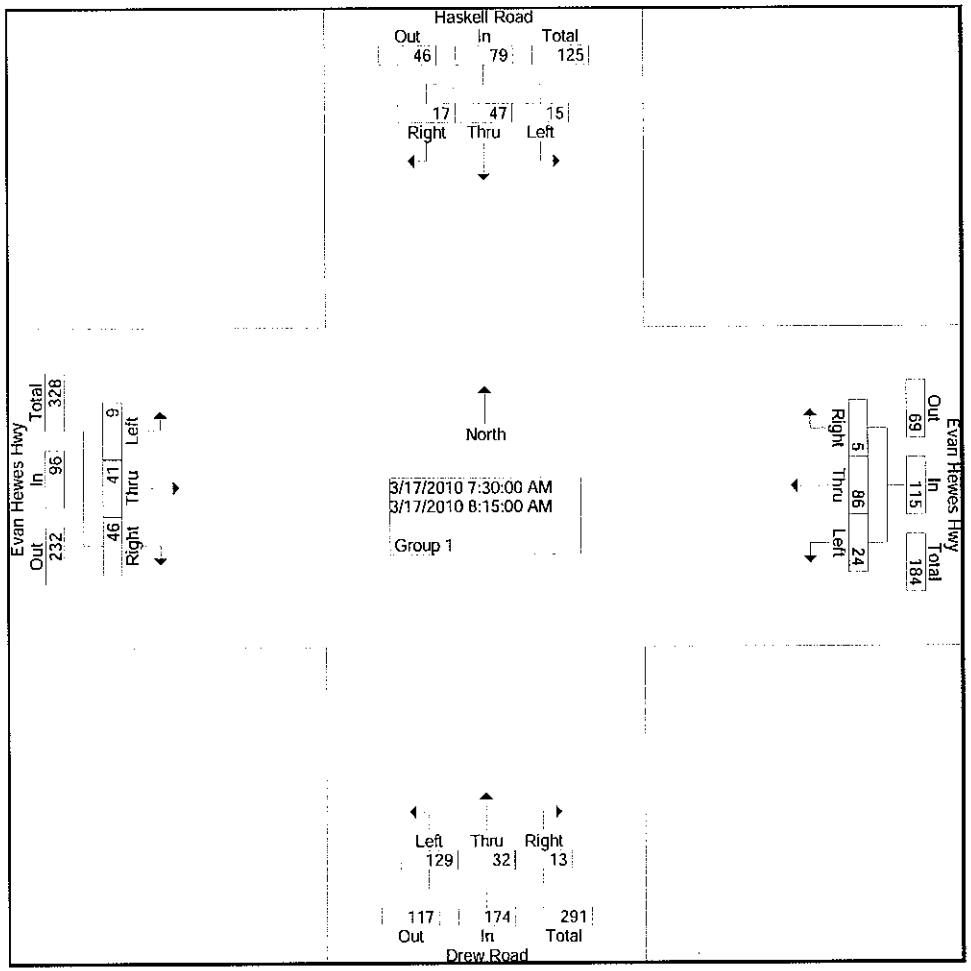
File Name : 10110041
Site Code : 00110041
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: C. Parish
Board #: D1-2603
Loc: Drew Road & Evan Hewes Hwy

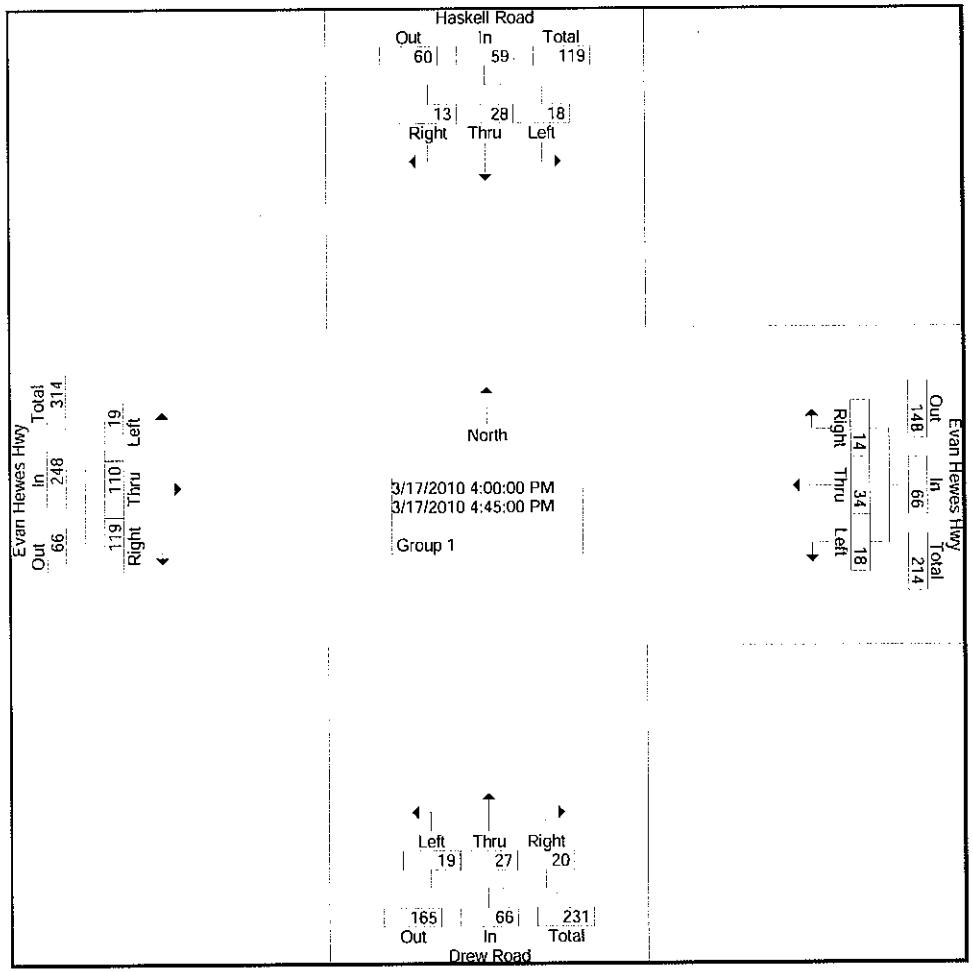
File Name : 10110030
Site Code : 00110030
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: C. Parish
Board #: D1-2603
Loc: Drew Road & Evan Hewes Hwy

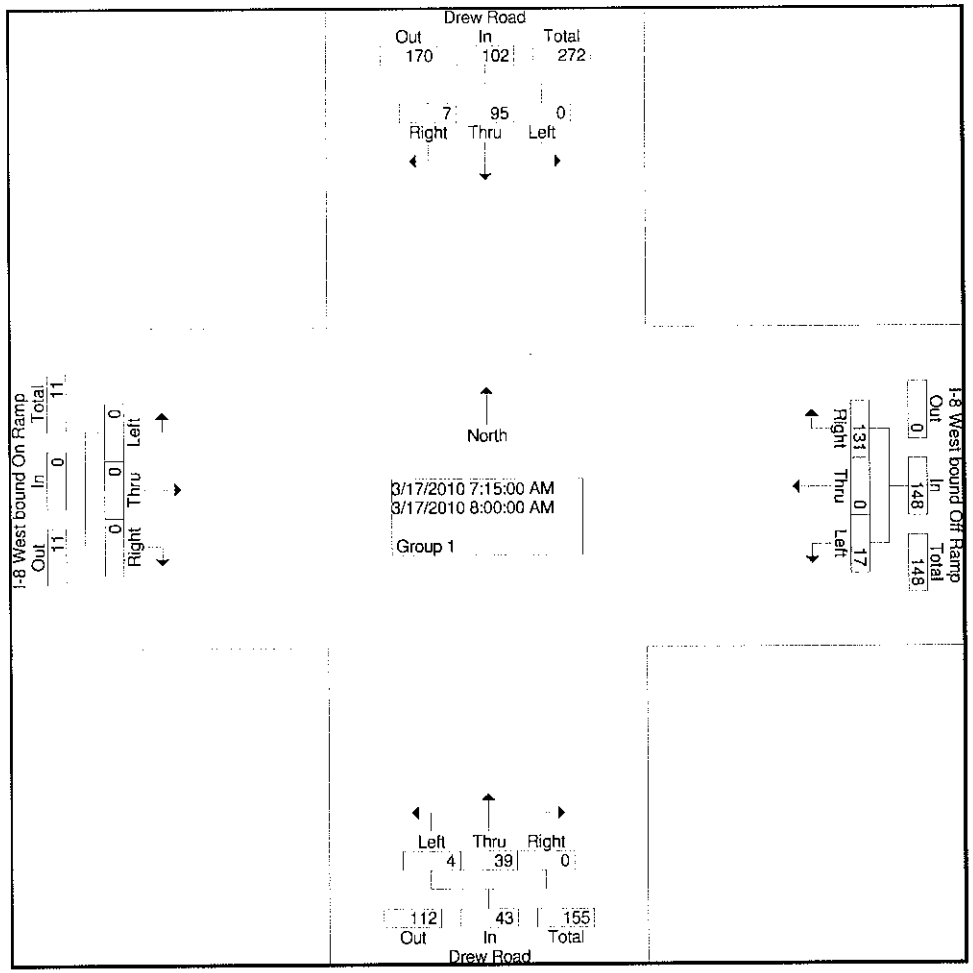
File Name : 10110031
Site Code : 00110031
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: M. Parish
Board #: D1-2602
Loc: Drew Road & I-8 W/B Ramps

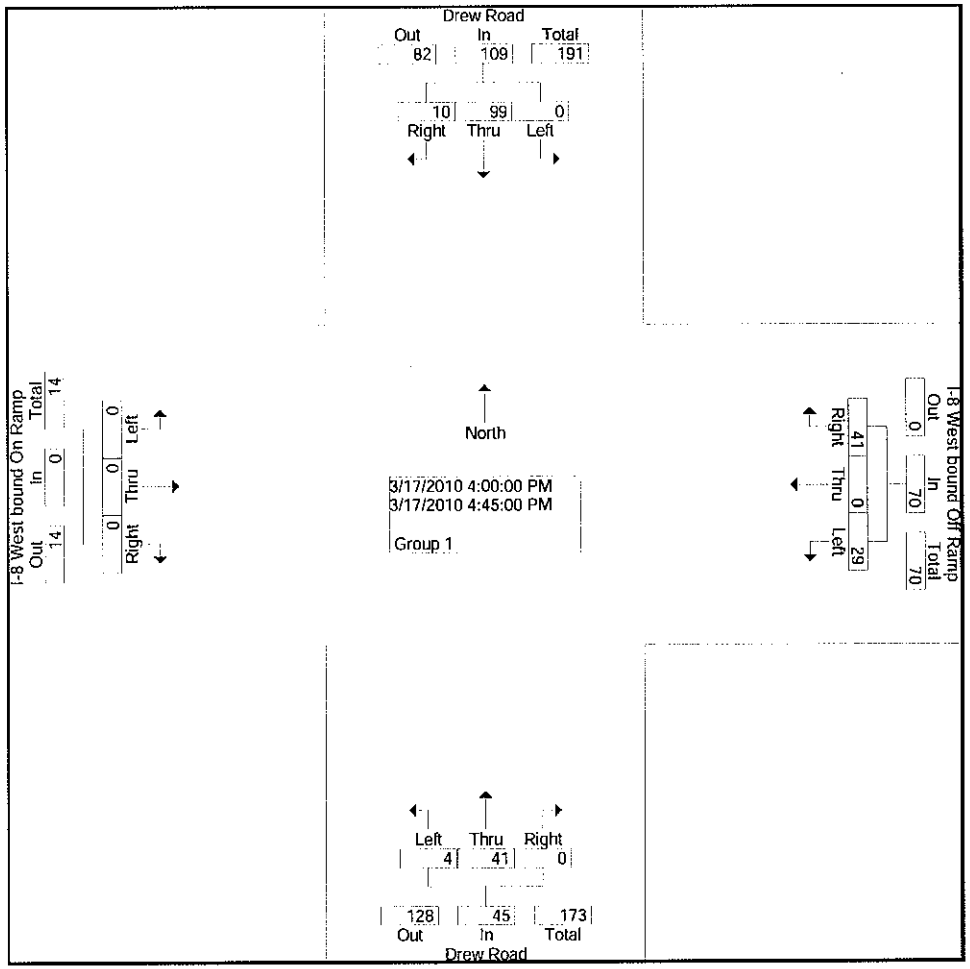
File Name : 10110020
Site Code : 00110020
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: M. Parish
Board #: D1-2602
Loc: Drew Road & I-8 W/B Ramps

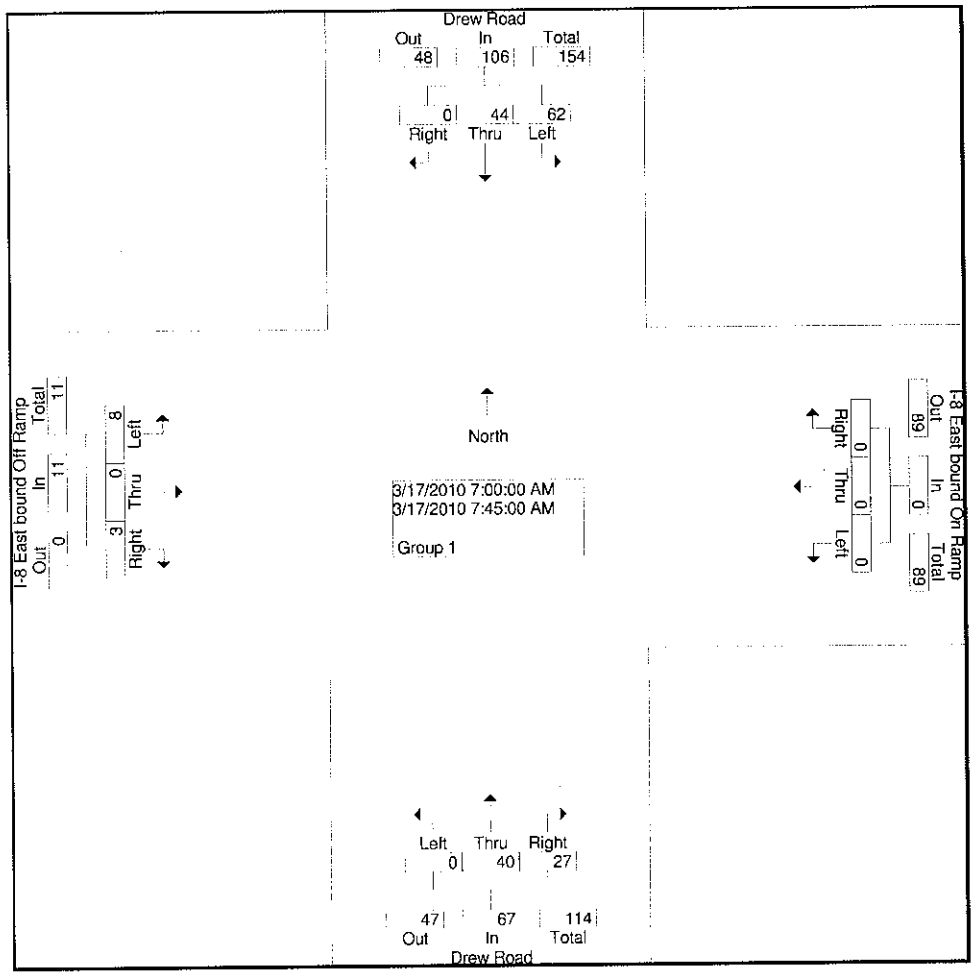
File Name : 10110021
Site Code : 00110021
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: M. Parish
Board #: D1-2602
Loc: Drew Road & I-8 E/B Ramps

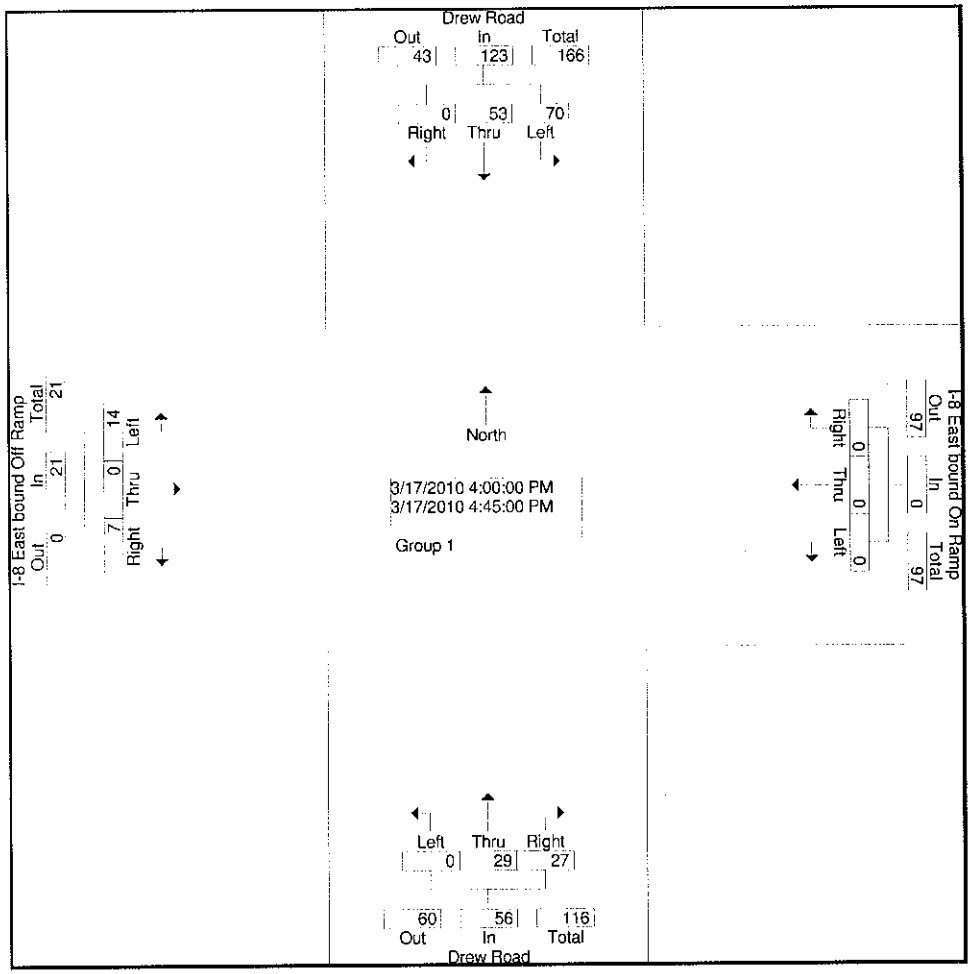
File Name : 10110010
Site Code : 00110010
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
PO Box 1544
Lakeside, CA 92040
(619) 390-8495 Fax (866) 768-1818

Weather : Clear & Dry
Counted By: M. Parish
Board #: D1-2602
Loc: Drew Road & I-8 E/B Ramps

File Name : 10110011
Site Code : 00110011
Start Date : 3/17/2010
Page No : 2



TDSSW, Inc.
Vehicle Counts

VehicleCount-533 -- English (ENU)

Datasets:

Site:	**[11004] New River Rd - N/O Evan Hewes Hwy**
Direction:	5 - South bound A>B, North bound B>A. Lane: 0
Survey Duration:	18:57 Wednesday, March 17, 2010 => 10:47 Friday, March 19, 2010
Zone:	North America
File:	1100419Mar2010.EC0 (Plus)
Identifier:	M3530X9Z MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 52 / 135 (38.52%)

*** Wednesday, March 17, 2010 - Total=7 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	1	0	0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	0

*** Thursday, March 18, 2010 - Total=35, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	0	0	0	0	3	1	0	0	4	1	3	2	2	3	2	2	3	2	3	2	2	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	1	2	1	0
0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	3	0	0	0	0	0
0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	1	0	1	0	0	2	0	1	0
0	0	0	0	0	0	0	3	0	0	0	2	0	1	0	0	1	0	0	0	1	0	0	0	0

AM Peak 0745 - 0845 (4), AM PHF=0.33 PM Peak 1315 - 1415 (4), PM PHF=1.00

*** Friday, March 19, 2010 - Total=10 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	0	0	0	0	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0	0	0	0	0	0	0	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-532 -- English (ENU)

Datasets:

Site:	**[11004] New River Rd - N/O Evan Hewes Hwy**
Direction:	5 - South bound A>B, North bound B>A. **Lane:** 0
Survey Duration:	18:57 Wednesday, March 17, 2010 => 10:47 Friday, March 19, 2010
Zone:	North America
File:	1100419Mar2010.EC0 (Plus)
Identifier:	M3530X9Z MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 75 / 135 (55.56%)

*** Wednesday, March 17, 2010 - Total=6 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0	1	1	0	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0	0	1	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	0	0

*** Thursday, March 18, 2010 - Total=55, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	1	1	1	2	4	2	6	3	4	2	1	6	1	8	4	3	2	1	1	2	0	
0	0	0	0	1	0	0	1	1	3	0	1	0	0	3	0	5	2	2	1	0	0	1	0	0
0	0	0	0	0	0	0	2	1	1	1	0	0	0	1	0	2	2	1	1	0	1	0	0	0
0	0	0	1	0	0	0	1	0	1	2	2	2	0	2	1	1	0	0	0	1	0	1	0	0
0	0	0	0	0	1	2	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0

AM Peak 0645 - 0745 (6), AM PHF=0.75 PM Peak 1530 - 1630 (8), PM PHF=0.40

*** Friday, March 19, 2010 - Total=14 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	0	0	1	0	2	2	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0	0	0	0	0	0	0	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	0	0	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	1	0	1	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0	0	0	0	1	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-530 -- English (ENU)

Datasets:

Site:	**[11001] Drew Rd - Btwn I-8 W/B Ramp & Evan Hewes Hwy**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	18:21 Wednesday, March 17, 2010 => 10:39 Friday, March 19, 2010
Zone:	North America
File:	1100119Mar2010.EC0 (Plus)
Identifier:	M144ME75 MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 2162 / 4330 (49.93%)

*** Wednesday, March 17, 2010 - Total=184 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	43	54	22	16	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	8	10	8	3	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	13	13	4	7	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	7	22	5	3	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	15	9	5	3	4

*** Thursday, March 18, 2010 - Total=1513, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
8	8	5	22	13	101	89	171	80	54	56	76	78	112	81	93	75	114	76	52	34	76	29	10	
1	1	0	2	2	14	11	24	32	14	18	20	27	19	28	21	15	26	23	17	7	18	12	2	4
2	3	1	1	2	13	18	35	14	17	15	21	17	38	16	20	15	36	19	13	6	23	4	2	5
1	3	1	11	4	43	28	62	17	11	10	24	15	39	20	26	23	25	24	12	11	28	5	3	3
4	1	3	8	5	31	32	50	17	12	13	11	19	16	17	26	22	27	10	10	10	7	8	3	4

AM Peak 0715 - 0815 (179), AM PHF=0.72 PM Peak 1315 - 1415 (121), PM PHF=0.78

*** Friday, March 19, 2010 - Total=465 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
16	10	7	18	15	98	81	153	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	1	1	1	4	9	20	26	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	5	2	2	2	22	19	17	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	2	1	7	4	44	17	56	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	2	3	8	5	23	25	54	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-531 -- English (ENU)

Datasets:

Site:	**[11001] Drew Rd - Btwn I-8 W/B Ramp & Evan Hewes Hwy**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	18:21 Wednesday, March 17, 2010 => 10:39 Friday, March 19, 2010
Zone:	North America
File:	1100119Mar2010.EC0 (Plus)
Identifier:	M144ME75 MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 2093 / 4330 (48.34%)

*** Wednesday, March 17, 2010 - Total=196 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	45	32	64	6	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	28	8	39	2	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	3	6	18	1	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	8	6	2	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	7	10	1	1	3

*** Thursday, March 18, 2010 - Total=1594, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
7	3	6	4	6	39	66	104	78	75	87	79	98	86	153	136	159	97	62	71	69	46	56	7	
1	0	0	0	0	4	18	8	25	12	25	20	16	23	41	44	39	20	17	16	16	7	32	3	1
2	0	4	0	1	11	16	23	26	20	19	20	37	25	58	23	41	22	20	21	23	20	20	0	2
1	1	2	1	2	8	13	35	16	25	25	21	25	16	28	28	37	25	12	21	18	7	3	2	2
3	2	0	3	3	16	19	38	11	18	18	18	20	22	26	41	42	30	13	13	12	12	1	2	2

AM Peak 0730 - 0830 (124), AM PHF=0.82 PM Peak 1600 - 1700 (159), PM PHF=0.95

*** Friday, March 19, 2010 - Total=303 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
7	1	5	6	13	34	63	83	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1	0	3	0	2	5	16	12	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	1	0	2	7	19	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0	1	3	3	12	17	28	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0	0	3	6	10	11	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-537 -- English (ENU)

Datasets:

Site:	**[11002] Evan Hewes Hwy - Btwn Drew Rd & New River Rd**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	18:33 Wednesday, March 17, 2010 => 10:44 Friday, March 19, 2010
Zone:	North America
File:	1100219Mar2010.EC0 (Plus)
Identifier:	M508KRAN MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 1876 / 4251 (44.13%)

*** Wednesday, March 17, 2010 - Total=195 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	32	27	91	8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	16	5	69	0	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	6	0	19	5	7
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2	7	2	2	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	8	15	1	1	0

*** Thursday, March 18, 2010 - Total=1482, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
11	6	6	2	2	20	59	62	50	63	54	45	102	104	199	170	199	76	44	27	29	42	97	13	
2	2	1	0	1	3	27	6	17	10	15	11	14	28	68	45	69	20	10	13	8	9	73	4	3
7	2	4	0	0	4	16	13	12	20	10	10	27	19	71	28	45	26	17	3	8	13	20	1	3
2	1	1	0	0	3	5	25	10	18	16	11	32	17	28	30	54	15	12	6	8	2	2	5	1
0	1	0	2	1	10	11	18	11	15	13	13	29	40	32	67	31	15	5	5	5	18	2	3	3

AM Peak 1145 - 1245 (86), AM PHF=0.67 PM Peak 1545 - 1645 (235), PM PHF=0.85

*** Friday, March 19, 2010 - Total=199 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	4	2	1	8	15	51	45	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	0	0	0	1	0	17	4	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	0	1	0	2	6	17	12	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	3	1	1	2	2	9	10	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1	0	0	3	7	8	19	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-536 -- English (ENU)

Datasets:

Site:	**[11002] Evan Hewes Hwy - Btwn Drew Rd & New River Rd**
Direction:	8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration:	18:33 Wednesday, March 17, 2010 => 10:44 Friday, March 19, 2010
Zone:	North America
File:	1100219Mar2010.EC0 (Plus)
Identifier:	M508KRAN MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 2314 / 4251 (54.43%)

*** Wednesday, March 17, 2010 - Total=149 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	20	63	22	15	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	6	9	9	4	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	3	22	8	3	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	7	27	2	6	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	5	3	2	0

*** Thursday, March 18, 2010 - Total=1497, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
2	9	5	24	21	174	128	244	89	57	43	90	63	137	70	60	53	40	26	35	17	75	23	12	
1	2	0	2	5	21	31	26	31	13	9	28	22	18	19	20	12	9	6	4	6	9	7	2	1
1	1	1	1	3	31	30	51	22	16	11	16	19	51	21	18	15	10	6	10	4	22	8	4	2
0	3	0	8	7	80	29	96	17	19	11	22	11	42	19	11	13	9	10	8	2	32	3	4	2
0	3	4	13	6	42	38	71	19	9	12	24	11	26	11	11	13	12	4	13	5	12	5	2	4

AM Peak 0715 - 0815 (249), AM PHF=0.65 PM Peak 1315 - 1415 (138), PM PHF=0.68

*** Friday, March 19, 2010 - Total=668 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	5	5	25	16	183	113	218	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1	2	0	2	6	15	31	35	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0	2	2	1	35	25	40	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	1	9	3	85	22	71	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	2	2	12	6	48	35	72	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-538 -- English (ENU)

Datasets:

Site:	**[11003] Evan Hewes Hwy - W/O New River Rd**
Direction:	6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration:	18:46 Wednesday, March 17, 2010 => 10:19 Friday, March 19, 2010
Zone:	North America
File:	1100319Mar2010.EC0 (Plus)
Identifier:	M293M05F MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	East (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 1827 / 4043 (45.19%)

*** Wednesday, March 17, 2010 - Total=188 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	29	28	90	8	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	14	5	72	0	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	6	0	15	5	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2	7	2	2	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	16	1	1	0

*** Thursday, March 18, 2010 - Total=1445, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
11	6	6	2	3	18	58	61	51	57	54	39	102	97	196	165	196	76	43	28	30	39	93	14	
3	2	1	0	1	2	27	6	15	8	16	10	14	25	63	45	67	19	10	13	10	8	74	5	3
6	2	4	0	0	4	15	10	11	18	9	8	27	14	72	28	45	27	17	4	7	13	16	1	3
2	1	1	0	0	3	5	24	11	17	16	11	30	17	30	27	52	16	11	6	8	1	1	6	1
0	1	0	2	2	9	11	21	14	14	13	10	31	41	31	65	32	14	5	5	5	17	2	2	3

AM Peak 1145 - 1245 (81), AM PHF=0.68 PM Peak 1545 - 1645 (229), PM PHF=0.85

*** Friday, March 19, 2010 - Total=194 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	4	2	1	8	13	51	43	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	0	0	0	1	0	18	4	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	0	1	0	2	6	17	9	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	3	1	1	2	2	10	11	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1	0	0	3	5	6	19	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TDSSW, Inc.
Vehicle Counts

VehicleCount-539 -- English (ENU)

Datasets:

Site:	**[11003] Evan Hewes Hwy - W/O New River Rd**
Direction:	6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration:	18:46 Wednesday, March 17, 2010 => 10:19 Friday, March 19, 2010
Zone:	North America
File:	1100319Mar2010.EC0 (Plus)
Identifier:	M293M05F MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**19:00 Wednesday, March 17, 2010 => 9:00 Friday, March 19, 2010**
Included classes:	1, 2, **3**, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	0 - 100 mph.
Direction:	West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F99)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 2151 / 4043 (53.20%)

*** Wednesday, March 17, 2010 - Total=125 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	14	64	12	15	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	9	4	4	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	1	21	3	3	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	29	2	6	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	5	3	2	0

*** Thursday, March 18, 2010 - Total=1385, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
0	8	3	26	20	170	119	237	93	55	43	78	59	132	54	44	46	38	26	33	14	63	13	11	
0	2	0	3	6	20	28	27	33	16	10	24	23	17	13	15	11	9	7	4	5	6	2	2	1
0	1	0	1	3	30	28	54	23	14	9	14	15	49	16	16	15	10	6	9	4	20	5	4	1
0	2	0	8	6	77	28	88	15	17	11	23	10	39	17	7	9	8	9	8	2	28	2	3	2
0	3	3	14	5	43	35	68	22	8	13	17	11	27	8	6	11	11	4	12	3	9	4	2	3

AM Peak 0715 - 0815 (243), AM PHF=0.69 PM Peak 1300 - 1400 (132), PM PHF=0.67

*** Friday, March 19, 2010 - Total=641 (Incomplete) , 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
7	5	5	26	15	181	110	207	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1	2	0	1	6	15	24	31	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0	2	3	1	34	28	39	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	1	10	3	83	22	67	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	2	2	12	5	49	36	70	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS - EXISTING

HCM Unsignalized Intersection Capacity Analysis
1: Evan Hewes Highway & New River Road

3/31/2010

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	42	237	3	2	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	46	258	3	2	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	261				309	259
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261				309	259
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	100				100	100
cM capacity (veh/h)	1258				666	760

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	48	261	5
Volume Left	2	0	2
Volume Right	0	3	3
cSH	1258	1700	719
Volume to Capacity	0.00	0.15	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.4	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.0
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: Evan Hewes Highway & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	9	41	46	24	86	5	129	32	13	15	47	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	45	50	26	93	5	140	35	14	16	51	18

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	32	72	73	52	189	86
Volume Left (vph)	10	0	26	0	140	16
Volume Right (vph)	0	50	0	5	14	18
Hadj (s)	0.32	0.31	0.35	0.10	0.27	0.08
Departure Headway (s)	5.7	5.0	5.7	5.4	4.9	4.8
Degree Utilization, x	0.05	0.10	0.11	0.08	0.26	0.11
Capacity (veh/h)	593	670	598	627	707	700
Control Delay (s)	7.8	7.4	8.2	7.7	9.5	8.4
Approach Delay (s)	7.5		8.0		9.5	8.4
Approach LOS	A		A		A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: I-8 WB Ramps & Drew

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	17	0	131	4	44	0	0	95	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	18	0	142	4	48	0	0	103	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	306	164	107	164	167	48	111			48		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306	164	107	164	167	48	111			48		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	100	98	100	86	100			100		
cM capacity (veh/h)	540	712	926	782	709	999	1431			1509		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	18	142	52	111
Volume Left	18	0	4	0
Volume Right	0	142	0	8
cSH	782	999	1431	1700
Volume to Capacity	0.02	0.14	0.00	0.07
Queue Length 95th (ft)	2	12	0	0
Control Delay (s)	9.7	9.2	0.6	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.3		0.6	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: I-8 EB Ramps & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	3	0	0	0	0	40	27	62	50	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	0	3	0	0	0	0	43	29	67	54	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	247	262	54	251	247	58	54			73		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	247	262	54	251	247	58	54			73		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	99	100	100	100	100	100	100			95		
cM capacity (veh/h)	666	601	991	661	612	986	1501			1478		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	9	3	73	122
Volume Left	9	0	0	67
Volume Right	0	3	29	0
cSH	666	991	1700	1478
Volume to Capacity	0.01	0.00	0.04	0.05
Queue Length 95th (ft)	1	0	0	4
Control Delay (s)	10.5	8.6	0.0	4.3
Lane LOS	B	A		A
Approach Delay (s)	10.0		0.0	4.3
Approach LOS	A			

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Evan Hewes Highway & New River Road

3/31/2010

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	191	43	0	4	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	208	47	0	4	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	47				261	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47				261	47
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	100				99	100
cM capacity (veh/h)	1511				710	1000

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	211	47	5
Volume Left	3	0	4
Volume Right	0	0	1
cSH	1511	1700	753
Volume to Capacity	0.00	0.03	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.1	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	0.1	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: Evan Hewes Highway & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	19	110	119	18	34	14	19	27	20	18	28	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	120	129	20	37	15	21	29	22	20	30	14

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	80	189	38	34	72	64
Volume Left (vph)	21	0	20	0	21	20
Volume Right (vph)	0	129	0	15	22	14
Hadj (s)	0.30	-0.31	0.43	-0.15	0.05	0.10
Departure Headway (s)	5.2	4.6	5.5	4.9	4.8	4.9
Degree Utilization, x	0.12	0.24	0.06	0.05	0.10	0.09
Capacity (veh/h)	673	757	623	695	702	688
Control Delay (s)	7.7	7.9	7.7	7.0	8.3	8.3
Approach Delay (s)	7.8		7.3		8.3	8.3
Approach LOS	A		A		A	A

Intersection Summary			
Delay	7.9		
HCM Level of Service	A		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: I-8 WB Ramps & Drew

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	70	0	41	4	41	0	0	99	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	76	0	45	4	45	0	0	108	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	211	166	113	166	172	45	118			45		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211	166	113	166	172	45	118			45		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	100	90	100	96	100			100		
cM capacity (veh/h)	695	710	919	778	705	1003	1421			1514		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	76	45	49	118
Volume Left	76	0	4	0
Volume Right	0	45	0	11
cSH	778	1003	1421	1700
Volume to Capacity	0.10	0.04	0.00	0.07
Queue Length 95th (ft)	8	3	0	0
Control Delay (s)	10.1	8.8	0.7	0.0
Lane LOS	B	A	A	
Approach Delay (s)	9.6		0.7	0.0
Approach LOS	A			

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		16.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
4: I-8 EB Ramps & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	0	7	0	0	0	0	31	27	70	58	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	0	8	0	0	0	0	34	29	76	63	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	264	278	63	271	264	48	63			63		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264	278	63	271	264	48	63			63		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	98	100	99	100	100	100	100			95		
cM capacity (veh/h)	647	585	980	634	596	998	1490			1490		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	15	8	63	139
Volume Left	15	0	0	76
Volume Right	0	8	29	0
cSH	647	980	1700	1490
Volume to Capacity	0.02	0.01	0.04	0.05
Queue Length 95th (ft)	2	1	0	4
Control Delay (s)	10.7	8.7	0.0	4.3
Lane LOS	B	A		A
Approach Delay (s)	10.0		0.0	4.3
Approach LOS	B			

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		23.6%	ICU Level of Service A
Analysis Period (min)		15	

APPENDIX C

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS - EXISTING + CONSTRUCTION TRAFFIC

HCM Unsignalized Intersection Capacity Analysis
1: Evan Hewes Highway & New River Road

3/31/2010

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	42	237	26	2	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	46	258	28	2	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	286				322	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286				322	272
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	100				100	100
cM capacity (veh/h)	1232				655	748

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	48	286	5
Volume Left	2	0	2
Volume Right	0	28	3
cSH	1232	1700	708
Volume to Capacity	0.00	0.17	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.4	0.0	10.1
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		24.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
2: Evan Hewes Highway & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	9	41	46	24	92	5	146	32	13	15	47	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	45	50	26	100	5	159	35	14	16	51	18

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	32	72	76	55	208	86
Volume Left (vph)	10	0	26	0	159	16
Volume Right (vph)	0	50	0	5	14	18
Hadj (s)	0.32	-0.31	0.34	0.10	0.28	0.08
Departure Headway (s)	5.7	5.1	5.7	5.5	4.9	4.9
Degree Utilization, x	0.05	0.10	0.12	0.08	0.28	0.12
Capacity (veh/h)	585	660	592	618	703	692
Control Delay (s)	7.9	7.5	8.3	7.8	9.8	8.5
Approach Delay (s)	7.6		8.1		9.8	8.5
Approach LOS	A		A		A	A

Intersection Summary			
Delay		8.7	
HCM Level of Service		A	
Intersection Capacity Utilization		31.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
3: I-8 WB Ramps & Drew

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	17	0	141	4	51	0	0	95	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	18	0	153	4	55	0	0	103	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	324	171	107	171	175	55	111			55		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	324	171	107	171	175	55	111			55		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	100	98	100	85	100			100		
cM capacity (veh/h)	517	706	926	773	702	989	1431			1500		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	18	153	60	111
Volume Left	18	0	4	0
Volume Right	0	153	0	8
cSH	773	989	1431	1700
Volume to Capacity	0.02	0.15	0.00	0.07
Queue Length 95th (ft)	2	14	0	0
Control Delay (s)	9.8	9.3	0.6	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.4		0.6	0.0
Approach LOS	A			

Intersection Summary			
Average Delay		4.8	
Intersection Capacity Utilization		18.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
4: I-8 EB Ramps & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	0	3	0	0	0	0	45	27	62	50	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	3	0	0	0	0	49	29	67	54	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	253	267	54	256	253	64	54			78		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253	267	54	256	253	64	54			78		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	98	100	100	100	100	100	100			95		
cM capacity (veh/h)	660	596	991	655	608	979	1501			1471		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	11	3	78	122
Volume Left	11	0	0	67
Volume Right	0	3	29	0
cSH	660	991	1700	1471
Volume to Capacity	0.02	0.00	0.05	0.05
Queue Length 95th (ft)	1	0	0	4
Control Delay (s)	10.5	8.6	0.0	4.3
Lane LOS	B	A		A
Approach Delay (s)	10.1		0.0	4.3
Approach LOS	B			

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		22.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
1: Evan Hewes Highway & New River Road

3/31/2010

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	3	191	43	0	27	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	208	47	0	29	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	47				261	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	47				261	47
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	100				96	100
cM capacity (veh/h)	1511				710	1000

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	211	47	30
Volume Left	3	0	29
Volume Right	0	0	1
cSH	1511	1700	717
Volume to Capacity	0.00	0.03	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.1	0.0	10.2
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		22.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
2: Evan Hewes Highway & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	19	116	136	18	34	14	19	27	20	18	28	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	126	148	20	37	15	21	29	22	20	30	14

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	84	211	38	34	72	64
Volume Left (vph)	21	0	20	0	21	20
Volume Right (vph)	0	148	0	15	22	14
Hadj (s)	0.29	-0.32	0.43	-0.15	0.05	0.10
Departure Headway (s)	5.2	4.6	5.5	5.0	4.9	4.9
Degree Utilization, x	0.12	0.27	0.06	0.05	0.10	0.09
Capacity (veh/h)	674	760	620	691	693	679
Control Delay (s)	7.7	8.1	7.7	7.0	8.4	8.4
Approach Delay (s)	8.0		7.4		8.4	8.4
Approach LOS	A		A		A	A

Intersection Summary			
Delay		8.0	
HCM Level of Service		A	
Intersection Capacity Utilization		26.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
3: I-8 WB Ramps & Drew

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	70	0	41	4	41	0	0	114	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	76	0	45	4	45	0	0	124	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	228	184	130	184	190	45	137			45		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228	184	130	184	190	45	137			45		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	100	90	100	96	100			100		
cM capacity (veh/h)	677	694	898	758	688	1003	1399			1514		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	76	45	49	137
Volume Left	76	0	4	0
Volume Right	0	45	0	13
cSH	758	1003	1399	1700
Volume to Capacity	0.10	0.04	0.00	0.08
Queue Length 95th (ft)	8	3	0	0
Control Delay (s)	10.3	8.8	0.7	0.0
Lane LOS	B	A	A	
Approach Delay (s)	9.7		0.7	0.0
Approach LOS	A			

Intersection Summary			
Average Delay		3.9	
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
4: I-8 EB Ramps & Drew Road

3/31/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	0	7	0	0	0	0	31	27	80	63	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	0	8	0	0	0	0	34	29	87	68	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	291	305	68	298	291	48	68			63		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291	305	68	298	291	48	68			63		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	98	100	99	100	100	100	100			94		
cM capacity (veh/h)	617	560	973	605	571	998	1483			1490		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	15	8	63	155
Volume Left	15	0	0	87
Volume Right	0	8	29	0
cSH	617	973	1700	1490
Volume to Capacity	0.02	0.01	0.04	0.06
Queue Length 95th (ft)	2	1	0	5
Control Delay (s)	11.0	8.7	0.0	4.4
Lane LOS	B	A		A
Approach Delay (s)	10.2		0.0	4.4
Approach LOS	B			

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)		15	

Phase I Environmental Site Assessment
Seeley County Water District
Wastewater Treatment Facility
1898 West Main Street
Seeley, California

Prepared for: Seeley County Water District
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1. Executive Summary

A Phase I Environmental Site Assessment (ESA) was conducted for Seeley County Water District (SCWD) Wastewater Treatment Plant (WWTP) in Seeley, Imperial County, California (Figure 1). This Phase I ESA is being conducted to support the Environmental Impact Report for the expansion of the WWTP. As such, the subject property area is defined as the limits of the expansion areas (Figure 2). The subject property currently consists of unimproved land, the UV filtration, unpaved parking areas, sewage grinder, a standby generator, the influent pump station and pond effluent pump station, miscellaneous equipment storage, and five aeration ponds.

The findings of this investigation are based upon a review of historical aerial photographs, historical topographic maps, Sanborn fire insurance maps, a radius search and records review, a site reconnaissance, a review of previous reports, and interviews.

Information gathered for this report indicated the following:

- Evidence of dumping was observed north of the subject property (north of the WWTP, but on the same parcel that contains the subject property; Figure 2). Additionally, based on the interview with the treatment plant operator, a community dump was located north of the WWTP in the 1940s and 1950s.

  Dudek did not review any documents that defined the limits of the former dump. No documents were available from the Imperial County Public Works, Imperial County Planning and Development Services, or CalRecycle for the subject property APN. Additionally, no land use information from historical sources was available prior to 1948. The subject and adjoining properties appeared to be unimproved land in the 1948 topographic map. Two dirt roads and unimproved land were visible on the WWTP site in the 1953 aerial photograph.

  Although the limits of the former dump were not defined, there is no record of evidence of the dump having been observed during the excavation of the facultative ponds located between the former dump and the subject property. These ponds were excavated in the 1960s and the western pond was excavated further in the 1990s. The total depth of the ponds is 10 to12 feet below ground surface. Additionally, there is no record of evidence of the dump having been observed during the recent excavation of the aeration ponds (between 2002 and 2005). Finally, a 2009 geotechnical study included four soil borings on the subject property to depths of up to 50 feet and no trash debris or voids were logged in the lithology log. Based on this information, it appears that the former dump was limited to the area north of the subject property.

- The WWTP was constructed in 1966. The subject property was used as the parking lot and unimproved land until at least 1988. By 1989, a treatment pond

was installed in the southwestern portion of the subject property. However, due to piping failure associated with a landslide into the New River, the treatment pond use was discontinued after one year of operation. According to the geotechnical report (Landmark, 2009), approximately 3 to 5 feet of undocumented fill was added to the southwestern portion of the subject property after the landslide. The five aeration ponds were installed on the southeastern portion of the subject property by 2005. By 2009, five aeration ponds, miscellaneous equipment storage, a standby generator, a sewage grinder (muffin monster), UV filtration, parking areas, septic tank drop off, and pump stations were located on the subject property.

- A diesel standby generator is located on northern portion of the subject property. The generator was installed in late 2009 as part of a United States Department of Agriculture (USDA) grant. No staining was observed on the concrete pad surrounding the standby generator.

- Chemical storage on the subject property is limited to 393 gallons of diesel fuel stored within the built-in tank of the standby generator. Chemical storage and use on the remainder the WWTP site is currently limited to small quantities of household cleaning supplies, motor oil, paint, and spray paint. These chemicals are stored on concrete slabs in the building located north of the subject property. It is unlikely that the storage or use of these chemicals has impacted the environmental conditions at the subject property.

- One gasoline 55-gallon drum and one diesel 55-gallon drum were formerly located on the northern portion of the subject property (50 to 100 feet west of the SCWD WWTP building). However, approximately five years ago the 55 gallon drums were removed from the site. The undocumented fill, which was placed in the western portions of the subject property, currently covers the location of the former 55-gallon drums.

- Ten gallon containers of gasoline were formerly stored in the onsite building with concrete slabs. According to Mr. Munger, the gasoline is no longer stored onsite due to theft. No staining was observed on the concrete where the fuel was formerly stored. It is unlikely that the storage or use of these chemicals has impacted the environmental conditions at the subject property.

- The SCWD WWTP site is listed in the National Pollutant Discharge Elimination System (NPDES), California Waste Discharge System (CA WDS), and Facility Index System (FINDS) databases due to discharge of treated wastewater effluent to the New River. The NPDES, CA WDS, and FINDS databases are compiled based on site use and do not document unauthorized releases.

- The former Seeley Camp was located approximately 1.2 miles north of the WWTP. Additionally, the existing El Centro Naval Air Facility is located

approximately 1.5 miles northwest of the WWTP. Based on the groundwater flow direction at the El Centro Naval Air Facility (to the northwest), it is unlikely that either military installation has impacted the environmental conditions of the subject property.

Recommendations for the Subject Property

Dudek has performed a Phase I Environmental Site Assessment of the subject property, in conformance with the scope and limitations of ASTM Practice E 1527-05. Based on the findings in this report, the following recognized environmental condition was identified:

- According to the 2009 geotechnical report, undocumented fill is located on the subject property. However, the proposed project being evaluated in the EIR includes construction of sludge drying beds where the undocumented fill is located. The geotechnical report recommends the removal of the fill prior to construction. Therefore, no further investigation of the undocumented fill is recommended.

2. Introduction

This Phase I Environmental Site Assessment was performed according to the guidelines stipulated in the American Society for Testing and Materials (ASTM) Standard E 1527-05, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process". The subject property is currently developed as the Seeley County Water District Wastewater Treatment Plant in Seeley, California. This Phase I ESA is being conducted to support the Environmental Impact Report for the expansion of the WWTP. The subject property consists of the location of the proposed expansion/improvements. The subject property is currently developed as unimproved land, UV filtration, a sewage grinder, an influent pump station and pond effluent pump station, miscellaneous equipment storage, a standby generator, and five aeration ponds.

2.1. Assessment Procedure and Scope of Investigation

Phase I Environmental Site Assessments assist in identifying past and present land use, including identification of possible on-site releases or disposal of manufacturing or other wastes if such information is contained within regulatory reports, files and/or is currently visible on-site. The assessment reviews Local, County, State, and U.S. Environmental Protection Agency lists of known or potentially hazardous waste sites, landfills, and sites currently under investigation for environmental violations that may be of concern to this site.

The scope of the environmental investigation consisted of: 1) a site reconnaissance; 2) a computerized database search of regulatory agency records; 3) a review of historical aerial photographs and historical topographic maps; 4) a review of available

Sanborn fire insurance maps and City Directory listings; 5) an interview with the operator of the treatment plant; and 6) the preparation of this Phase I ESA Report detailing the findings of the investigation.

These activities were conducted in order to identify recognized environmental conditions. The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the ground, groundwater, or surface water on the property.

The term recognized environmental condition is not intended to include *de minimus* conditions. *De minimus* conditions are conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

Historical recognized environmental conditions are environmental conditions that would have been considered recognized environmental conditions in the past, but may not currently be considered recognized environmental conditions. An example of a historical recognized environmental condition is a past release that was appropriately remediated.

2.2 *Qualifications of Environmental Professionals*

The Phase I ESA was prepared by Rachel Ganiere, Environmental Engineer, and Nicole Peacock, a Professional Engineer and Professional Geologist. The site reconnaissance and interviews were conducted by Ms. Ganiere. Qualifications for Ms. Ganiere and Ms. Peacock are presented in Appendix A.

The Phase I ESA was conducted under the supervision of Nicole Peacock, a Professional Engineer and Professional Geologist with 10 years of relevant experience. I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in Section 312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.

3. Site Location

The subject property is situated on an approximately 4 acre portion of the Seeley Wastewater Treatment Facility site (Figure 1 and 2; Appendix B, Photographs 1 and 2). The WWTP is located within a larger, approximately 32.2 acre parcel (APN 051-430-008-000).

The Seeley Wastewater Treatment Facility is located at 1898 West Main Street in Seeley, Imperial County, California. The subject property is bordered by the facultative ponds and Seeley County Water District offices to the north, New River Boulevard to the east, unimproved land and the New River to the west, and unimproved land to the south (Figure 2). The Seeley Wastewater Treatment Facility is surrounded by residential neighborhoods to the east, the New River to the west, agricultural land to the north, and unimproved land to the south.

4. Environmental Setting

General topographic information for the subject property and the surrounding area was obtained from a review of the USGS topographic map for Seeley, California, from the EDR report, and from the site visit. The subject property is approximately 45 feet below mean sea level.

No subsurface geologic investigations were performed as a part of this Phase I site assessment. A geotechnical study that included four soil borings at the site was issued in August 2009 (Appendix C). The four borings were advanced to depths ranging from 21.5 to 51.5 feet below the existing ground surface. The site specific geologic information presented in this section is based on information presented in the August 2009 geotechnical report.

The soils at the site generally consist of interbedded soft to stiff silty clays and loose to medium dense sandy silts/silts until 10 to 17.5 feet bgs. Stiff to very stiff clay were encountered from approximately 10 to 51.5 feet bgs. No active faults are mapped on the site.

Hydrogeologic information was obtained from the August 2009 geotechnical report. A piezometer was installed on the subject property on July 21, 2009 by Landmark Consultants. On August 3, 2009, the water level was measured at 10 feet below ground surface. According to Landmark Consultants, the piezometer was not removed from the subject property. However, Dudek did not observe the piezometer during the site reconnaissance. The groundwater flow direction is inferred to be to the west using surface topography.

Surface water run-off during rain events in the vicinity of the subject property flows via sheet flow to the New River and New River Boulevard.

5. Previous Investigations

Dudek reviewed the following previous reports:

- Geotechnical Report: Seeley Water Reclamation Facility Title 22 Additions, prepared by Landmark Consultants, Inc., dated August 2009.

  The information obtained from the report regarding site soils was summarized in Section 4 of this Phase I ESA. The remainder of the report discussed geologic hazards, such as seismic activity, landslides, flood hazards, and liquefaction.

  In addition, the geotechnical report provided historical site conditions of the subject property. According to the report, three wastewater treatment ponds were located on the western portion of the subject property. The ponds were used for 1 year, but were abandoned approximately 20 years ago due to piping failure associated with a landslide on the New River bluffs. Undocumented fill was used to backfill the western portion of the subject property to ground level. Landmark Consultants indicated approximately 3 to 5 feet of fill is located in the southwestern portion of the subject property.

- Report of Geotechnical Investigation Wastewater Treatment Plant, prepared by Geotechnics Incorporated, dated May 12, 2003.

  Four cone penetrometer (CPT) borings were advanced to a maximum depth of 50.5 feet in 2003. No soil samples were collected from the CPT borings. Geotechnics stated that the soils consist of fine grained sandy silt or lean clay based on the borings advanced at the Seeley Water Treatment Plant, approximately 1,000 feet northeast of the subject property. Groundwater was encountered in each of the four CPT borings at depths ranging between 8 and 13 feet bgs. The remainder of the report discussed geologic hazards, such as seismic activity, landslides, flood hazards, and liquefaction.

6. Interviews

6.1. Site Representative Interview

Dudek interviewed Andy Munger, the Seeley County Water District Chief Operator, on March 19, 2010. Mr. Munger has worked at the SCWD WWTP since 2008.

The interview revealed the following about the subject property:

- Mr. Munger stated that the WWTP was constructed in 1966. Mr. Munger stated that the facility originally utilized a percolation system until California required additional treatment of wastewater. Mr. Munger was unaware of the date that the UV filtration system was implemented.

- Mr. Munger stated that the chemicals stored within the subject property include diesel for the backup generator. Mr. Munger stated that the backup generator was installed in late 2009 as part of a United States Department of Agriculture (USDA) grant.

  Chemicals including household cleaning chemicals and paint are stored in the onsite building located north of the subject property. Mr. Munger stated that gasoline and grease were formerly stored in the onsite building, but due to theft, the chemicals are currently stored at the Water Treatment Facility located northeast of the site. In addition, Mr. Munger indicated that one gasoline 55 gallon drum and one diesel 55 gallon drum were formerly located on the site. Mr. Munger stated that the two 55 gallon drums were removed from the site more than five years ago. No staining was observed in the storage shed of the Seeley County Water District Offices.

- Mr. Munger stated that the area located north of the facultative ponds (north of the subject property) was formerly used as a dump site in the 1940s and possibly 1950s. Mr. Munger did not have any additional information pertaining to the former dump site.

- Mr. Munger indicated that three of the five aeration ponds located on the subject property are not in service. In addition, Mr. Munger stated that the west facultative pond, located north of the subject property, is also not in service.

- Mr. Munger indicated that treatment ponds were located on the western portion of the subject property. However, due to land failure, the use of the treatment ponds was discontinued. In addition, Mr. Munger stated that fill from the west facultative/percolation pond was used to bring the western portion of the subject property to ground level.

- Mr. Munger stated that water samples are collected from each of the three ponds (facultative and aeration) as well as the effluent to measure the pH, dissolved oxygen, and temperature on a daily basis.

- Mr. Munger stated that there are no wells on the subject property, nor on the WWTP site.

6.2. *User-Provided Information*

In accordance with ASTM Standard 1527-05, Dudek posed questions to the user of this Phase I ESA, the SCWD. David Dale of SCWD provided the following answers.

1) Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law?

No

2) Are you aware of any activity and land use limitations, such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

   No

3) As the user of this ESA, do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

   No

4) If the purchase price of the subject property was below fair market value, did this occur because contamination was/is known or believed to be present at the property?

   Not applicable

5) Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

   No

6) As the user of this ESA, based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of contamination at the property?

   No

6.3. Agency Contacts

Dudek contacted the Imperial County Certified Unified Program Agency (CUPA) Office (the Department of Toxic Substances Control [DTSC]), Imperial County Planning and Development Services, Imperial County Environmental Health Department, and the Colorado River Basin Regional Water Quality Control Board regarding the SCWD WWTP.

In addition, Dudek contacted agencies regarding the former dump located north of the wastewater treatment facility. Dudek contacted the Imperial County Public Works, Imperial County Building and Planning Department, and Department of Resources Recycling and Recovery (CalRecycle and formerly managed by Integrated Waste Management Board and Division of Recycling) for additional information pertaining to the former dump site. According to Ms. Claire (last name not provided), the Imperial County Public Works department has no record of a landfill located in Seeley. Ms. Danielle Bruce of the Imperial County Building and Planning Department stated that no records were on file for the site located north of the Seeley Wastewater Treatment Facility. Dana Sturgess of CalRecycle stated that the agency did not begin collecting data on landfills until mid-1974 and did not begin

regulating landfills until 1977 or 1978. Therefore, Ms. Sturgess stated that CalRecycle does not have any files for a former dump located north of the WWTP.

6.3.1. Imperial County Certified Unified Program Agency (CUPA) Office

The Imperial County CUPA office was contacted on March 15, 2010 to obtain information pertaining to the site. According to Ms. Laura (last name not provided) the Imperial County CUPA office did not have any records for the site or site address. Laura referred Dudek to the Imperial County Building and Planning Department and the Imperial County Environmental Health Department for information pertaining to the site. Laura stated that DTSC took over the inspections beginning 4 years ago. She stated that any historical records were kept by the above stated agencies.

6.3.2. Imperial County Planning and Development Services

Dudek contacted the Imperial County Planning and Development Services on March 19, 2010. According to Ms. Danielle Bruce, the Imperial County Planning and Development Services has building permits for the site. Dudek reviewed the permits on file, which pertain to a 2004 electrical permit application for the WWTP.

6.3.3. Imperial County Environmental Health Department

Dudek contacted the Imperial County Environmental Health Department on March 22, 2010. According to the Imperial County Environmental Health Department Representative, no records are on file for the site. The representative referred Dudek to the Colorado River Basin Regional Water Quality Control Board for any information pertaining to the SCWD WWTP.

6.3.4. Colorado River Basin Regional Water Quality Control Board

The Colorado River Basin Regional Water Quality Control Board (RWQCB) was contacted on March 22, 2010 to obtain information regarding permits, violations, inspections, USTs, or ASTs on record for the wastewater treatment facility. The RWQCB has 22 files connected to the site. According to Mr. John Carmona and Doug Wylie the files are related to the NPDES permit held by the Seeley County Water District. Mr. Wylie provided the most recent enforcement actions issued by the RWQCB in 2008. The enforcement order pertained to violations of the National Pollutant Discharge Elimination System (NPDES) permit.

7. Site Reconnaissance

A site reconnaissance was conducted on March 19, 2010 by Rachel Ganiere of Dudek. Ms. Ganiere was accompanied by Andy Munger, Chief Operator. The primary focus of the site reconnaissance was the subject property. In addition, Dudek visited the remaining portions of the WWTP site. Site photographs are presented in Appendix B and the site features are shown on Figure 2.

Subject Property

The subject property consists of the southern portion of the SCWD WWTP (Photographs 1 and 2). The subject property includes unimproved land, miscellaneous equipment storage, five aeration ponds, UV filtration, an influent pump station and pond effluent pump station, standby generator, a sewage grinder (Muffin Monster), and septic tank drop off.

The unimproved land is located on the western portion of the subject property (Photograph 2). Vegetation was visible throughout the western portion of the subject property.

The miscellaneous equipment storage was observed in the southern and central portions of the subject property (Figure 2, Photographs 3 and 4). The equipment included broken pumps, pipes, used light ballasts, and chain link fence.

Five aeration ponds were observed on the eastern portion of the subject property (Photograph 5). Currently, aeration ponds numbers 1 and 5 are in use. The three remaining ponds are not in service. The standby generator, muffin monster, flow meters, and septic tank drop off were observed in the northeastern portion of the subject property (Photographs 6 and 7). Mr. Munger stated that the standby generator, muffin monster, flow meters, and septic tank drop off were installed in late 2009 as part of a grant from the USDA. The standby generator Caterpillar D-125-6 tank contains 393 gallons of diesel fuel. No staining was observed on the concrete pad surrounding the standby generator (Photograph 7).

The UV filtration is located on the northwestern portion of the subject property (Photograph 8). Mr. Munger indicated that a second UV filtration unit was installed in late 2009 to provide continuous treatment of the wastewater.

Five pole mounted transformers were observed on the northern portion of the subject property. The non-PCB containing transformers (labeled as non-PCB containing) are owned by Imperial Irrigation District (IID).

Distressed Vegetation

No areas of distressed vegetation were observed on the subject property.

Indications of Solid Debris Storage

All garbage generated on-site is disposed of off-site by Allied Waste. In addition, broken and used equipment is stored on the southern and central portions of the subject property (Photographs 3 and 4). Dudek observed pumps, pipe, fence, and light ballasts among the equipment storage areas.

Chemical Storage or Use

Dudek observed a standby generator on the northeastern portion of the subject property (Photograph 7). According to Mr. Munger, the standby generator was installed on the subject property in late 2009. The standby generator contains 393 gallons of diesel. No staining was observed on the concrete pad surrounding the generator.

Unnaturally Discolored Ponds or Flowing Waters

No areas of unnaturally discolored standing or flowing water were observed on the subject property. Five aeration ponds were observed on the eastern portion of the subject property (Photograph 5). Aeration pond numbers 1 and 5 are currently used in the wastewater treatment.

Groundwater Wells, Cisterns, Cesspools or Septic Tanks

No groundwater wells or septic tanks were observed on the subject property. The subsurface influent pump station and subsurface pond effluent pump station are located on the eastern portion of the subject property. The influent pump station transfers the wastewater to the facultative pond using up to two pumps; the effluent pump station maintains three pumps. Reportedly, one piezometer was installed west of aeration pond number 4 in July 2009. According to Landmark Consultants, the piezometer was not removed from the subject property.

Abnormal Odor

No abnormal odors for a wastewater treatment facility were observed during the site visit.

Recent Soil Disturbances

Recent soil disturbance was observed south of the parking lot (Photograph 9). Mr. Munger indicated that a parking lot drain was installed due to the recent rainstorms.

Storage Tanks

No storage tanks were observed on the subject property.

Surrounding Area and Remainder of the WWTP

Portions of the WWTP that border the subject property include New River Boulevard to the east, New River to the west, unimproved land to the south, and the SCWD

onsite building and the two facultative ponds to the north. The treated effluent outfall is located north of the facultative ponds (Photograph 10). Miscellaneous debris was observed north of the facultative ponds (Figure 2). Dudek observed tires, telephone poles, mattresses, bottles, plates, etc. among the debris (Photograph 11). Mr. Munger indicated that the area located north of the treatment ponds was used as the community dump in the 1940s and 1950s. He was unaware of the dump boundaries or contents.

Distressed Vegetation
No areas of distressed vegetation were observed on the remainder of the WWTP during the site visit.

Indications of Solid Debris Storage
Evidence of solid debris storage was observed north of the WWTP. Dudek observed tires, telephone poles, mattresses, bottles, and plates among the debris (Photograph 11).

Chemical Storage or Use
Chemical storage and use on the remainder of the WWTP site consists of 1-gallon containers of paint, motor oil, spray paint, caulk, and household cleaning supplies in the onsite building (Photograph 12). Three 5-gallon empty containers of gasoline were observed in the storage area of the onsite building. Mr. Munger stated that the gasoline is no longer stored on the subject property due to theft. Mr. Munger indicated that gasoline is currently stored at the Water Treatment Plant located northeast of the WWTP.

Unnaturally Discolored Ponds or Flowing Waters
No areas of unnaturally discolored standing or flowing water were observed on the WWTP. The in-service facultative pond was full of wastewater. Water was observed flowing from the effluent outfall (Photograph 10).

Groundwater Wells, Cisterns, Cesspools or Septic Tanks
No groundwater wells or septic tanks were observed on the WWTP. Wastewater can be collected from a subsurface holding area south of the facultative ponds. The wastewater then flows via gravity to the aeration ponds.

Abnormal Odor
No abnormal odors for a wastewater treatment facility were observed during the site visit.

Recent Soil Disturbances
No areas of recent soil disturbances were observed on the WWTP.

Storage Tanks
No storage tanks were observed on the WWTP during the site reconnaissance.

8. Review of Historical Aerial Photographs

Historical aerial photographs were obtained from EDR. Aerial photographs from 1953, 1974, 1984, 1996, 2002, and 2005 are included in Appendix D.

The New River stream bed and unimproved land is visible on the subject and surrounding area in 1953. A dirt road is visible on the northern portion of the subject property and north of the subject property in the 1953 aerial photograph. The quality of the 1974 aerial photograph is poor. Graded land is visible on the subject property in the 1974 aerial photograph. Two treatment ponds and one building are visible north of the subject property; the New River is visible to the west; unimproved land is visible to the south and a paved road (New River Blvd.) is visible to the east. The 1984 aerial photograph appears similar to the 1974 aerial; residential buildings are visible to the east of the subject property. The 1996 and 2002 aerial photographs appear similar to the 1984 aerial photograph. Five aeration ponds are visible on the subject property in the 2005 aerial photograph. The New River is visible to the west; two buildings and two treatment ponds are visible to the north; unimproved land is visible to the south; and a paved road and residential developments are visible to the east.

9. Review of Historical Topographic Maps

Historical topographic maps were obtained from EDR. Historical topographic maps are another historical source that can be used to document the prior use of the property and surrounding area. Topographic maps from 1948, 1957, and 1979 (photo-revision of 1957) were reviewed (Appendix E).

Vacant land is depicted on subject property in the 1948, 1957, and 1979 maps. An unimproved road is depicted east of the subject property. The 1979 map depicts roads south and east of the subject property. The New River is depicted west of the subject property and vacant land is depicted north of the subject property.

No indications of properties that may have impacted the subject property were observed in these maps.

10. Site History

Based on aerial photographs and interviews, the site has been used as a portion of the Seeley County Water District wastewater treatment facility since 1966. Prior to 1966, a dirt road and unimproved land were located on the subject property. Mr. Munger indicated that the area north of the WWTP treatment ponds was used as the community dump in the 1940s and 1950s. No additional information was available from public agencies regarding the former dump. During the site reconnaissance, miscellaneous debris including bottles, tires, etc were observed north of the WWTP treatment ponds (north of the subject property).

According to the Landmark Geotechnical Report (see Section 5), treatment ponds were installed on the western portion of the subject property in 1988 – 1989. The treatment ponds were used for one year until a landslide occurred along the New River bluffs. The use of the treatment ponds was discontinued by 1990 and the area was eventually filled in to ground surface. By 2005, five aeration ponds were located on the eastern portion of the subject property. A stand-by generator, Muffin Monster (sewage grinder), flow meters, and the septic tank drop off were installed on the northeastern portion of the subject property.

Dudek reviewed additional historical sources to obtain information on the subject property. Dudek requested Sanborn Fire Insurance maps from EDR; however, they were not available for the subject property area.

Dudek reviewed city directories for the years 1968 to 1993, in approximate 5 year intervals (Appendix F). Seeley County Water District was listed at 1898 W. Main Street in 1978 through 1993. Seeley County Water District was also listed on Rio Vista Street in 1968 and 1973. It is possible that the site address changed between 1973 and 1978. The remaining addresses identified in the city directory consist of residential listings.

11. Public Agency Records Search Review

The regulatory database gives a listing of sites, within an approximately one-mile radius of the subject property, which are known to be chemical handlers, hazardous waste generators, or polluters. Information in these listings includes the location of the site relative to the subject property, sources of pollution, and the status of the site. The search performed for this assessment was conducted in March 2010 by EDR. The complete database search report is included in Appendix G.

The subject property consists of a portion of the entire wastewater treatment site. The wastewater treatment site, as a whole, was listed in the EDR report in three of the databases searched by EDR: NPDES, CA WDS, and FINDS. No additional sites were mapped within the search radii. Due to inadequate address information, 42 facilities were cited but were unmapped. These sites are discussed in Section 11.5.

The following sections describe which databases were searched and how many facilities were identified within those databases:

11.1. U.S. Environmental Protection Agency (EPA) Federal Sources

The following computer databases were included in this search:

ACRONYM	DATABASE	SEARCH DISTANCE
NPL	National Priorities List (including proposed NPL sites)	1 mile

CORRACTS	Resource Conservation and Recovery Act (RCRA) Corrective Action	1 mile
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	0.5 mile
NFRAP	No Further Remedial Action Planned (CERCLIS)	0.5 mile
TSD	RCRA permitted treatment, storage or disposal facilities	0.5 mile
TRIS	Toxic Release Inventory Database	Target Property
RCRIS	RCRA registered small or large generators of hazardous waste	0.25 mile
ERNS	Emergency Response Notification System of spills	Target Property
CONSENT	Superfund (CERCLA) Consent Decrees	1 mile
ROD	Record of Decision	1 mile
FINDS	Facility Index System/Facility Identification Initiative Program Summary Report	Target Property
HMIRS	Hazardous Materials Information Reporting System	Target Property
MLTS	Material Licensing Tracking System	Target Property
MINES	Mines Master Index File	0.25 mile
NPL LIENS	Federal Superfund Liens	Target Property
PADS	PCB Activity Database System	Target Property
DOD	Department of Defense Sites	1 mile
NPDES	A Listing of NPDES permits, including stormwater	Target Property
US BROWNFIELDS	A Listing of Brownfields Sites	0.5 mile
RAATS	RCRA Administrative Action Tracking System	Target Property
TSCA	Toxic Substance Control Act	Target Property
Delisted NPL	National Priority List Deletions	1 mile
UMTRA	Uranium Mill Tailings Sites	0.5 mile
FUDS	Formerly Used Defense Sites	1 mile
INDIAN RESERV	Indian Reservations	1 mile
SSTS	Section 7 Tracking Systems	Target Property

ODI	Open Dump Inventory	0.5 mile
FTTS	Federal Insecticide, Fungicide, & Rodenticide Act/TSCA Tracking System	Target Property
US INST CONTROLS	Sites with Instrument Controls	0.5 mile
US ENG CONTROLS	Sites with Engineering Controls	0.5 mile

Seeley CWD WWTP was identified on the NPDES and FINDS databases, along with State and local CA WDS database. The target property (the Seeley County Water District Wastewater Treatment Facility) is discussed in detail in Section 11.4. No additional facilities were mapped within the search radii.

11.2. California State Sources

The following computer databases were included in this search:

ACRONYM	DATABASE	SEARCH DISTANCE
AWP	Annual Workplan Sites	1 mile
CAL-SITES	Cal-EPA, Department Of Toxic Substances Control	1 mile
CHMIRS	California Hazardous Material Incident Report System	Target Property
Notify 65	Proposition 65	1 mile
State Landfill	State Landfill	0.5 mile
WMUDS/SWAT	Waste Management Unit Database/Solid Waste Assessment Test	0.5 mile
LUST	Leaking Underground Storage Tank	0.5 mile
BEP	California Bond Expenditure Plan (DHS)	1 mile
DEED RSTR	Department Of Health Services – Land Use And Air Assessment	0.5 mile
CORTESE	State Index Of Properties With Hazardous Waste	0.5 mile
REF	Sites Referred To Another State Or Local Agency	0.25 mile
5CH	Proposed And Existing School Sites Being Evaluated By DTSC	0.25 mile
TOXIC PITS	Toxic Pits Cleanup Facilities	1 mile
UST	Registered Underground Storage Tanks, Including Tanks On Indian Land And Historic USTs	0.25 mile

HIST UST	Historic Underground Storage Tanks	0.25 mile
SWEEPS UST	UST listing maintained by RWQCB in the 1980s	0.25 mile
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land	0.5 mile
INDIAN UST	Underground Storage Tanks on Indian Land	0.25 mile
CA FID UST	Facility Inventory Database	0.25 mile
AST	Registered Aboveground Storage Tanks	0.25 mile
VCP	Brownfields Voluntary Cleanup Program	0.5 mile
CLEANERS	Dry Cleaner Facilities	0.25 mile
NFA	Properties With No Further Action Required By DTSC	0.25 mile
NFE	Properties Needing Further Evaluation By DTSC	0.25 mile
EMI	Emissions Inventory Data	Target Property
SWRCY	Recycler Database	0.5 mile
SLIC	Statewide SLIC Cases	0.5 mile
CA WDS	Sites Issued Waste Discharge Requirements	Target Property
WIP	Well Investigation Program Case List	0.25 mile
HAZNET	Hazardous Waste Information System	Target Property

The target property was listed in three of the databases searched by EDR: NPDES, CA WDS, and FINDS. The target property (the wastewater treatment site) is discussed in detail in Section 11.4. No facilities were mapped within the search radii.

11.3. EDR Proprietary Historical Databases

The following computer databases were included in this search:

ACRONYM	DATABASE	SEARCH DISTANCE
Gas Stations/Dry Cleaners	Business listing for Dry Cleaner or Gas Station	0.25 mile
Manufactured Gas Plants	Business Listing for Gas Plants	1 mile

No sites were listed on the EDR historical databases.

11.4. Detailed Regulatory Database Search Review

The target property (entire wastewater treatment site) was identified in National Pollutant Discharge Elimination System (NPDES), California Waste Discharge System

(CA WDS), and Facility Index System (FINDS) databases. The NPDES, CA WDS, and FINDS database listings for the site are compiled based on site use and do not document unauthorized releases. The NPDES database listing is due to maintaining a permit to discharge the treated wastewater effluent to the New River. The CA WDS database listing is associated with domestic sewage treatment and discharge of the treated wastewater to the New River. The Permit Compliance System tracks NPDES permit holding facilities, the permit compliance, and enforcement status and reports the information to FINDS.

11.5. Unmapped Sites

Unmapped sites are due to inadequate address information. Forty-two unique sites were listed in the EDR report as unmapped sites. Based on the address information supplied, the 42 unmapped sites are located greater than one mile from the subject property.

12. Evaluation of Potential Hazards and Environmental Concerns

Dudek obtained information regarding the following potential sources of hazards, hazardous material releases, and naturally-occurring hazardous substances from the site reconnaissance, the EDR report, the interview, historical documents, and from various agencies and companies.

Agricultural Use
According to a review of historical aerial photographs, the subject property was not used for agricultural purposes.

Mines
No active or abandoned mines were observed on the subject property. Additionally, the subject property is not listed on the MINES database in the EDR report.

Off-site sources
Based on the information presented in Section 11, it is unlikely that offsite properties have impacted the environmental conditions at the subject property.

Government Use
No military bases are located within a mile of the subject property. Dudek researched Camp Seeley which operated from 1940 until 1944. Camp Seeley was used to test transport and combat vehicles (Appendix H). The site is located approximately 1.2 miles north of the Seeley Wastewater Treatment Facility and 1.3 miles north of the subject property.

Residential Use
According to a review of historical aerial photographs, topographic maps, and Sanborn fire insurance maps, the site has not been used as a residence.

Lead-Based Paint
No information was available for review regarding the potential presence of lead based paint. The proposed project does not involve demolition of existing site buildings.

Railroads
No railroads were observed near the subject property during the site reconnaissance. According to the USGS 7.5 minute topographic map and aerial photographs, the Arizona Eastern Railroad is located 0.3 miles south of the subject property.

Asbestos
The soil types identified at the site during the August 2009 geotechnical investigation (sedimentary soils) are not indicative of naturally-occurring asbestos. Additionally, the Division of Mines and Geology August 2000 map titled *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* shows no naturally occurring asbestos in the vicinity of the site (Appendix I).

No information was available for review regarding the potential presence of asbestos containing building materials. The proposed project does not involve demolition of existing site buildings.

PCB Items
Five pole mounted transformers were observed on the subject property. A no-PCB label was posted on each pole mounted transformer.

Fill Material
The August 2009 geotechnical report stated that within the southwest portion of the subject property undocumented fill material is located in the top three to five feet of the subsurface (Appendix C). The fill soil is due to past grading activities to bring the western portion of the subject property to ground surface. The geotechnical report stated that the fill soil should be removed prior to construction of the subject property.

Debris
Miscellaneous equipment is stored in the southwestern portion of the subject property. Mr. Munger stated that the equipment storage consists of broken and used equipment.

In addition, miscellaneous debris (broken bottles, plates, mattress, telephone poles, tires, etc) were observed north of the facultative ponds (north of the subject property).

Illegal Drug Manufacturing Sites

No evidence of a drug lab on the subject property was observed by Dudek during the site reconnaissance. The site was not listed in the EDR report as a drug lab site or a site containing drug lab waste.

Airports

No airports are located within 1 mile of the site.

Landfills

Based on the site reconnaissance and interview, the area north of the subject property was used as a dump. Although the limits of the former dump were not defined, there is no record of evidence of the dump having been observed during the excavation of the facultative ponds located between the former dump and the subject property. These ponds were excavated both in the 1960s and the western pond was excavated further in the 1990s. The total depth of the ponds is 10 to12 feet below ground surface. Additionally, there is no record of evidence of the dump having been observed during the recent excavation of the aeration ponds (between 2002 and 2005). Finally, a 2009 geotechnical study included four soil borings on the subject property to depths of up to 50 feet and no trash debris or voids were logged in the lithology log. Based on this information, it appears that the former dump was limited to the area north of the subject property.

Water tanks

Dudek did not observe water tanks on the subject property or on adjacent properties.

Highways

County Highway S80 is located approximately 0.13 miles south of the subject property (Figure 1). Interstate 8 is located approximately 2 miles south of the subject property.

13. Conclusions and Recommendations

This Phase I Environmental Site Assessment was conducted for Seeley County Water District (SCWD) Wastewater Treatment Plant.

The subject and adjoining properties appeared to be unimproved land in the 1948 topographic map. Two dirt roads and unimproved land were visible on the WWTP site in the 1953 aerial photograph. The WWTP was constructed in 1966. The subject property was used as the parking lot and unimproved land until at least 1988. By 1989, a treatment pond was installed in the southwestern portion of the subject property. However, due to piping failure associated with a landslide into the New River, the treatment pond use was discontinued after one year of operation. According to the geotechnical report (Landmark, 2009), approximately 3 to 5 feet of undocumented fill was added to the western portion of the subject property after the landslide. The five aeration ponds were installed on the southeastern portion of the subject property by

2005. By 2009, five aeration ponds, miscellaneous equipment storage, a standby generator, a grinder (Muffin Monster), UV filtration, parking areas, septic tank drop off, and pump stations were located on the subject property.

The area immediately surrounding the subject property areas consists of the WWTP onsite building and facultative ponds to the north. The area surrounding the WWTP site consists of residential neighborhoods, the New River, and unimproved land.

Information gathered for this report indicated the following:

- Evidence of dumping was observed north of the subject property (north of the WWTP, but on the same parcel that contains the subject property; Figure 2). Additionally, based on the interview with the treatment plant operator, a community dump was located north of the WWTP in the 1940s and 1950s.

  Dudek did not review any documents that defined the limits of the former dump. No documents were available from the Imperial County Public Works, Imperial County Planning and Development Services, and CalRecycle for the subject property APN. Additionally, no land use information from historical sources was available prior to 1948. The subject and adjoining properties appeared to be unimproved land in the 1948 topographic map. Two dirt roads and unimproved land were visible on the WWTP site in the 1953 aerial photograph.

  Although the limits of the former dump were not defined, there is no record of evidence of the dump having been observed during the excavation of the facultative ponds located between the former dump and the subject property. These ponds were excavated both in the 1960s and the western pond was excavated further in the 1990s. The total depth of the ponds is 10 to12 feet below ground surface. Additionally, there is no record of evidence of the dump having been observed during the recent excavation of the aeration ponds (between 2002 and 2005). Finally, a 2009 geotechnical study included four soil borings on the subject property to depths of up to 50 feet and no trash debris or voids were logged in the lithology log. Based on this information, it appears that the former dump was limited to the area north of the subject property.

- Chemical storage on the subject property is limited to 393 gallons of diesel fuel stored within the built-in tank of the standby generator. The diesel standby generator is located on the northeastern portion of the subject property. The generator was installed in late 2009 as part of a USDA grant. No staining was observed on the concrete pad surrounding the standby generator.

  One gasoline 55-gallon drum and one diesel 55-gallon drum were formerly located on the northwestern portion of the subject property (50 to 100 feet west of the SCWD WWTP building). However, approximately five years ago the 55 gallon drums were removed from the site. The undocumented fill which

was placed in the western portions of the subject property includes the former location of the 55-gallon drums.

- Chemical storage and use on the remainder the WWTP site is currently limited to small quantities of household cleaning supplies, motor oil, paint, and spray paint. These chemicals are stored on concrete slabs in the building located north of the subject property. It is unlikely that the storage or use of these chemicals has impacted the environmental conditions at the subject property.

  Ten gallon containers of gasoline were formerly stored in the onsite building with concrete slabs. According to Mr. Munger, the gasoline is no longer stored onsite due to theft. No staining was observed on the concrete where the fuel was formerly stored. It is unlikely that the storage or use of these chemicals has impacted the environmental conditions at the subject property.

- The SCWD WWTP site is listed in the National Pollutant Discharge Elimination System (NPDES), California Waste Discharge System (CA WDS), and Facility Index System (FINDS) databases due to discharge of treated wastewater effluent to the New River. The NPDES, CA WDS, and FINDS databases are compiled based on site use and do not document unauthorized releases.

- The former Seeley Camp was located approximately 1.2 miles north of the WWTP. Additionally, the existing El Centro Naval Air Facility is located approximately 1.5 miles northwest of the WWTP. Based on the groundwater flow direction at the El Centro Naval Air Facility (to the northwest), it is unlikely that either military installation has impacted the environmental conditions of the subject property.

Recommendations for the Subject Property

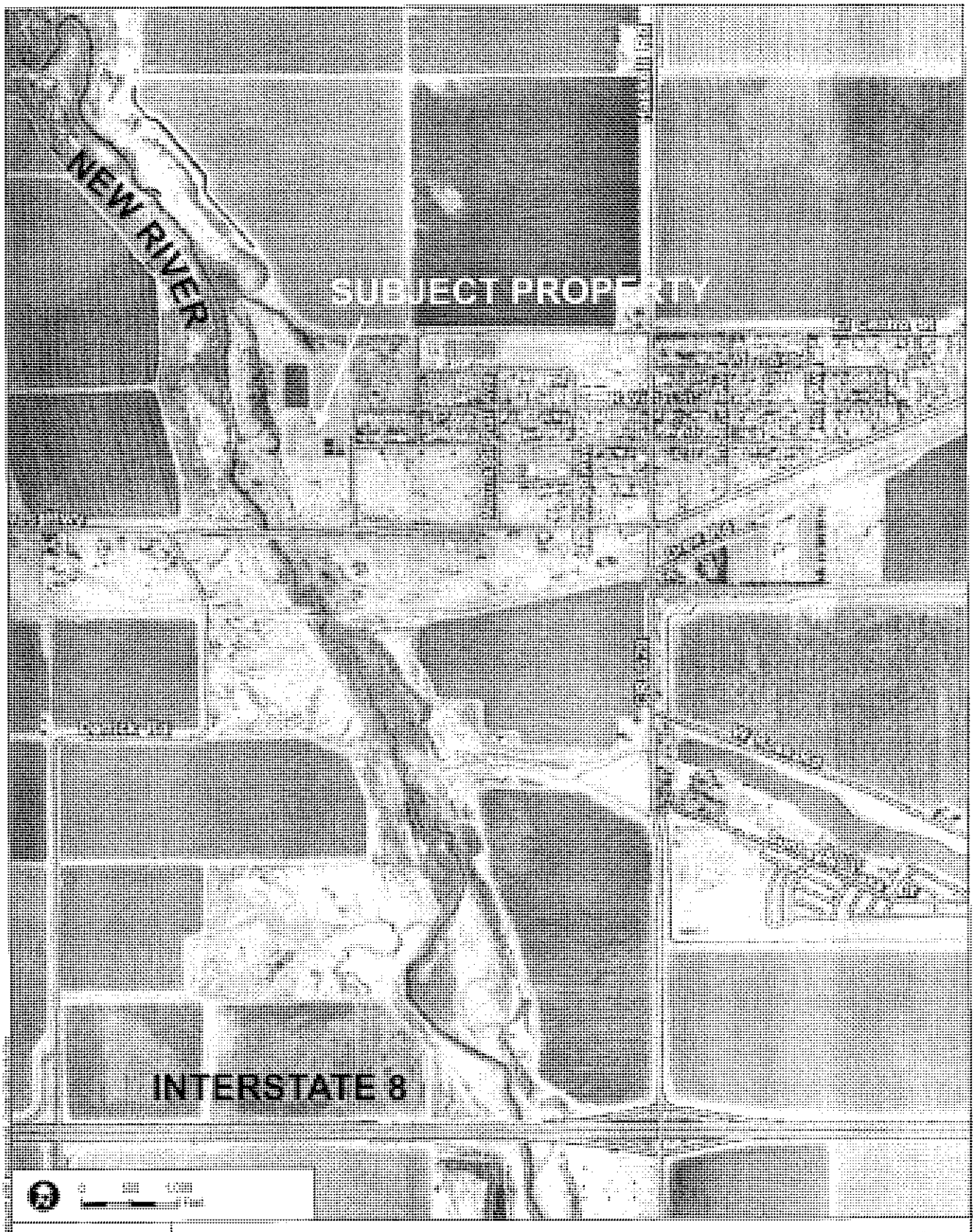
Dudek has performed a Phase I Environmental Site Assessment of the subject property, in conformance with the scope and limitations of ASTM Practice E 1527-05. Based on the findings in this report, the following recognized environmental condition was identified:

- According to the 2009 geotechnical report, undocumented fill is located on the subject property. However, the proposed project being evaluated in the EIR includes construction of sludge drying beds where the undocumented fill is located. The geotechnical report recommends the removal of the fill prior to construction. Therefore, no further investigation is recommended for the undocumented fill.

14. Limitations

The findings and conclusions presented in this report are professional opinions based solely upon the indicated data described in this report, visual observations of the site and vicinity and our interpretation of the available historical information and documents reviewed. Dudek makes no warranty as to the accuracy of statements made by others or the accuracy of information included in documentation reviewed in connection with this study. It should be recognized that this study was not intended to be a definitive investigation of potential contamination at the site and that the recommendations do not necessarily include all conditions that may be present. Because the scope of the investigation was limited, it is possible that currently unrecognized conditions or contamination might exist at the site.

No warranties or guarantees or representations, expressed or implied, are made by Dudek, except that this report has been prepared in accordance with current generally accepted practices and standards consistent with the level of care and skill exercised under similar circumstances by other professionals performing the same or similar services. The conclusions are intended exclusively for the purpose outlined herein and may not be suitable to satisfy the needs of other users. Thus, any use or reuse of this document is at the sole risk of said user.



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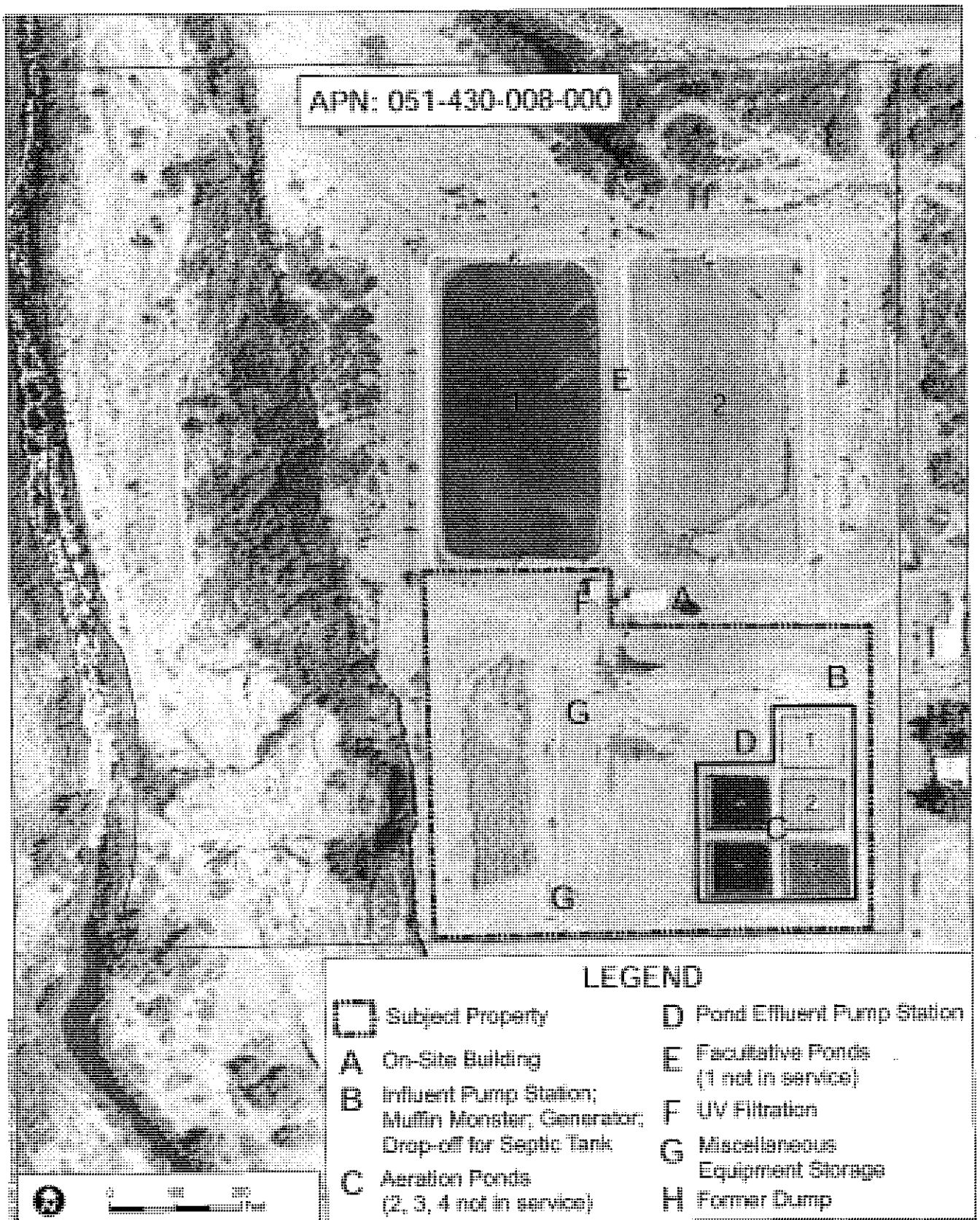
SEELEY COUNTY WATER DISTRICT

FIGURE 1
VICINITY MAP

MARCH 2018



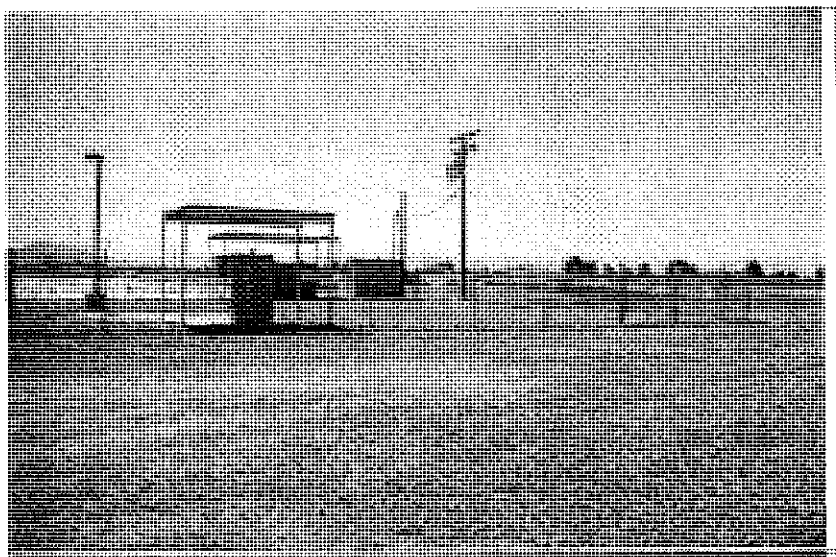
DUDEK

SEELEY COUNTY WATER DISTRICT

FIGURE 3
SITE MAP

Qualifications of Environmental Professionals

Environmental Professional	Professional License	Degree(s)	Years Experience	Task Performed
Nicole Peacock	Professional Engineer, State of California; Professional Geologist, State of California	B.S., Civil and Environmental Engineering, B.S., Geology, University of California, Los Angeles, 1999	10	Report Preparation
Rachel Ganiere	Engineer in Training	B.S., Earth and Environmental Engineering, Columbia University, 2003	5	Report Preparation, Site Reconnaissance, and Interviews

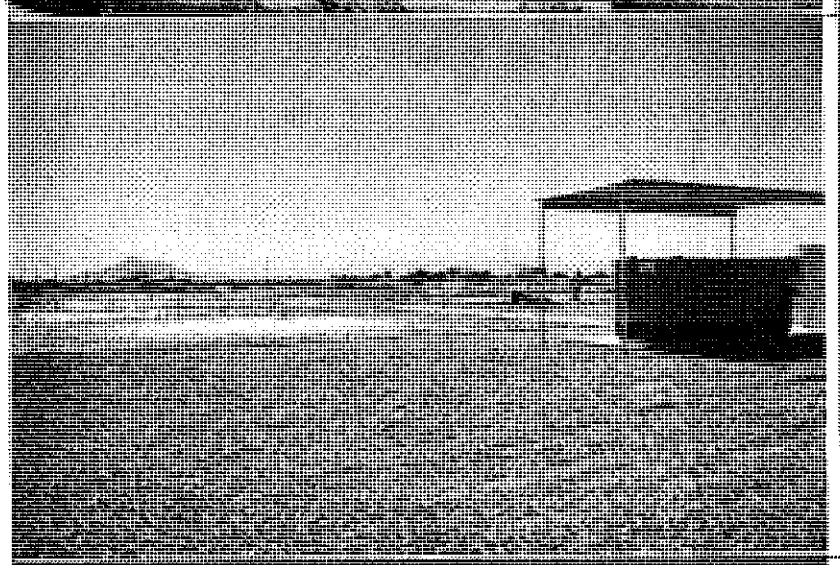


Photograph 1 - View of the southeastern portion of WWTP.

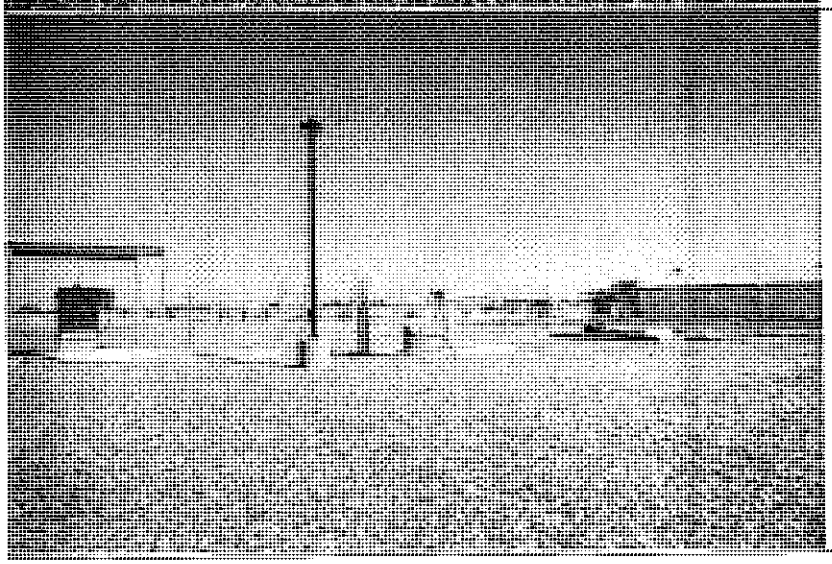
Photograph 2 - View of the western portion of the subject property.

Photograph 3 - Equipment storage on the southern portion of the subject property.

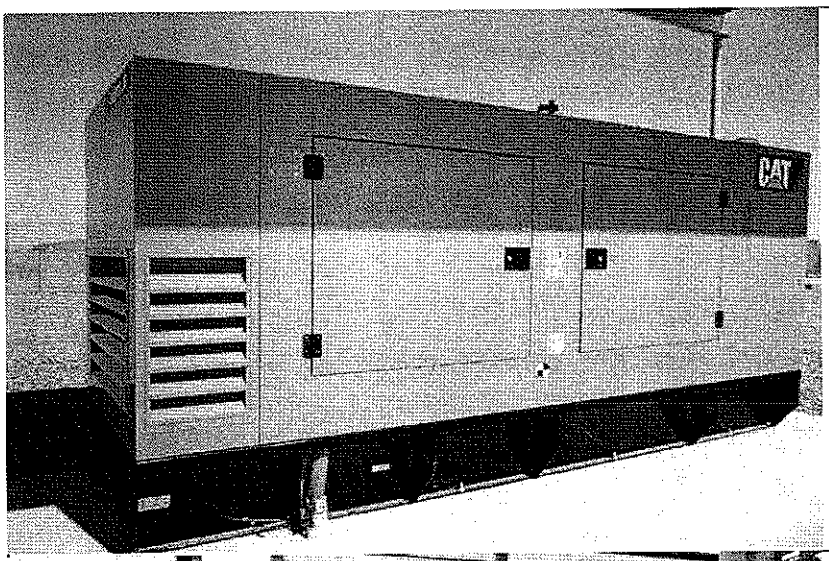
Photograph 4 - Equipment storage on the central portion of the subject property.



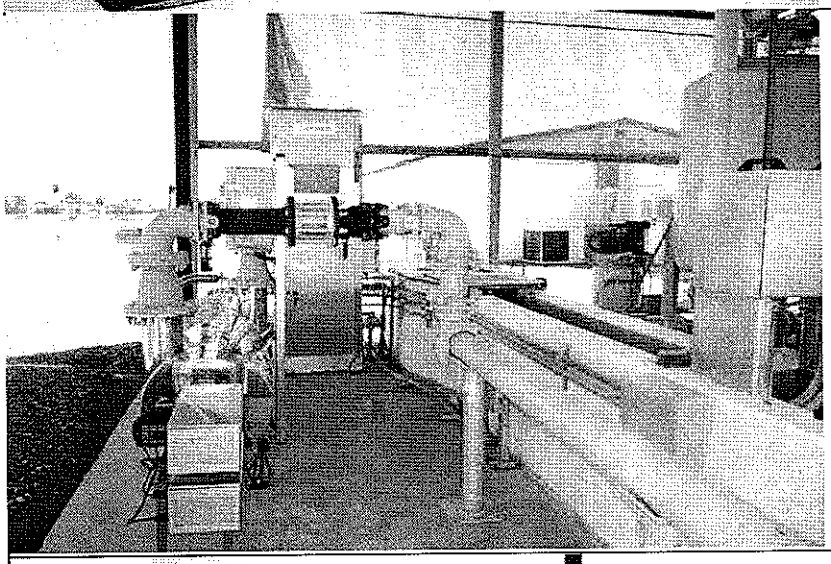
Photograph 5 - Aeration ponds located in the southeastern portion of the subject property.



Photograph 6 - Mulle Heater, effluent pump station, septic tank drop off, and flow meters located north of aeration ponds.



Photograph 7 - Standby generator located north of the aeration ponds.

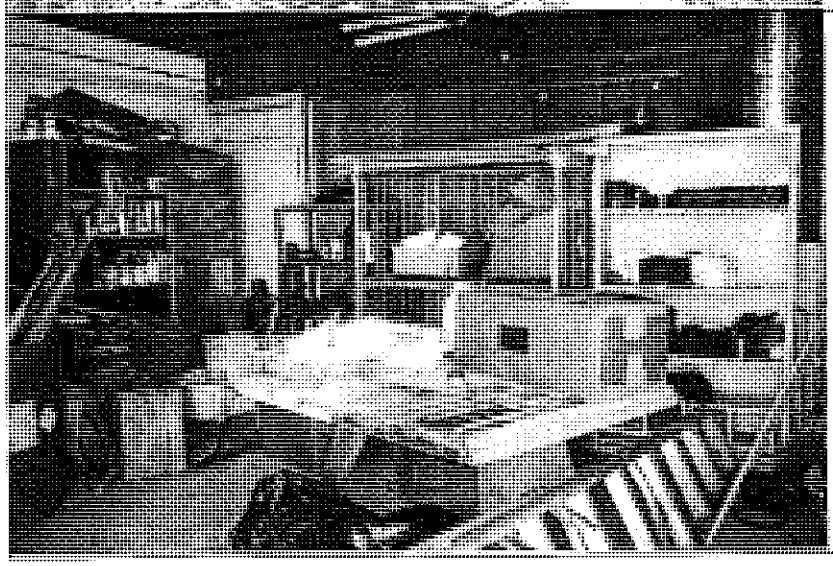


Photograph 8 - UV Filtration located on the northwestern portion of the subject property.

Photograph 9 - Recently installed stormwater drainage in the parking lot.

Photograph 10 - Wastewater effluent outfall.

Photograph 11 - Debris observed north of the facultative ponds.



Photograph 12 - SCWD under building storage area.

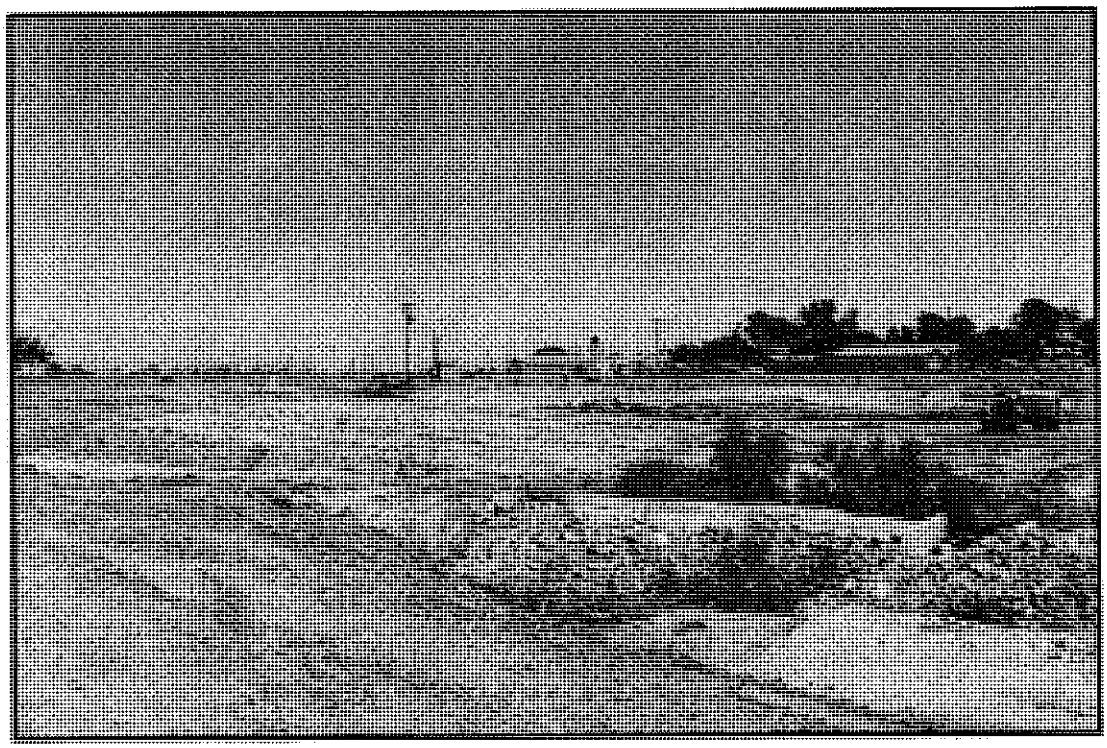
JOB. NO 6382 FILE NO. 165

Geotechnical Report

Seeley Water Reclamation Facility
Title 22 Additions
Seeley, California

Prepared for:

Dudek and Associates
750 Second Street
Encinitas, CA 92024



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August 13, 2009

Mr. Tom Falk, PE
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Geotechnical Investigation
Seeley Water Reclamation Facility
(Title 22 Additions)
Seeley, California
LCI Report No. LE09142

Dear Mr. Falk:

This geotechnical report is provided for design and construction of the proposed California Code of Regulations – Title 22 Water Reclamation Facility additions to the Seeley Wastewater Treatment Plant (WWTP) located in western Seeley, California. Our geotechnical investigation was conducted in response to your request for our services. The enclosed report describes our soil engineering investigation and presents our professional opinions regarding geotechnical conditions at the site to be considered in the design and construction of the project.

This executive summary presents ***selected*** elements of our findings and recommendations only. This summary ***does not*** present all details needed for the proper application of our findings and recommendations. Our findings, recommendations, and application options are related ***only through reading the full report***, and are best evaluated with the active participation of the engineer of record who developed them. The findings of this study are summarized below:

- The findings of this study indicate that the subsurface soils at the site generally consist of 10 to 17.5 feet of interbedded layers of soft to stiff silty clays (CL) of low to moderate expansion and loose to medium dense sandy silts/silts (ML) of low expansion. Stiff to very stiff clay (CL-CH) were encountered from a depth of 10 to 51.5 feet below ground surface.

- The risk of liquefaction induced settlement is low (estimated settlement of ¼ to ½ inch occurring at 10 to13 feet below ground surface).

- Estimated foundation settlements for the 30-foot by 25-foot clarifier are indicated on Plate D-1 attached on Appendix D of this report. Differential settlement is estimated to be about two-thirds of total settlement.

- The clay soils are aggressive to concrete and steel. Concrete mixes shall have a maximum water cement ratio of 0.45 and a minimum compressive strength of 4,500 psi (minimum of 6 sacks Type II/V cement per cubic yard).

- Due to highly corrosive soils, all reinforcing bars, anchor bolts and hold downs shall have a minimum concrete cover of 3.0 inches.

We did not encounter soil conditions that would preclude development of the proposed project provided the recommendations contained in this report are implemented in the design and construction of this project.

We appreciate the opportunity to provide our findings and professional opinions regarding geotechnical conditions at the site. If you have any questions or comments regarding our findings, please call our office at (760) 370-3000.

Respectfully Submitted,
Landmark Consultants, Inc.

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Section 1
INTRODUCTION

1.1 Project Description

This report presents the findings of our geotechnical investigation for the proposed improvements to the Townsite of Seeley's existing Wastewater Treatment Plant (WWTP) located in western Seeley, California (See Vicinity Map, Plate A-1). The proposed Title 22 Water Reclamation improvements will consist of the construction of one (1) 30 feet by 25 feet square concrete clarifier tank, one (1) 50 foot diameter by 24 feet high reclaimed water steel storage tank, pre-fabricated filter steel tanks (filters) installed on slab-on-grade of 20 feet by 30 feet, reclaimed water pump station, sludge drying beds and several small structures to support equipment such pumps, control panels and electrical gear.

The proposed clarifiers and reclaimed water pump station will consist of reinforced concrete and constructed mostly below grade (approximately 12 to 15 feet below grade). A site plan for the proposed improvements was provided by Dudek and Associates, the project designers, prior to initiation of the field investigation.

Site development will include building pads preparation, clarifiers and pump station excavations, embankment construction and underground utility installation for a variety of pipelines associated with the reclamation plant operation.

1.2 Purpose and Scope of Work

The purpose of this geotechnical study was to investigate the upper 21.5 to 51.5 feet of subsurface soil at selected locations within the site for evaluation of physical/engineering properties. From the subsequent field and laboratory data, professional opinions were developed and are provided in this report regarding geotechnical conditions at this site and the effect on design and construction. The scope of our services consisted of the following:

- Field exploration and in-situ testing of the site soils at selected locations and depths.
- Laboratory testing for physical and/or chemical properties of selected samples.
- Review of the available literature and publications pertaining to local geology, faulting, and seismicity.
- Review of Geotechnical Investigation – Seeley Wastewater Plant by Geotechnics, Inc., Project No. 0748-002-01, dated May 12, 2003.
- Engineering analysis and evaluation of the data collected.
- Preparation of this report presenting our findings, professional opinions, and recommendations for the geotechnical aspects of project design and construction.

This report addresses the following geotechnical issues:

- Subsurface soil and groundwater conditions
- Site geology, regional faulting and seismicity, near source factors, and site seismic accelerations
- Liquefaction potential and its mitigation
- Expansive soil and methods of mitigation
- Compressible subsoils, estimated settlements and methods of mitigation
- Aggressive soil conditions to metals and concrete

Professional opinions with regard to the above issues are presented for the following:

- Site grading and earthwork
- Building pad and foundation subgrade preparation
- Allowable soil bearing pressures and expected settlements
- Concrete slabs-on-grade
- Lateral earth pressures
- Excavation conditions and buried utility installations
- Mitigation of the potential effects of salt concentrations in native soil to concrete mixes and steel reinforcement
- Seismic design parameters

Our scope of work for this report did not include an evaluation of the site for the presence of environmentally hazardous materials or conditions.

1.3 Authorization

Mr. Tom Falk of Dudek and Associates provided authorization by written agreement to proceed with our work on June 30, 2009. We conducted our work according to our written proposal dated April 27, 2009.

Section 2
METHODS OF INVESTIGATION

2.1 Field Exploration

Subsurface exploration was performed on July 21, 2009 using 2R Drilling of Ontario, California to advance four (4) borings to depth of 21.5 to 51.5 feet below existing ground surface. The borings were advanced with a truck-mounted, CME 55 drill rig using 8-inch diameter, hollow-stem, continuous-flight augers. The approximate boring locations were established in the field and plotted on the site map by sighting to discernable site features. The boring locations are shown on the Site and Exploration Plan (Plate A-2).

A staff engineer observed the drilling operations and maintained a log of the soil encountered and sampling depths, visually classified the soil encountered during drilling in accordance with the Unified Soil Classification System, and obtained drive tube and bulk samples of the subsurface materials at selected intervals. Relatively undisturbed soil samples were retrieved using a 2-inch outside diameter (OD) split-spoon sampler or a 3-inch OD Modified California Split-Barrel (ring) sampler. The samples were obtained by driving the sampler ahead of the auger tip at selected depths. The drill rig was equipped with a 140-pound CME automatic hammer for conducting Standard Penetration Tests (SPT). The number of blows required to drive the samplers 12 inches into the soil is recorded on the boring logs as "blows per foot". Blow counts reported on the boring logs represent the field blow counts. No corrections have been applied for effects of overburden pressure, automatic hammer drive energy, drill rod lengths, liners, and sampler diameter. Pocket penetrometer readings were also obtained to evaluate the stiffness of cohesive soils retrieved from sampler barrels.

After logging and sampling the soil, the exploratory borings were backfilled with the excavated material. The backfill was loosely placed and was not compacted to the requirements specified for engineered fill.

The subsurface borings logs are presented on Plates B-1 through B-4 in Appendix B. A key to the interpretation of the borings logs are presented on Plate B-5. The stratification lines shown on the subsurface logs represent the approximate boundaries between the various strata. However, the transition from one stratum to another may be gradual over some range of depth.

2.2 Laboratory Testing

Laboratory tests were conducted on selected bulk (auger cuttings) and relatively undisturbed soil samples obtained in thin-wall tubes from the soil boring to aid in classification and evaluation of selected engineering properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials (ASTM) or other standardized methods as referenced below. The laboratory testing program consisted of the following tests:

- Plasticity Index (ASTM D4318) – used for soil classification, settlement estimates and expansive soil design criteria.
- Particle Size Analyses (ASTM D422) – used for soil classification and liquefaction evaluation.
- Unit Dry Densities (ASTM D2937) and Moisture Contents (ASTM D2216) – used for insitu soil parameters.
- Direct Shear (ASTM D3080) – used for soil strength determination
- One Dimensional Consolidation (ASTM D2435) – used for settlement estimates.
- Unconfined Compression (ASTM D2166) – used for soil strength estimates.
- Chemical Analyses (soluble sulfates & chlorides, pH, and resistivity) (Caltrans Methods) – used for concrete mix evaluations and corrosion protection requirements.

The laboratory test results are presented on the subsurface logs in Appendix B and on Plates C-1 through C-7 in Appendix C.

Engineering parameters of soil strength, compressibility and relative density utilized for developing design criteria provided within this report were obtained from the field and laboratory testing program.

Section 3
DISCUSSION

3.1 Site Conditions

The existing Seeley Wastewater Treatment Plant (WWTP) is located at the northwest corner of West Main Road and New River Boulevard in western Seeley, California. The proposed water reclamation facility improvements are located within an area that once consisted of three wastewater treatment ponds that are approximately 2 to 3 feet below that the north side of the WWTP site. It is our understanding that these ponds were used for about 1 year, and then were abandoned roughly 20 years ago after a landslide and piping failure occurred on the New River bluffs along the western edge of the WWTP property. Water infiltration from the ponds accessed sand soil strata and emerged at the incised New River channel bluff.

The western portion of the proposed reclamation facility improvements (where the Sludge beds will be located) were backfilled in the past few years with undocumented fill to the existing WWTP ground level. The reclamation facility improvements will be located at the west side of the existing Biolac and Aeration ponds. The locations of the proposed new structures are shown in the Site and Exploration Plan (Plate A-2) in Appendix A.

The Seeley WWTP is entirely surrounded by a chain-link fence with two access gates from the parking lot. Office and operation buildings, parking area and primary treatment ponds are located to the north side of the proposed improvements area. The western edge of the Seeley WWTP property is bordered by steep bluffs which descend to the banks of the New River. The lower bench of the river channel is approximately 15 to 20 feet below the west sides of the WWTP site. Properties to the east consist of single family residential homes. Vacant land abuts the south side of the property. Active agricultural land lies to the north side of the WWTP property.

The project site lies at an elevation of approximately 45 feet below mean sea level (MSL) (El. 955 local datum) in the Imperial Valley region of the California low desert. The surrounding properties above the flood plain lie on terrain which is flat (planar), part of a large agricultural valley, which was previously an ancient lake bed covered with fresh water to an elevation of 43± feet above MSL.

The New River overflowed in 1906 as a result of a headworks failure on the Colorado River during high flows on the river, causing the deep and wire incised flood channel. The Boulder Canyon Project (Hoover Dam – 1930's) has regulated the flow of the Colorado River. New River flows are now limited to agricultural drain waters and WWTP discharges from Mexico. Annual rainfall in this arid region is less than 3 inches per year with four months of average summertime temperatures above 100 °F. Winter temperatures are mild, seldom reaching freezing.

3.2 Geologic Setting

The project site is located in the Imperial Valley portion of the Salton Trough physiographic province. The Salton Trough is a topographic and geologic structural depression resulting from large scale regional faulting. The trough is bounded on the northeast by the San Andreas Fault and Chocolate Mountains and the southwest by the Peninsular Range and faults of the San Jacinto Fault Zone. The Salton Trough represents the northward extension of the Gulf of California, containing both marine and non-marine sediments since the Miocene Epoch. Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity. Figure 1 shows the location of the site in relation to regional faults and physiographic features.

The Imperial Valley is directly underlain by lacustrine deposits, which consist of interbedded lenticular and tabular silt, sand, and clay. The Late Pleistocene to Holocene lake deposits are probably less than 100 feet thick and derived from periodic flooding of the Colorado River which intermittently formed a fresh water lake (Lake Cahuilla). Older deposits consist of Miocene to Pleistocene non-marine and marine sediments deposited during intrusions of the Gulf of California. Basement rock consisting of Mesozoic granite and Paleozoic metamorphic rocks are estimated to exist at depths between 15,000 - 20,000 feet.

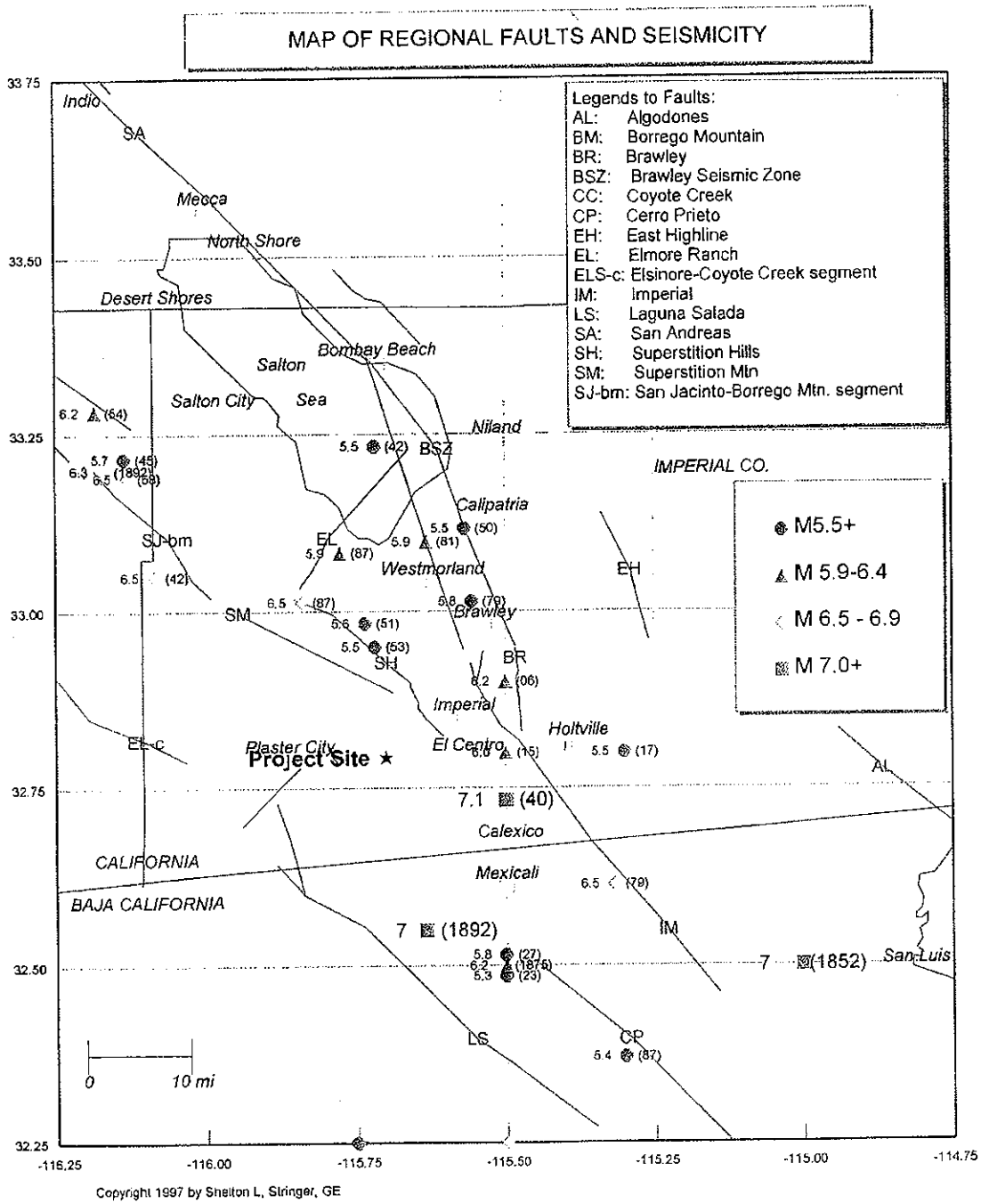
3.3 Seismicity and Faulting

Faulting and Seismic Sources: We have performed a computer-aided search of known faults or seismic zones that lie within a 62 mile (100 kilometer) radius of the project site as shown on Figure 1 and Table 1. The search identifies known faults within this distance and computes deterministic ground accelerations at the site based on the maximum credible earthquake expected on each of the faults and the distance from the fault to the site. The Maximum Magnitude Earthquake (Mmax) listed was taken from published geologic information available for each fault (Cao, et. al., 2003 and Jennings, 1994).

Seismic Risk: The project site is located in the seismically active Imperial Valley of southern California and is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. The proposed site structures should be designed in accordance with the 2007 California Building Code (CBC) for a "Maximum Considered Earthquake" (MCE) and with the appropriate site coefficients. The MCE is defined as the ground motion having a 2 percent probability of being exceeded in 50 years.

Seismic Hazards.

- **Groundshaking.** The primary seismic hazard at the project site is the potential for strong groundshaking during earthquakes along the Imperial, Brawley, and Superstition Hills Faults. A further discussion of groundshaking follows in Section 3.4.
- **Surface Rupture.** The project site does not lie within a State of California, Alquist-Priolo Earthquake Fault Zone. Surface fault rupture is considered to be unlikely at the project site because of the well-delineated fault lines through the Imperial Valley as shown on USGS and CGS maps. However, because of the high tectonic activity and deep alluvium of the region, we cannot preclude the potential for surface rupture on undiscovered or new faults that may underlie the site.
- **Liquefaction.** Liquefaction is a potential design consideration because of underlying saturated sandy substrata. The potential for liquefaction at the sites is discussed in more detail in Section 3.7.



Faults and Seismic Zones from Jennings (1994), Earthquakes modified from Ellsworth (1990) catalog.

Figure 1. Map of Regional Faults and Seismicity

Table 1
FAULT PARAMETERS & DETERMINISTIC ESTIMATES OF PEAK GROUND ACCELERATION (PGA)

Fault Name or Seismic Zone	Distance (mi) & Direction from Site	Fault Type		Fault Length (km)	Maximum Magnitude Mmax (Mw)	Avg Slip Rate (mm/yr)	Avg Return Period (yrs)	Date of Last Rupture (year)	Largest Historic Event >5.5M	(year)	Est. Site PGA (g)
Reference Notes: (1)		(2)	(3)	(2)	(4)	(3)	(3)	(3)	(5)		(6)
Imperial Valley Faults											
Imperial	11 NE	A	B	62	**7.0**	20	79	1979	7.0	1940	**0.24**
Brawley Seismic Zone	13 NE	B	B	42	**6.4**	25	24		5.9	1981	**0.16**
Brawley	13 E	B	B	14	**7.0**	20	---	1979	5.8	1979	**0.21**
Cerro Prieto	25 SE	A	B	116	**7.2**	34	50	1980	7.1	1934	**0.15**
East Highline Canal	28 ENE	C	C	22	**6.3**	1	774				**0.08**
San Jacinto Fault System											
- Superstition Hills	5.4 NE	B	A	22	**6.6**	4	250	1987	6.5	1987	**0.31**
- Superstition Mtn.	6.4 N	B	A	23	**6.6**	5	500	1440 +/-			**0.28**
- Elmore Ranch	19 NNW	B	A	29	**6.6**	1	225	1987	5.9	1987	**0.13**
- Borrego Mtn	23 NW	B	A	29	**6.6**	4	175		6.5	1942	**0.11**
- Anza Segment	40 NW	A	A	90	**7.2**	12	250	1918	6.8	1918	**0.10**
- Coyote Creek	42 NW	B	A	40	**6.8**	4	175	1968	6.5	1968	**0.08**
- Hot Spgs-Buck Ridge	56 NW	B	A	70	**6.5**	2	354		6.3	1937	**0.05**
- Whole Zone	6.4 N	A	A	245	**7.5**	---	---				**0.45**
Elsinore Fault System											
- Laguna Salada	11 WSW	B	B	67	**7.0**	3.5	336		7.0	1891	**0.24**
- Coyote Segment	19 W	B	A	38	**6.8**	4	625				**0.14**
- Julian Segment	44 WNW	A	A	75	**7.1**	5	340				**0.09**
- Earthquake Valley	46 WNW	B	A	20	**6.5**	2	351				**0.06**
- Whole Zone	19 W	A	A	250	**7.5**	---	---				**0.21**
San Andreas Fault System											
- Coachella Valley	39 N	A	A	95	**7.4**	25	220	1690+/-	6.5	1948	**0.12**
- Whole S. Calif. Zone	39 N	A	A	458	**7.9**	---	---	1857	7.8	1857	**0.15**

Notes:

1. Jennings (1994) and CDMG (1996)
2. CDMG (1996), where Type A faults -- slip rate >5 mm/yr and well constrained paleoseismic data
   Type B faults -- all other faults.
3. WGCEP (1995)
4. CDMG (1996) based on Wells & Coppersmith (1994)
5. Ellsworth Catalog in USGS PP 1515 (1990) and USBR (1976), Mw = moment magnitude,
6. The deterministic estimates of the Site PGA are based on the attenuation relationship of:
   Boore, Joyner, Fumal (1997)

Other Secondary Hazards.

▸ **Landsliding.** The project site is located within the incised New River channel. Even though the western portion of the WWTP property has been re-graded, there are indications of a landslide on the New River bluff along the western edge of the site. Linear erosion piping voids of about 1 to 3 feet in length are located along the west crown slope edge. The geotechnical report prepared by Geotechnics, Inc. in 2003 indicated tension cracks associated with the landslide extending back into the area of the previously abandoned unlined wastewater ponds. Geotechnics also noted evidence of piping in the southwest corner of the site which has been covered by recent placement of undocumented fill on the western side of the project site.

▸ **Volcanic hazards.** The site is not located in proximity to any known volcanically active area and the risk of volcanic hazards is considered very low.

▸ **Tsunamis, seiches, and flooding.** The site does not lie near any large bodies of water, so the threat of tsunami, seiches, or other seismically-induced flooding is unlikely. The Seeley WWTP site lies outside of the FEMA 100 year Flood Area of the New River.

▸ **Expansive soil.** In general, much of the near surface soils in the Imperial Valley consist of silty clays and clays which are moderate to highly expansive. The expansive soil conditions are discussed in more detail in Section 3.5.

3.4 Site Acceleration and UBC Seismic Coefficients

Site Acceleration: Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Accelerations also are dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same general area. Deterministic horizontal peak ground accelerations (PGA) from maximum probable earthquakes on regional faults have been estimated and are included in Table 1. The deterministic PGA estimate for the project site is based on the ground motion having a 10% probability of being exceeded in 50 years (return period of 475 years).

The computer program FRISKSP (Blake, 2000) was used to obtain the probabilistic estimate of the site PGA using the attenuation relationship NEHRP D 250 of Boore, Joyner, and Fumal (1997). The PGA estimate for the Design Basis Earthquake (DBE), defined as an event having a 10% probability of being exceeded in 50 years (return period of 475 years) was estimated to be **0.50g**.

The PGA estimate for the Maximum Considered Earthquake (MCE), which is defined as an event having a 2% probability of being exceeded in 50 years (return period of 2,500 years), was estimated to be **0.72g**.

2007 CBC (2006 IBC) Seismic Response Parameters: The 2007 California Building Code (CBC) seismic parameters are based on the Maximum Considered Earthquake for a ground motion with a 2% probability of occurrence in 50 years. This follows the methodology of the 2006 International Building Code (IBC). Table 2 lists seismic and site coefficients given in Chapter 16 of the CBC. The site soils have been classified as Site Class D (stiff soil profile). Design earthquake ground motions are defined as the earthquake ground motions that are two-thirds (2/3) of the corresponding MCE ground motions. Design earthquake ground motion data are provided in Table 2.

Because the project site is within 10 km of an active fault, a site-specific ground motion hazard analysis was prepared in accordance with the 2007 CBC (Table 3). The determination of the site specific ground motion was performed in conformance with the guidelines outlined in ASCE 7-05 Section 21 (21.2.1, 21.2.2, and 21.3). The probabilistic MCE ground acceleration was calculated to be 0.71g (Section 21.2.1). The deterministic MCE ground acceleration at the site due to an earthquake on the Imperial Fault is 0.60g (Section 21.2.2). In accordance with Section 21.2.3, the site specific ground acceleration is taken as 2/3 of the lesser of the probabilistic and deterministic MCE acceleration values. Accordingly, the design PGA used to calculate liquefaction potential and seismic settlement was determined to be 0.48g as per Section 21.3 of ASCE 7-05.

3.5 Subsurface Soil

Subsurface soils encountered during the field exploration conducted on June 21, 2009 generally consist of 10 to 17.5 feet of interbedded soft to stiff silty clays (CL) and loose to medium dense sandy silts/silts (ML). Stiff to very stiff clay (CL-CH) were encountered to a depth of 10 to 51.5 feet, the maximum depth of exploration. The subsurface logs (Plates B-1 through B-4) depict the stratigraphic relationships of the various soil types.

The native surface silty clays likely exhibit low to moderate swell potential (Expansion Index, EI = 21 to 90) when correlated to Plasticity Index tests (ASTM D4318) performed on the native clays. Silty soil layers exhibit low swell potential (Expansion Index, EI = 21 to 50).

Table 2
2007 California Building Code (CBC) and ASCE 7-05 Seismic Parameters

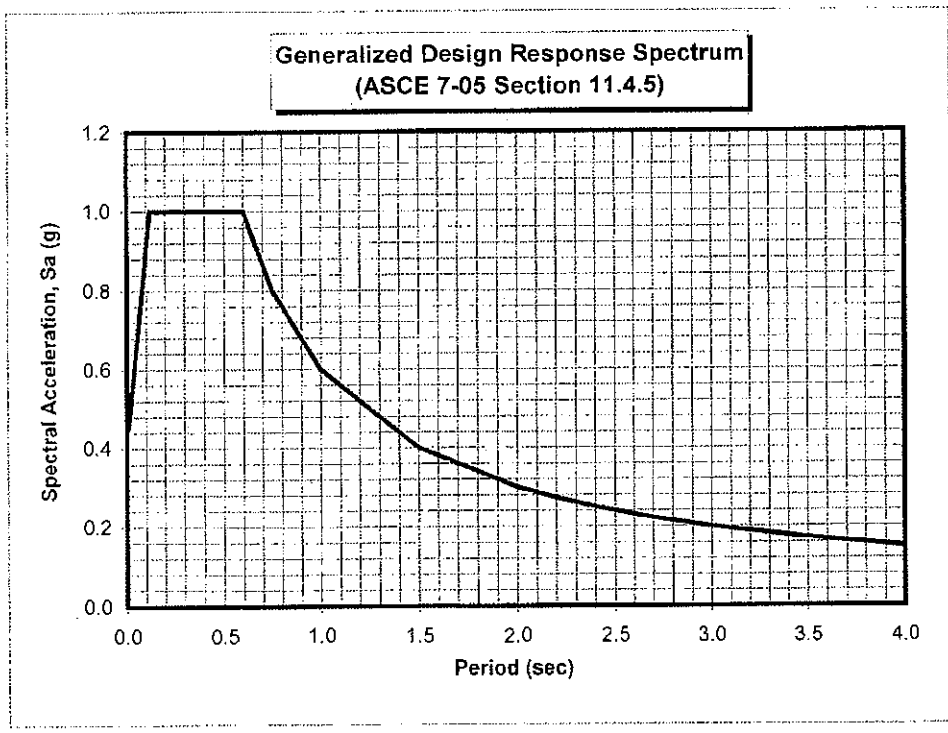
		IBC Reference
Site Class:	D	Table 1613.5.2
Latitude:	32.7936 N	
Longitude:	-115.6999 W	

Maximum Considered Earthquake (MCE) Ground Motion

Short Period Spectral Response	S_s	1.50 g	Figure 1613.5(3)
1 second Spectral Response	S_1	0.60 g	Figure 1613.5(4)
Site Coefficient	F_a	1.00	Table 1613.5.3 (1)
Site Coefficient	F_v	1.50	Table 1613.5.3 (2)
Adjusted Short Period Spectral Response	S_{MS}	1.50 g	$= F_a * S_s$
Adjusted 1 second Spectral Response	S_{M1}	0.90 g	$= F_v * S_1$

Design Earthquake Ground Motion

Short Period Spectral Response	S_{DS}	1.00 g	$= 2/3*S_{MS}$
1 second Spectral Response	S_{D1}	0.60 g	$= 2/3*S_{M1}$
	To	0.12 sec	$=0.2*S_{D1}/S_{DS}$
	Ts	0.60 sec	$=S_{D1}/S_{DS}$

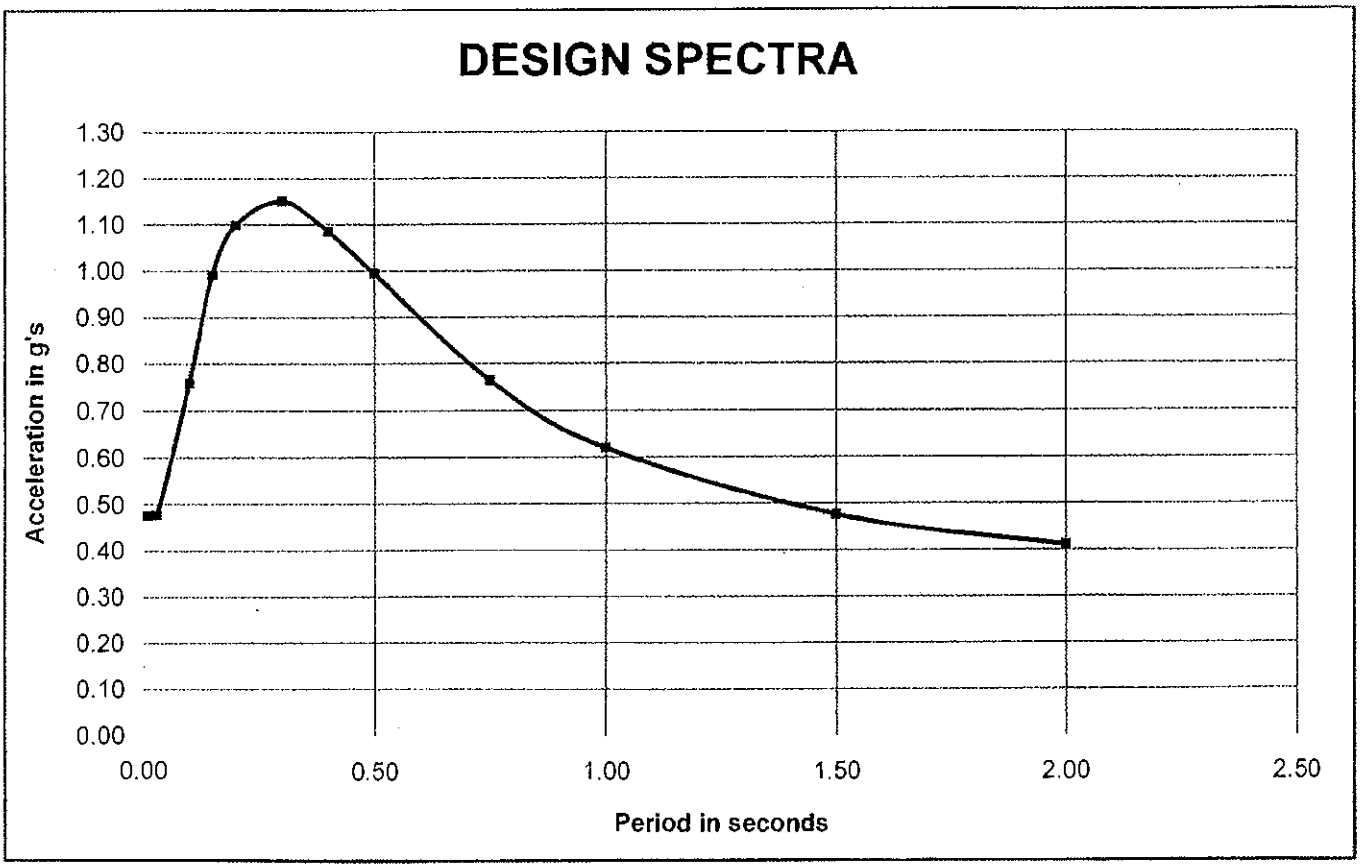


2007 CBC

Period T (sec)	Sa (g)	80% Sa (g)
0.01	0.45	0.36
0.03	0.55	0.44
0.10	0.90	0.72
0.12	1.00	0.80
0.15	1.00	0.80
0.20	1.00	0.80
0.30	1.00	0.80
0.40	1.00	0.80
0.50	1.00	0.80
0.60	1.00	0.80
0.75	0.80	0.64
1.00	0.60	0.48
1.50	0.40	0.32
2.00	0.30	0.24
2.20	0.27	0.22
2.40	0.25	0.20
2.60	0.23	0.18
2.80	0.21	0.17
3.00	0.20	0.16
3.50	0.17	0.14
4.00	0.15	0.12

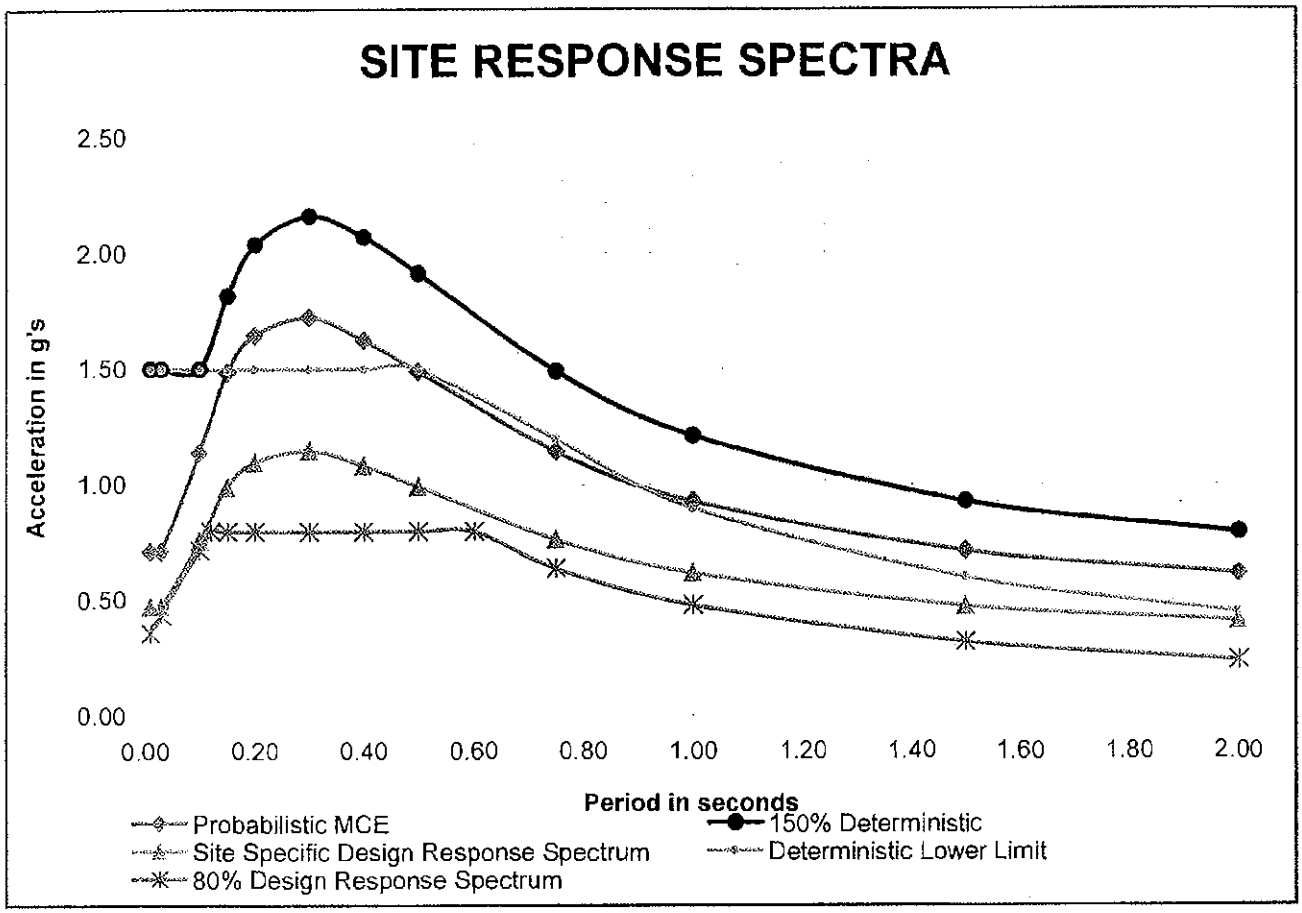
SITE SPECIFIC GROUND MOTION
Table 3

PSHA MCE 2% in 50 years		DETERMINISTIC MCE			DETERMINISTIC LOWER LIMIT		DESIGN RESPONSE SPECTRUM	
Period sec	Sam g's	Period sec	Sam g's	150% Sam g's	Period sec	Sam g's	Period sec	Sam g's
0.01	0.71	0.01	0.60	1.50	0.01	1.50	0.01	0.48
0.03	0.72	0.03	0.60	1.50	0.03	1.50	0.03	0.48
0.10	1.14	0.10	0.94	1.50	0.10	1.50	0.10	0.76
0.15	1.49	0.15	1.21	1.82	0.15	1.50	0.15	0.99
0.20	1.65	0.20	1.36	2.04	0.20	1.50	0.20	1.10
0.30	1.73	0.30	1.44	2.16	0.30	1.50	0.30	1.15
0.40	1.63	0.40	1.38	2.07	0.40	1.50	0.40	1.09
0.50	1.49	0.50	1.28	1.91	0.50	1.50	0.50	0.99
0.75	1.15	0.75	0.99	1.49	0.75	1.20	0.75	0.76
1.00	0.93	1.00	0.81	1.21	1.00	0.90	1.00	0.62
1.50	0.71	1.50	0.62	0.93	1.50	0.60	1.50	0.48
2.00	0.62	2.00	0.53	0.79	2.00	0.45	2.00	0.41



DESIGN ACCELERATION PARAMETERS
(ASCE 7-05 Section 21.4)

Short Period Spectral Response (S_{DS})	0.80	Adjusted Short Period Spectral Response (S_{MS})	1.20
1 second Spectral Response (S_{D1})	0.48	Adjusted 1 second Spectral Response (S_{M1})	0.72



REFERENCES

PROBABILISTIC MCE	2% in 50 years (2,500 year Return Period) ASCE 7-05 Section 21.2.1
150% DETERMINISTIC MCE	150% Sam of Maximum Considered Earthquake ASCE 7-05 Section 21.2.2
DESIGN RESPONSE SPECTRUM	ASCE 7-05 Section 21.2.3 and 21.3
DETERMINISTIC LOWER LIMIT	Lower Limit Deterministic ASCE 7-05 Section 21.2.2
80% GENERAL PROCEDURE SPECTRUM	80% Sa 2007 CBC and ASCE 7-05

Native clay and silt are expansive when wetted and can shrink with moisture loss (drying). Development of building foundations, concrete flatwork, and asphaltic concrete pavements should include provisions for mitigating potential swelling forces and reduction in soil strength, which can occur from saturation of the soil. Causes for soil saturation include landscape irrigation, broken utility lines, or capillary rise in moisture upon sealing the ground surface to evaporation. Moisture losses can occur with close proximity of structures to downslopes and root system moisture extraction from deep rooted shrubs and trees placed near the foundations.

Typical measures used for industrial projects to remediate expansive soil include moisture conditioning subgrade soils to a minimum of 5% above optimum moisture (ASTM D1557) within the drying zone of surface soils, and design of foundations that are resistant to shrink/swell forces of silty/clay soil.

3.6 Groundwater

A 2-inch diameter piezometer was installed in Boring B-1 to a depth of 20 feet at the project site. Groundwater was encountered in the piezometer at a depth of 10.0 feet on August 6, 2009, 16 days after placement of the piezometer. There is uncertainty in the accuracy of short-term water level measurements, particularly in fine-grained soil. Groundwater levels may fluctuate with water levels in the existing ponds, irrigation of adjacent properties, drainage, and site grading. The referenced groundwater level should not be interpreted to represent an accurate or permanent condition.

3.7 Liquefaction

Liquefaction occurs when granular soil below the water table is subjected to vibratory motions, such as produced by earthquakes. With strong ground shaking, an increase in pore water pressure develops as the soil tends to reduce in volume. If the increase in pore water pressure is sufficient to reduce the vertical effective stress (suspending the soil particles in water), the soil strength decreases and the soil behaves as a liquid (similar to quicksand). Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow bearing foundations.

Four conditions are generally required for liquefaction to occur:

(1) the soil must be saturated (relatively shallow groundwater);
(2) the soil must be loosely packed (low to medium relative density);
(3) the soil must be relatively cohesionless (not clayey); and
(4) groundshaking of sufficient intensity must occur to function as a trigger mechanism.

All of these conditions exist to some degree at these sites.

Methods of Analysis: Liquefaction potential at the project site was evaluated using the 1997 NCEER Liquefaction Workshop methods. The 1997 NCEER methods utilize direct SPT blow counts or CPT cone readings from site exploration and earthquake magnitude/PGA estimates from the seismic hazard analysis. The resistance to liquefaction is plotted on a chart of cyclic shear stress ratio (CSR) versus a corrected blow count $N_{1(60)}$ or Qc_{1N}. A ground acceleration of 0.50g was used in the analysis with a 10-foot groundwater depth.

Liquefaction induced settlements have been estimated using the 1987 Tokimatsu and Seed method. Fines content of liquefiable sands and silt increase the liquefaction resistance in that more cycles of ground motions are required to fully develop increased pore pressures Prior to calculating the settlements, the field SPT blow counts were corrected to account for the type of hammer, borehole diameter, overburden pressure and rod length $N_{1(60)}$ in accordance with Robertson and Wride (1997). The corrected blow counts were then converted to equivalent clean sand blow counts ($N_{1(60)cs}$

A computed factor of safety less than 1.0 indicates a liquefiable condition.

The soil encountered at the points of exploration included saturated silts and silty sands that could liquefy during a CBC Design Basis Earthquake. Liquefaction can occur within several isolated silt and sand layers between depths of 17 to 45 feet. The likely triggering mechanism for liquefaction appears to be strong groundshaking associated with the rupture of the Imperial Fault, Superstition Hills Fault and possibly the Cerro Prieto Fault. The analysis is summarized in the table below.

SUMMARY OF LIQUEFACTION ANALYSES

Boring Location	Depth To First Liquefiable Zone (ft)	Potential Induced Settlement (in)
B-1	10	½
B-2	10	¼

Liquefaction Effects: ***Based on empirical relationships, total induced settlements are estimated to be about ¼ to ½ inches should liquefaction occur.*** The minimum differential settlement can be estimated to be on the order of one-half of the total settlement. Because of the depth of the liquefiable layer, wide area subsidence from soil overburden would be the expected effect of liquefaction rather than bearing capacity failure of the proposed structures.

Since the potentially liquefiable silty and sandy soils are overlain by 10 feet of non-liquefying soil which resist groundwater movement, it is unlikely that the light structure loads planned are sufficient to result in liquefaction induced settlement greater than the surrounding land mass. It is expected that the proposed improvements will settle at the same rate as the land mass should liquefaction occur.

Liquefaction Induced Ground Failure: Based on research from Ishihara (1985) and Youd and Garris (1995) ground rupture or sand boil formation is unlikely because of the thickness of the overlying unliquefiable soil.

Mitigation: Mitigation of liquefaction induced settlements for this site is not required.

Section 4
RECOMMENDATIONS

4.1 Site Preparation

Clearing and Grubbing: All surface improvements, debris or vegetation on the site at the time of construction should be removed from the construction area. Root balls should be completely excavated. Organic strippings should be hauled from the site and not used as fill. Any trash, construction debris, concrete slabs, old pavement, landfill, and buried obstructions such as old foundations and utility lines exposed during rough grading should be traced to the limits of the foreign material by the grading contractor and removed under our supervision. Any excavations resulting from site clearing should be sloped to a bowl shape to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative.

Buildings Subgrade Preparation (Shallow Foundations): The exposed surface soil within the building pad/foundation areas should be removed to 24 inches below the building pad, base foundation elevation or existing grade (whichever is lower) extending five feet beyond all exterior wall/column lines (including concreted areas adjacent to the building). Exposed cohesive subgrade should be scarified to a depth of 8 inches, uniformly moisture conditioned to 5 to 10% above optimum moisture content (clays) or 2 to 6% above optimum (silts), and recompacted to 85 to 90% (clays) or 87 to 92% (silts) of the maximum density determined in accordance with ASTM D1557 methods.

The native soil is suitable for use as engineered fill provided it is free from concentrations of organic matter or other deleterious material. The fill soil should be uniformly moisture conditioned by discing and watering to the limits specified above, placed in maximum 8-inch lifts (loose), and compacted to the limits specified above. Clay soil should not be compacted greater than 90% relative compaction because highly compacted soil will result in increased swelling. Loose and organic material from the bottom of the existing aeration lagoons shall be completed removed and not used as a backfill or engineered fill.

If building foundation designs are to be utilized which do not include provisions for expansive soil, an engineered building support pad consisting a minimum of 2.5 feet of granular soil (or to a minimum of 18 inches below the deepest footing), placed in maximum 8-inch lifts (loose), compacted to at least 95% of ASTM D1557 maximum density at 2% below to 4% above optimum moisture, should be placed below the bottom of the slab.

Imported fill soil (if required) should have a Plasticity Index less than 15 and sulfates (SO_4) less than 2,000 ppm or non-expansive, granular soil meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and 5 to 35% passing the No. 200 sieve. The geotechnical engineer should approve imported fill soil sources before hauling material to the site. Imported granular fill should be placed in lifts no greater than 8 inches in loose thickness and compacted to at least of 95% of ASTM D1557 maximum dry density at optimum moisture ±2%.

In areas other than the building pad which are to receive area concrete slabs, the ground surface should be presaturated to a minimum depth of 24 inches and then scarified to 8 inches, moisture conditioned to a minimum of 5% over optimum, and recompacted to 83-87% of ASTM D1557 maximum density just prior to concrete placement.

Clarifiers Subgrade Preparation: The clarifier is planned to be founded at 12 feet below existing grade, where the transition line between silts and clays is encountered. Subsurface silt/clays at proposed bottom of excavation are saturated; consequently, the subgrade has a high potential for pumping under equipment loads. Additionally, the silts below the groundwater (10 ft bgs) are susceptible to liquefaction and subsequent loss of bearing capacity. Therefore, the subgrade for the clarifier should be overexcavated 24 inches below the bottom of concrete and replaced with drainage rock (ASTM C33, Size 57 or 467). Prior to crushed rock placement, the bottom of the excavation should be covered with a geotextile filter fabric (Mirafi 140 or better) lapped at sides and ends in accordance with manufacture's installations guidelines. The 2.0 ft thick layer of drainage rock should be end dumped onto the filter fabric and spread evenly by excavators or dozers. Upon completing placement of the drainage rock a small vibratory compactor (walk-behind or equivalent) should be used to densify the crushed rock layer. Following densification of the drainage rock, a second layer of filter fabric should be placed over the drainage rock. The drainage rock layer should be continuous below the clarifier foundation and should extend a minimum of five feet beyond the exterior wall.

Below Grade Structures Site Preparation: Below grade structures, like the reclaimed water pump station, are planned to be constructed 10 to 15 feet below existing grade. Groundwater is expected to be encountered at this depth. The subsurface silt/clays at proposed bottom of excavation are saturated; consequently, the subgrade has a high potential for pumping under equipment loads

Therefore, the bottom of the excavation should be overexcavated 24 inches and covered with a geotextile filter fabric (Mirafi 140 or equivalent). Crushed rock conforming to ASTM C33, Size 57 or 467 gradations should be placed in the bottom of the excavation to act as stabilizing layer and a drainage blanket. The crushed rock should be densified by vibrating plate compactors.

Sludge Drying Beds Site Preparation: The Drying Beds are planned to be constructed at the southwest side of the WWTP site, where approximately 3 to 5 feet of undocumented fill is placed. Loose undocumented fill material shall be completed removed and uniformly moisture conditioned to 5 to 10% above optimum moisture content (clays) or 2 to 6% above optimum (silts), and recompacted to 85 to 90% (clays) or 87 to 92% (silts) of the maximum density determined in accordance with ASTM D1557 methods. All vegetation and rock sizes bigger than 3 inches should be completed removed.

Utility Trench Backfill: Trench backfill for utilities should conform to San Diego Regional Standard Drawing S-4 (Appendix F), using either Type A, B or C backfill.

Type A backfill for HDPE pipe consists of a 4 to 6 inch bed of ¾-inch crushed rock below the pipe and pipezone backfill (to 12" above top of pipe) consisting of crusher fines (sand). Sewer pipes (SDR-35), water mains, and stormdrain pipes of other that HDPE pipe may use crusher fines for bedding. The crusher fines shall be compacted to a minimum of 90% of ASTM D1557 maximum density. Pipe deflection should be checked to not exceed 2% of pipe diameter. Native clay/silt soils may be used to backfill the remainder of the trench. Clays shall be compacted to a minimum of 85% of ASTM D1557 maximum density and silts shall be compacted to a minimum of 87% of ASTM D1557 maximum density, except that the top 12 inches of the trench shall be compacted to at least 90% of ASTM D1557 maximum density.

Type B backfill for HDPE pipe requires 6 inches of ¾-inch crushed rock as bedding and to springline of the pipe. Thereafter, sand/cement slurry (3 sack cement factor) should be used to 12 inches above the top of the pipe. Native clay and silt soils may be used in the remainder of the trench backfill as specified above.

Type C backfill for HDPE pipe shall consist of a geotextile filter fabric encapsulating ¾-inch crushed rock. The crushed rock thickness shall be 6 inches below and to the sides of the pipe and shall extend to 12 inches above the top of the pipe. The filter fabric shall cover the trench bottom, sidewalls and over the top of the crushed rock. Native clay and silt soils may be used in the remainder of the trench backfill as specified above.

Type C backfill must be used in wet soils and below groundwater for all buried utility pipelines unless dewatered (by well points) to at least 24 inches below the trench bottom prior to excavation. Type A backfill may be used in the case of a dewatered trench condition.

On-site soil free of debris, vegetation, and other deleterious matter may be suitable for use as utility trench backfill above pipezone, but may be difficult to uniformly maintain at specified moistures and compact to the specified densities. Native backfill should only be placed and compacted after encapsulating buried pipes with suitable bedding and pipe envelope material.

Imported granular material is acceptable for backfill of utility trenches. Granular trench backfill used in building pad areas should be plugged with a solid (no clods or voids) 2-foot width of native clay soils at each end of the building foundation to prevent landscape water migration into the trench below the building.

Backfill soil of utility trenches within paved areas should be placed in layers not more that 6 inches in thickness and mechanically compacted to a minimum of 87% of the ASTM D1557 maximum dry density except for the top 12 inches of the trench which shall be compacted to at least 90%.

Moisture Control and Drainage: If clay soils are used at building pads (without 2.5 feet of granular soil), the moisture condition of the building pad should be maintained during trenching and utility installation until concrete is placed or should be rewetted by use of multiple applications of water with sprinklers before initiating delayed construction. If soil drying is noted in footings, a 2 to 3 inch depth of water may be used in the bottom of footings to restore footing subgrade moisture and reduce potential edge lift.

Adequate site drainage is essential to future performance of the project. Infiltration of excess irrigation water and stormwaters can adversely affect the performance of the subsurface soil at the site. Positive drainage should be maintained away from all structures (5% for 5 feet minimum across unpaved areas) to prevent ponding and subsequent saturation of the native clay soil. Gutters and downspouts should be used as a means to convey water away from foundations. If landscape irrigation is allowed next to the building, drip irrigation systems or lined planter boxes should be used. The subgrade soil should be maintained in a moist, but not saturated state, and not allowed to dry out. Drainage should be maintained without ponding. Trees should be set back from foundations equal to their anticipated height.

Observation and Density Testing: All site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. The geotechnical firm that provides observation and testing during construction shall assume the responsibility of "*geotechnical engineer of record*" and, as such, shall perform additional tests and investigation as necessary to satisfy themselves as to the site conditions and the recommendations for site development.

Auxiliary Structures Foundation Preparation: Auxiliary structures such as free standing or retaining walls should have the existing soil beneath the structure foundation prepared in the manner recommended for the building pad except the preparation needed only to extend 18 inches below and beyond the footing.

4.2 Foundations and Settlements

Structural concrete mat foundations are suitable to support the buildings, clarifier tank and the pre-fabricated steel tanks. The mats shall be founded on a layer of properly prepared and compacted soil as described in Section 4.1. The foundations may be designed using an allowable soil bearing pressure of 1,500 psf for compacted native soils and 2,000 psf when foundations are supported on imported sands or crushed rock (extending a minimum of 1.0 feet below footings). The allowable soil pressure may be increased by 20% for each foot of embedment depth in excess of 18 inches and by one-third for short term loads induced by winds or seismic events. The maximum allowable soil pressure at increased embedment depths shall not exceed 3,000 psf.

Flat Plate Structural Mats: Structural mats may be designed for a modulus of subgrade reaction (Ks) of 100 pci when placed on compacted native soil or a subgrade modulus of 250 pci when placed on 2.5 feet of granular fill (buildings) or a subgrade modulus of 250 pci when placed on 24 inches of crushed rock (below grade structures). The building support pad shall be moisture conditioned and recompacted as specified in Section 4.1 of this report.

All footings should be embedded a minimum of 18 inches below the building support pad or lowest adjacent final grade, whichever is deeper. Continuous wall footings should have a minimum width of 12 inches. Spread footings should have a minimum width of 24 inches. Recommended concrete reinforcement and sizing for all footings should be provided by the structural engineer.

Resistance to horizontal loads will be developed by passive earth pressure on the sides of footings and frictional resistance developed along the bases of footings and concrete slabs. Passive resistance to lateral earth pressure may be calculated using an equivalent fluid pressure of 250 pcf (300 pcf for import granular material) to resist lateral loadings. The top one foot of embedment should not be considered in computing passive resistance unless the adjacent area is confined by a slab or pavement. An allowable friction coefficient of 0.25 (0.35 for import granular material) may also be used at the base of the footings to resist lateral loading.

Small buildings and small equipment foundations such pumps, control panel, electrical gear, etc., movement under the estimated static (non-seismic) loadings and static site conditions are estimated to not exceed ¾ inch with differential movement of about two-thirds of total movement for the loading assumptions stated above when the subgrade preparation guidelines given above are followed. Liquefaction settlements may be ¼ to ½ inch.

Settlement estimates (in inches) developed for different footing dimensions embedded a minimum of 1.5 feet into native soils and loaded to 10, 25, 50, 75 and 100 kips follow. No settlement value is indicated when soil bearing pressures exceed 1,500 psf.

Table 4: Settlement Estimates (inches)

Load, Kips	Size of Footing (ft.)					
	5 x 5	10 x 10	15 x 15	20 x 20	25 x 25	30 x 30
10	0.15	0.10	0.05	0.04	0.03	0.03
25	0.30	0.20	0.15	0.12	0.10	0.07
50	---	0.35	0.30	0.25	0.20	0.15
75	---	0.50	0.40	0.35	0.27	0.22
100	---	0.75	0.55	0..45	0.35	0.32

Clarifier tank (30-ft by 25-ft) foundation movements under estimated loadings are shown on the Load/Settlement Curves for 12 ft embedment depth (Plate D-1). The loading to be used with the Settlement Curve is the "Net Load" after reducing the full structural load by the soil overburden load of 1,400 psf (for 12 ft. of overburden soil). Differential movement is estimated to be about two-thirds of total movement. No seismically induced liquefaction settlements are expected at this depth if the clarifier subgrade preparation specified in Section 4.1 is followed.

4.3 Steel Tank Foundation and Settlements

Site Preparation and Grading: The existing soils underlying the 50-foot diameter tank area should be removed to a depth of 30 inches below ground surface and a minimum of 18 inches below the bottom of the ring foundation extending to a minimum of 5 feet beyond the perimeter of the tank. The native soil at the subexcavation and footing excavation level should be compacted to 85 - 90 % of ASTM D1557 maximum density for a minimum depth of 8 inches. The area should then be brought to finish grade with engineered fill consisting of the following components:

- 24 inches of crushed aggregate base
- 8 inches of crushed rock

As a minimum, a steel ring should be placed to contain the crushed rock subgrade below the tank. The rock fill should be placed to the top of the ring wall. The fill may be crowned about 3.5 inch to allow for differential movement between the tank perimeter and center.

The engineered fill should be placed in 8-inch maximum loose lifts and compacted to a minimum 90% of ASTM D1557 maximum density within 2% of optimum moisture. The crushed rock tank underlayment should meet the gradation requirements of ASTM C33, size 57 (1" x No. 4 rock). The proposed source of engineered fill and rock should be submitted to the geotechnical engineer for review and testing to verify conformance to these requirements.

Tank Foundations: Flexible steel tanks, which can withstand large settlements, generally require minimal foundations, allowing settlement to occur and using flexible connections to inlet/outlet piping. The tanks should have a perimeter ring wall foundation which supports the tank wall and roof. The minimum depth of the ring wall footing should be 18 inches below the finished ground surface. The minimum footing width should be 12 inches.

Estimated Tank Settlements: The subsurface clays are saturated and overconsolidated in their natural state. Imposed foundations loads can consolidate the soils by reducing the void ratio through pore water expulsion. The amount of vertical settlement that occurs as a result of soil compression varies with applied loads, foundation shape and width.

Moderately loaded structures, such as the flexible steel tanks which can withstand large settlements, will generally require minimal foundations, allowing settlement to occur and using flexible connections to inlet/outlet utility lines. The silts and clays will consolidate fairly slowly because of their low permeability. Flexible connections such a "Flex-Tend" expansion joints should be used to connect exterior piping with the tank. The tank should be preloaded and monitored for settlement prior to making piping connections. It may be necessary to readjust piping connections after the loading sequence.

Estimated settlements were calculated using the consolidation and field data test data for the silt and clay strata and Schmertman's analysis for the granular strata using the CPT engineering properties correlations. The soils to a depth of the diameter of the tank (50 feet) may be significantly stressed so as to contribute to the overall settlement. The estimated settlement for the tank is approximately 5.0 inches in the center of the tank and about 1.7 inch at the edge of the tank. Since the settlements are deep seated, little is gained by further excavation and replacement of compacted granular fill to reduce settlements

4.4 Slabs-On-Grade

Concrete slabs and flatwork placed over native clay soil should either be uniformly thick structural mats (10 inches or greater) or should be designed in accordance with Chapter 18 of the 2007 CBC and shall be a minimum of 5 inches thick due to expansive soil conditions. Concrete floor slabs shall be monolithically placed with the footings (no cold joints) unless placed on 2.5 feet of granular fill. The concrete slabs should be underlain by a 10-mil polyethylene vapor retarder that works as a capillary break to reduce moisture migration into the slab section.

The vapor retarder should be properly lapped and continuously sealed and extend a minimum of 12 inches into the footing excavations. The vapor retarder should be sandwiched by 4 inches (2 inches above and 2 inches below) of clean sand (Sand Equivalent SE>30) unless placed on 2.5 feet of granular fill, in which case, the vapor retarder may lie directly on the granular fill with 2 inches of clean sand cover. Concrete slabs may be placed without a sand cover directly over a 15-mil vapor retarder (Stego-Wrap or equivalent).

Concrete slab and flatwork reinforcement should consist of chaired rebar slab reinforcement (minimum of No. 3 bars at 18-inch centers, both horizontal directions) placed at slab mid-height to resist potential swell forces and cracking. Slab thickness and steel reinforcement are minimums only and should be verified by the structural engineer/designer knowing the actual project loadings. All steel components of the foundation system should be protected from corrosion by maintaining a 3-inch minimum concrete cover of densely consolidated concrete at footings (by use of a vibrator).

The construction joint between the foundation and any mowstrips/sidewalks placed adjacent to foundations should be sealed with a polyurethane based non-hardening sealant to prevent moisture migration between the joint. Epoxy coated embedded steel components or permanent waterproofing membranes placed at the exterior footing sidewall may also be used to mitigate the corrosion potential of concrete placed in contact with native soil.

Control joints should be provided in all concrete slabs-on-grade at a maximum spacing (in feet) of 2 to 3 times the slab thickness (in inches) as recommended by American Concrete Institute (ACI) guidelines. All joints should form approximately square patterns to reduce randomly oriented contraction cracks. Contraction joints in the slabs should be tooled at the time of the pour or sawcut (¼ of slab depth) within 6 to 8 hours of concrete placement. Construction (cold) joints in foundations and area flatwork should either be thickened butt-joints with dowels or a thickened keyed-joint designed to resist vertical deflection at the joint. All joints in flatwork should be sealed to prevent moisture, vermin, or foreign material intrusion. Precautions should be taken to prevent curling of slabs in this arid desert region (refer to ACI guidelines).

All independent flatwork (sidewalks, housekeeping slabs) should be placed on a minimum of 2 inches of concrete sand or aggregate base, dowelled to the perimeter foundations where adjacent to the building and sloped 2% or more away from the building. A minimum of 24 inches of moisture conditioned (5% minimum above optimum) and 8 inches of compacted subgrade (83 to 87%) should underlie all independent flatwork. Flatwork which contains steel reinforcing (except wire mesh) should be underlain by a 10-mil (minimum) polyethylene separation sheet and at least a 2-inch sand cover. All flatwork should be jointed in square patterns and at irregularities in shape at a maximum spacing of 10 feet or the least width of the sidewalk.

4.5 Reclaimed Water Pump Stations Geotechnical Design Criteria

The pump stations may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf) at the base of the station (approximately 10 to 15 feet below grade). Footings and equipment foundations which are embedded a minimum of 18 inches into native soil or compacted backfill around the pump wet-well may be designed for an allowable bearing pressure of 1,500 psf. It is suggested that rigid mat be used for structures placed over wet well backfill.

Horizontal sliding can be resisted with passive earth pressure equivalent to 250 pounds per cubic foot (pcf) of fluid pressure and a coefficient of friction of 0.25. Groundwater buoyant forces and lateral loads should be considered in the wet well design. Active earth pressures of 55 pcf should be used above groundwater and at-rest pressures of 70 pcf should be used for braced walls. Dewatering of the wet well site prior to excavation will be required at a depth below 10 feet.

4.6 Excavations

All site excavations should conform to CalOSHA requirements for Type B soil. The contractor is solely responsible for the safety of workers entering trenches. Temporary excavations with depths of 4 feet or less may be cut nearly vertical for short duration. Excavations deeper than 4 feet will require shoring or slope inclinations in conformance to CAL/OSHA regulations for Type B soil. These temporary deep excavations will require slope inclinations no steeper than 1½(H):1(V) unless trench shoring is used. If excavations are planned below groundwater (10 feet below ground surface), all excavation slopes should be excavated according to OSHA Standards for Type C soils. Dewatering of the excavation site will be required prior to start of excavation.

All unlined permanent slopes should not be steeper than 3:1 to reduce wind and rain erosion. Protected slopes with ground cover may be as steep as 2:1. However, maintenance with motorized equipment may not be possible at this inclination. Embankment construction shall be properly prepared and compacted as described in Section 4.1.

All discussions in this section regarding stable excavation slopes assume minimal equipment vibration and adequate setback of excavated material and construction equipment from the top of the excavation. We recommended that the minimum setback distance be equal to the depth of excavation and at least 10 feet from the crown of the slope. If excavated materials are stockpiled adjacent to the excavation, the weight of the material should be considered as a surcharge load for slope stability.

Excavation for the tank clarifier and reclaimed water pump station (12 to 15 feet depth) will encounter the groundwater table (10 feet depth). Therefore, seepage and pumping subgrade conditions should be anticipated. An adequately designed dewatering system, such as well points or sumps, will be required to control groundwater seepage and prevent running ground conditions. The responsibility for dewatering and selection of an appropriate system for dewatering is beyond the scope of this report.

4.7 Concrete Mixes and Corrosivity

Selected chemical analyses for corrosivity were conducted on bulk samples of the near surface soil from the project site (Plate C-7). The native soils were found to have low to severe levels of sulfate ion concentration (680 to 2,400 ppm). Sulfate ions in high concentrations can attack the cementitious material in concrete, causing weakening of the cement matrix and eventual deterioration by raveling. The California Building Code recommends that increased quantities of Type II Portland Cement be used at a low water/cement ratio when concrete is subjected to moderate sulfate concentrations. Type V Portland Cement and/or Type II/V cement with 25% flyash replacement is recommended when the concrete is subjected to soil with severe sulfate concentration.

A minimum of 6.0 sacks per cubic yard of concrete (4,500 psi) of Type V Portland Cement with a maximum water/cement ratio of 0.45 (by weight) should be used for concrete placed in contact with native soil on this project (sitework including sidewalks, housekeeping slabs, and foundations). Admixtures may be required to allow placement of this low water/cement ratio concrete.

The native soil has low to very severe levels of chloride ion concentration (190 to 4,060 ppm). Chloride ions can cause corrosion of reinforcing steel, anchor bolts and other buried metallic conduits. Resistivity determinations on the soil indicate very severe potential for metal loss because of electrochemical corrosion processes. Mitigation of the corrosion of steel can be achieved by using steel pipes coated with epoxy corrosion inhibitors, asphaltic and epoxy coatings, cathodic protection or by encapsulating the portion of the pipe lying above groundwater with a minimum of 3 inches of densely consolidated concrete. ***No unprotected metallic pipes or conduits should be placed below foundations.***

Foundation designs shall provide a minimum concrete cover of three (3) inches around steel reinforcing or embedded components (anchor bolts, etc.) exposed to native soil or landscape water (to 18 inches above grade). If the 3-inch concrete edge distance cannot be achieved, all embedded steel components (anchor bolts, etc.) shall be epoxy dipped for corrosion protection or a corrosion inhibitor and a permanent waterproofing membrane shall be placed along the exterior face of the exterior footings. ***Hold-down straps should not be used at foundation edges due to corrosion of metal at its protrusion from the slab edge.*** Additionally, the concrete should be thoroughly vibrated at footings during placement to decrease the permeability of the concrete. ***Copper water piping should not be placed under floor slabs.***

4.8 Lateral Earth Pressures

Earth retaining structures (retaining walls) should be designed to resist the soil pressure imposed by the retained soil mass. Walls with native or granular drained backfill may be designed for an assumed static earth pressure equivalent to that exerted by a fluid weighing 55 pcf (native) and 35 pcf (granular) for unrestrained (active) conditions (able to rotate 0.1% of wall height), and 100 pcf (native) and 60 pcf (granular) for restrained (at-rest) conditions. These values should be verified at the actual wall locations during construction.

An allowable friction coefficient of 0.25 (0.35 for imported granular material) may also be used at the base of the retaining wall foundation to resist lateral loading.

When applicable (unbalanced retaining wall greater than 6 feet high) seismic earth pressure on walls may be assumed to exert a uniform pressure distribution of 7.5H psf against the back of the wall. The total seismic load is assumed to act as a point load at 0.6H above the base of the wall. The term H is the height of the backfill against a retaining wall in feet. The recommended value 7.5H was derived from the following formula:

$$P_e = \tfrac{3}{8}(k_h)\gamma H^2$$

where: $k_h = 0.75a_{max}$ (a_{max} is a pseudo-static maximum of 0.20g)
$\gamma = 125$ pcf

which equates to $P_e = 7.0H^2$ (acting as a point load at 0.6H from base of wall)

A pseudo-static a_{max} is typically used in slope stability analysis.

Surcharge loads should be considered if loads are applied within a zone between the face of the wall and a plane projected behind the wall 45 degrees upward from the base of the wall. The increase in lateral earth pressure acting uniformly against the back of the wall should be taken as 50% of the surcharge load within this zone. Areas of the retaining wall subjected to traffic loads should be designed for a uniform surcharge load equivalent to two feet of native soil.

Walls should be provided with backdrains to reduce the potential for the buildup of hydrostatic pressure. The drainage system should consist of a composite HDPE drainage panel or a 2-foot wide zone of free draining crushed rock placed adjacent to the wall and extending 2/3 the height of the wall. The gravel should be completely enclosed in an approved filter fabric to separate the gravel and backfill soil. A perforated pipe should be placed perforations down at the base of the permeable material at least six inches below finished floor elevations. The pipe should be sloped to drain to an appropriate outlet that is protected against erosion. Walls should be properly waterproofed. The project geotechnical engineer should approve any alternative drain system.

4.9 Seismic Design

This site is located in the seismically active southern California area and the site structures are subject to strong ground shaking due to potential fault movements along the Brawley, Superstition Hills, and Imperial Faults. Engineered design and earthquake-resistant construction are the common solutions to increase safety and development of seismic areas. Designs should comply with the latest edition of the CBC for Site Class D using the seismic coefficients given in Section 3.4 of this report.

Section 5

LIMITATIONS AND ADDITIONAL SERVICES

5.1 Limitations

The recommendations and conclusions within this report are based on current information regarding the proposed Water Reclamation Facility to the Seeley Wastewater Treatment Plant (WWTP) located in western Seeley, California. The conclusions and recommendations of this report are invalid if:

- Structural loads change from those stated or the structures are relocated.
- The Additional Services section of this report is not followed.
- This report is used for adjacent or other property.
- Changes of grade or groundwater occur between the issuance of this report and construction other than those anticipated in this report.
- Any other change that materially alters the project from that proposed at the time this report was prepared.

Findings and recommendations in this report are based on selected points of field exploration, geologic literature, laboratory testing, and our understanding of the proposed project. Our analysis of data and recommendations presented herein are based on the assumption that soil conditions do not vary significantly from those found at specific exploratory locations. Variations in soil conditions can exist between and beyond the exploration points or groundwater elevations may change. If detected, these conditions may require additional studies, consultation, and possible design revisions.

This report contains information that may be useful in the preparation of contract specifications. However, the report is not worded is such a manner that we recommend its use as a construction specification document without proper modification. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report was prepared according to the generally accepted *geotechnical engineering standards of practice* that existed in Imperial County at the time the report was prepared. No express or implied warranties are made in connection with our services. This report should be considered invalid for periods after two years from the report date without a review of the validity of the findings and recommendations by our firm, because of potential changes in the Geotechnical Engineering Standards of Practice.

The client has responsibility to see that all parties to the project including, designer, contractor, and subcontractor are made aware of this entire report. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

5.2 Additional Services

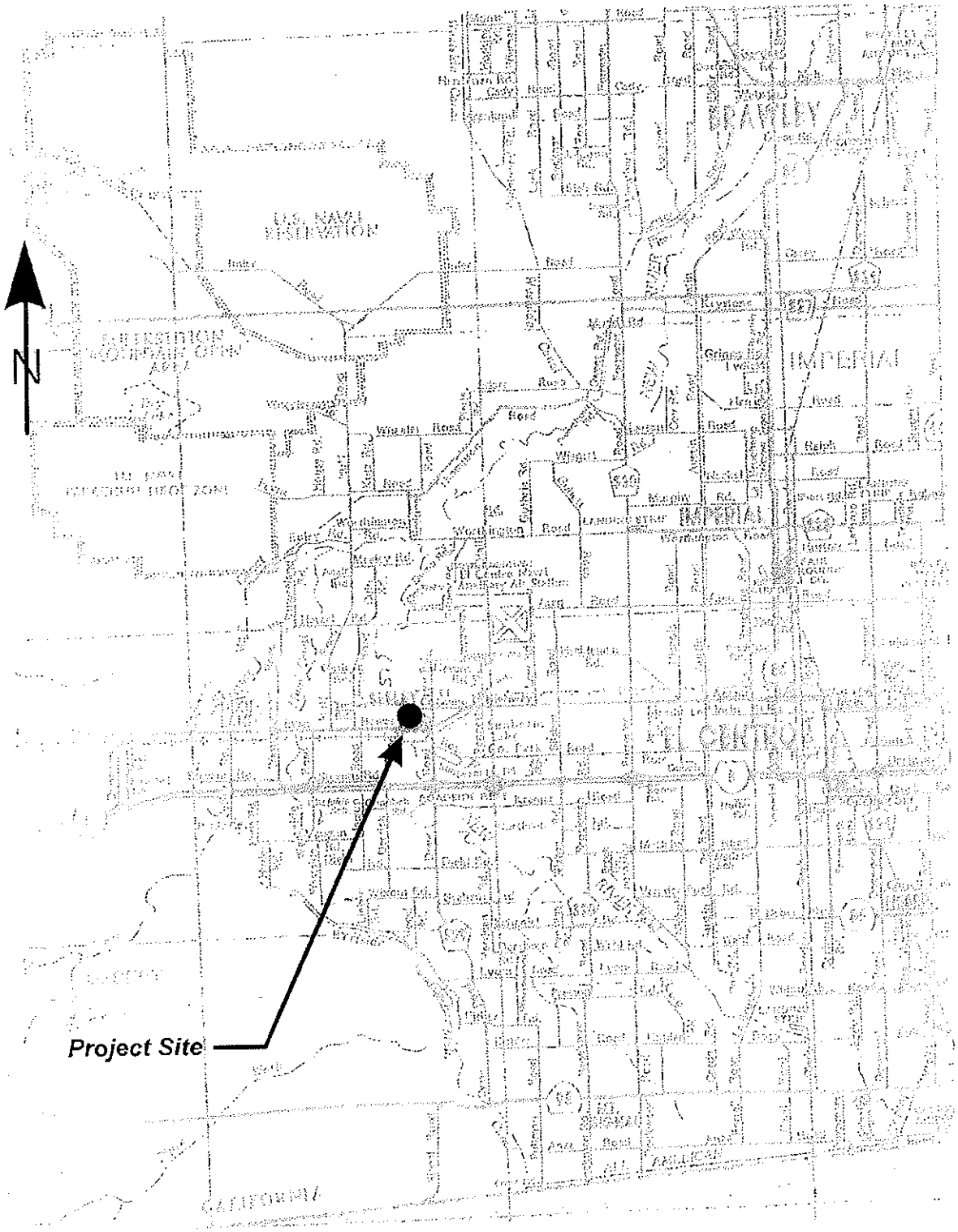
We recommend that Landmark Consultants, Inc. be retained as the geotechnical consultant to provide the tests and observations services during construction. If Landmark Consultants does not provide such services then *the geotechnical engineering firm providing such tests and observations shall become the geotechnical engineer of record and assume responsibility for the project.*

The recommendations presented in this report are based on the assumption that:

- Consultation during development of design and construction documents to check that the geotechnical recommendations are appropriate for the proposed project and that the geotechnical recommendations are properly interpreted and incorporated into the documents.
- Landmark Consultants will have the opportunity to review and comment on the plans and specifications for the project prior to the issuance of such for bidding.
- Continuous observation, inspection, and testing by the geotechnical consultant of record during site clearing, grading, excavation, placement of fills, building pad and subgrade preparation, and backfilling of utility trenches.
- Observation of foundation excavations and reinforcing steel before concrete placement.
- Other consultation as necessary during design and construction.

We emphasize our review of the project plans and specifications to check for compatibility with our recommendations and conclusions. Additional information concerning the scope and cost of these services can be obtained from our office.

APPENDIX A



LANDMARK
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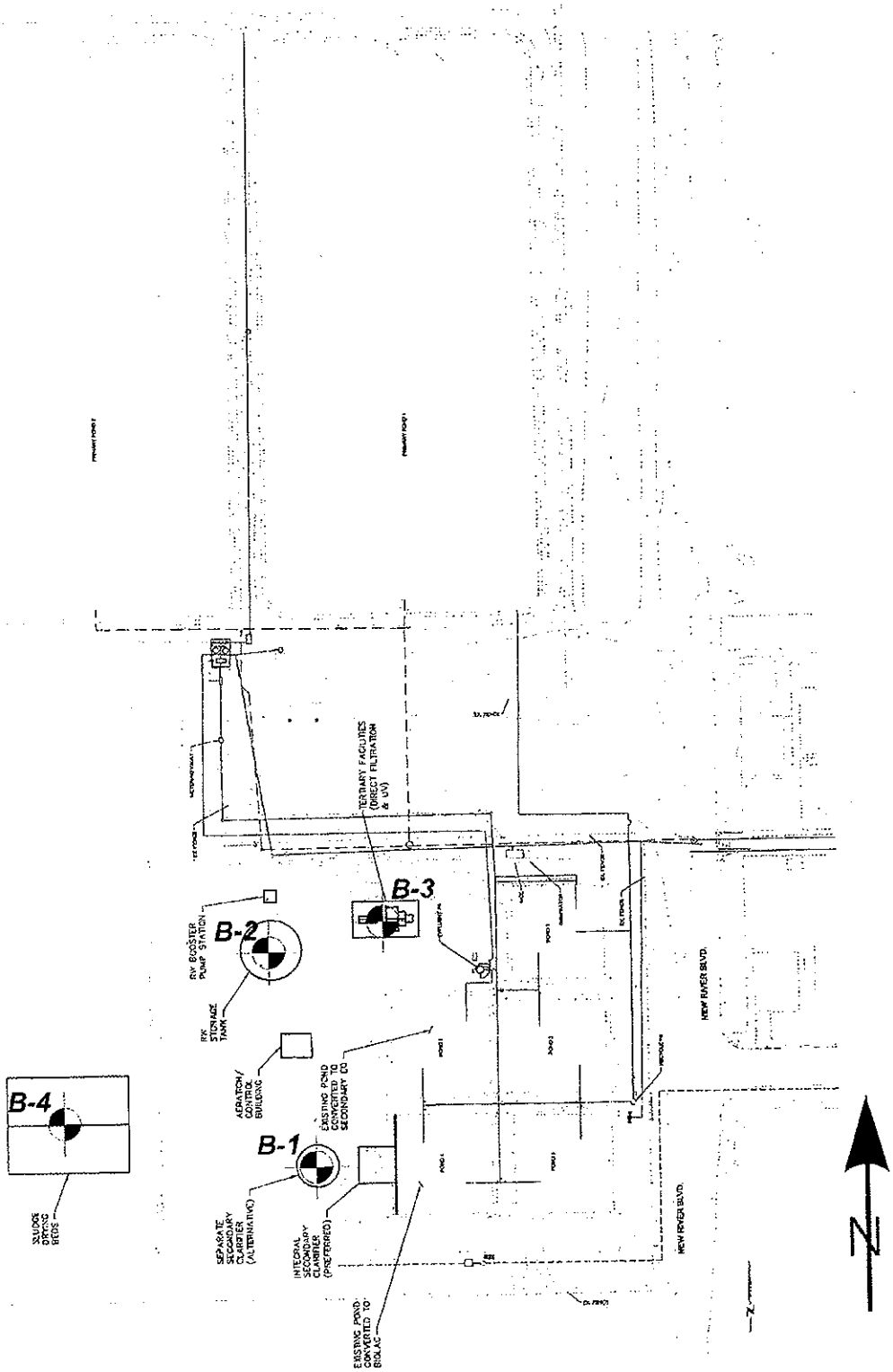
Project No.: LE09142

Vicinity Map

Plate
A-1



LANDMARK
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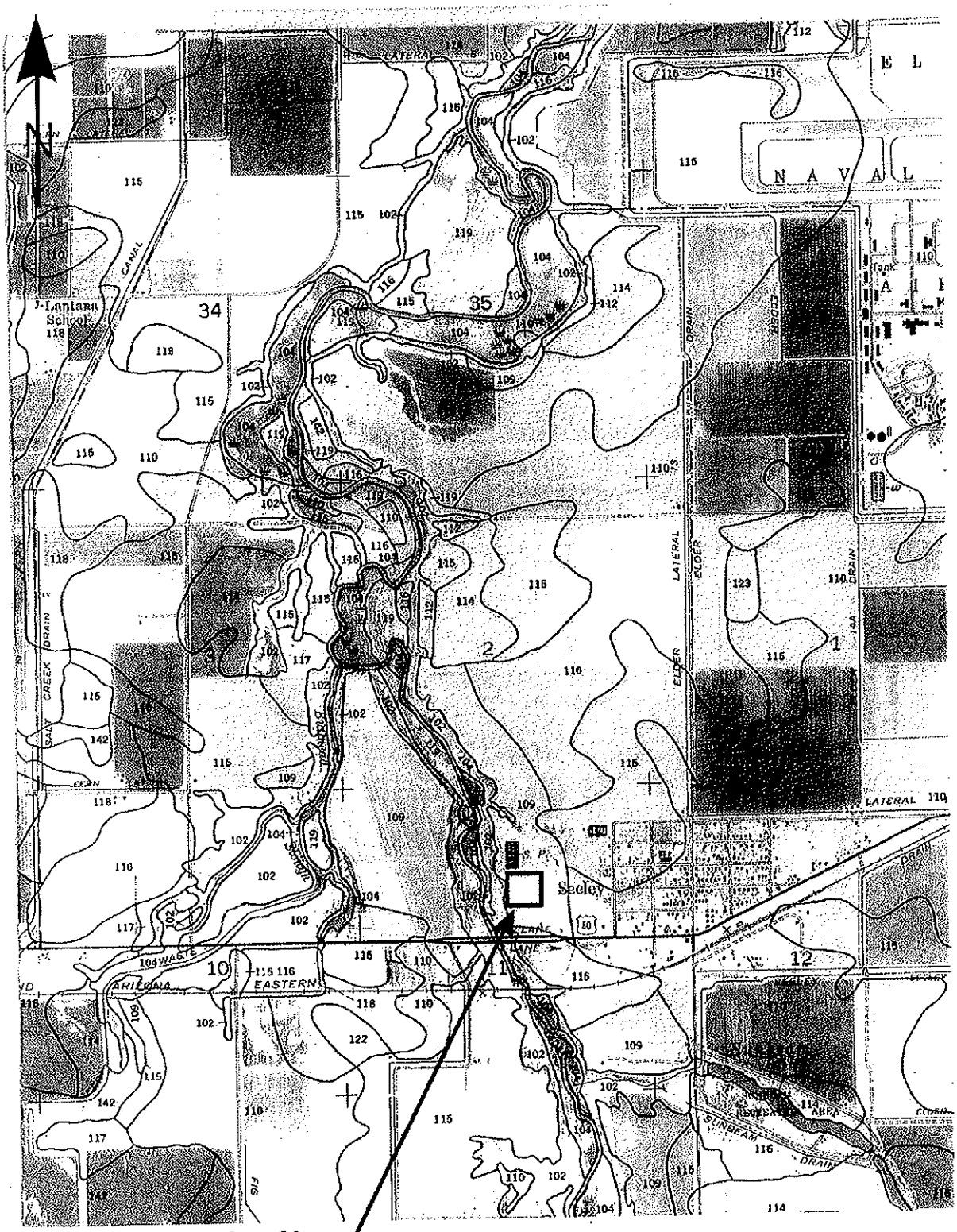
Project No.: LE09142

Site and Exploration Map

Plate
A-2



LANDMARK
Geo-Engineers and Geologists

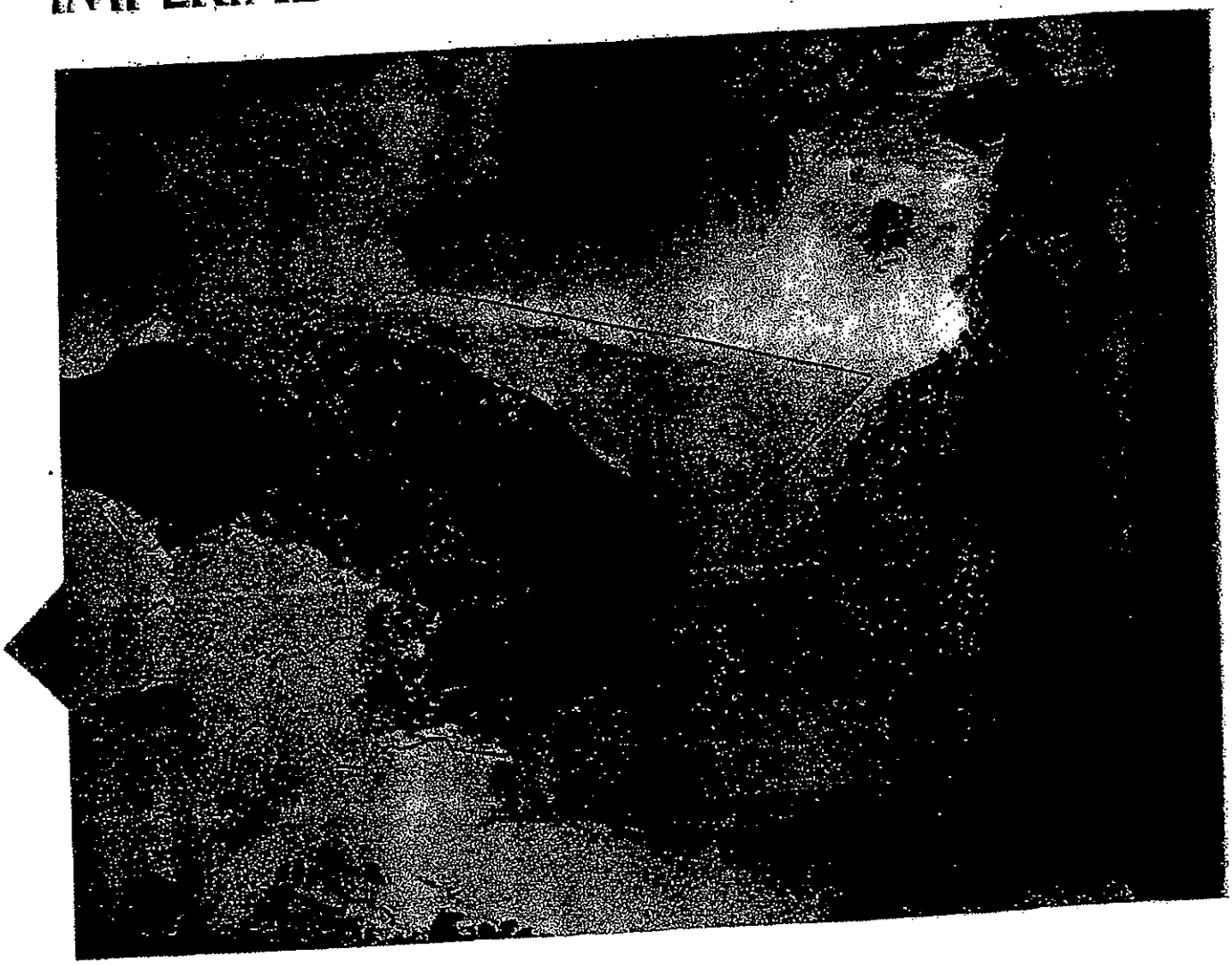
Project No.: LE09142

Soil Survey Map

Plate
A-3

Soil Survey of

IMPERIAL COUNTY CALIFORNIA IMPERIAL VALLEY AREA



United States Department of Agriculture Soil Conservation Service
in cooperation with
University of California Agricultural Experiment Station
and
Imperial Irrigation District

TABLE 11.--ENGINEERING INDEX PROPERTIES

[The symbol > means more than. Absence of an entry indicates that data were not estimated]

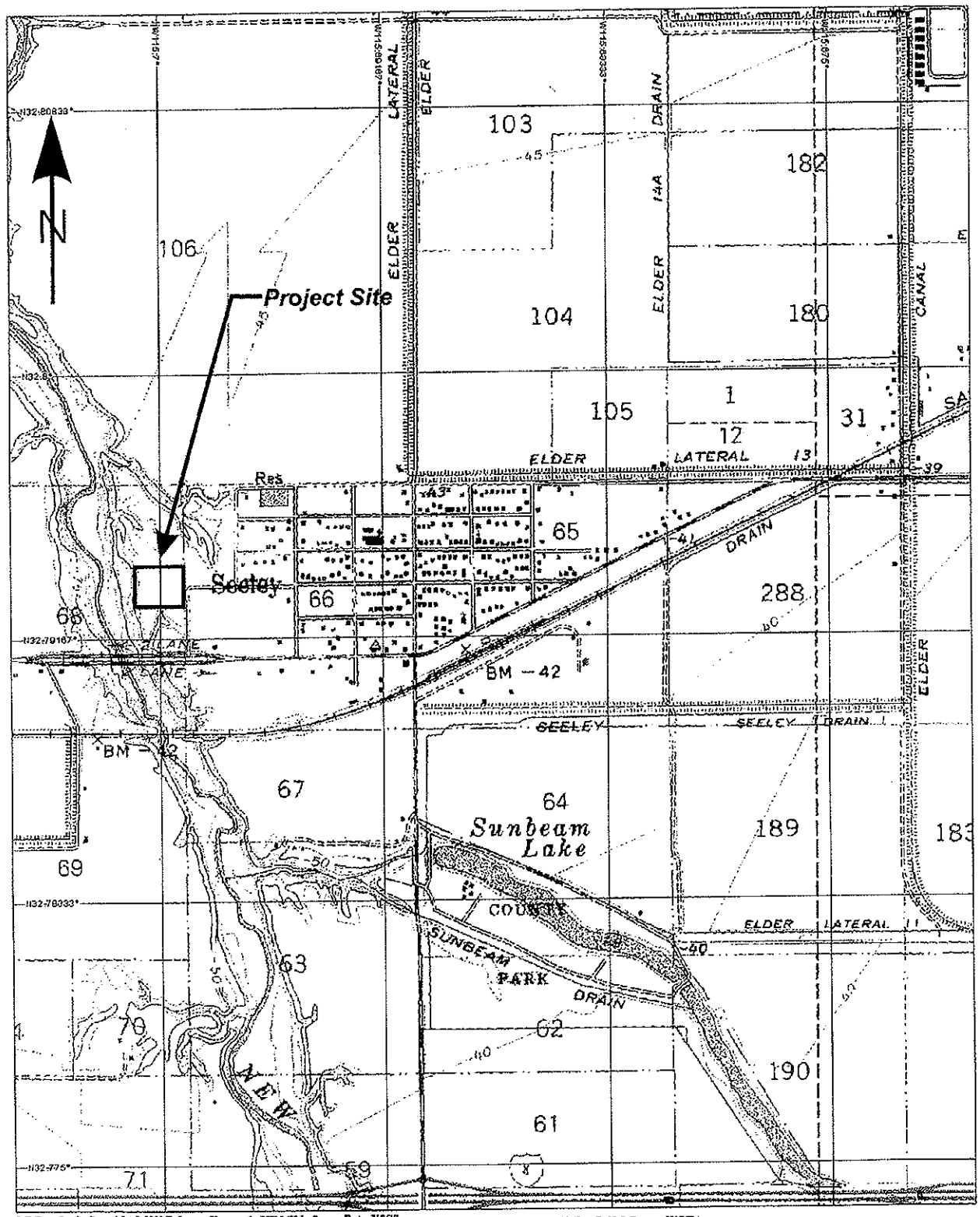
Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
100---------- Antho	0-13	Loamy fine sand	SM	A-2	0	100	100	75-85	10-30	---	NP
	13-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	90-100	75-95	50-60	15-40	---	NP
101*: Antho----------	0-8	Loamy fine sand	SM	A-2	0	100	100	75-85	10-30	---	NP
	8-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	90-100	75-95	50-60	15-40	---	NP
Superstition------	0-6	Fine sand--------	SM	A-2	0	100	95-100	70-85	15-25	---	NP
	6-60	Loamy fine sand, fine sand, sand.	SM	A-2	0	100	95-100	70-85	15-25	---	NP
102*. Badland											
103---------- Carsitas	0-10	Gravelly sand---	SP, SP-SM	A-1, A-2	0-5	60-90	50-85	30-55	0-10	---	NP
	10-60	Gravelly sand, gravelly coarse sand, sand.	SP, SP-SM	A-1	0-5	60-90	50-85	25-50	0-10	---	NP
104* Fluvaquents											
105---------- Glenbar	0-13	Clay loam--------	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
	13-60	Clay loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
106---------- Glenbar	0-13	Clay loam--------	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
107*---------- Glenbar	0-13	Loam----------	ML, CL-ML, CL	A-4	0	100	100	100	70-80	20-30	NP-10
	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	75-95	35-45	15-30
108---------- Holtville	0-14	Loam----------	ML	A-4	0	100	100	85-100	55-95	25-35	NP-10
	14-22	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	22-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
109---------- Holtville	0-17	Silty clay------	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	17-24	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	24-35	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
	35-60	Loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	75-100	20-55	---	NP
110---------- Holtville	0-17	Silty clay------	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-35
	17-24	Clay, silty clay	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-35
	24-35	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	55-85	25-35	NP-10
	35-60	Loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	75-100	20-55	---	NP

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
111*:											
Holtville	0-10	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	10-22	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	22-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
Imperial	0-12	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
112 Imperial	0-12	Silty clay	CH	A-7	0	100	100	100	85-95	50-70	25-45
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
113 Imperial	0-12	Silty clay	CH	A-7	0	100	100	100	85-95	50-70	25-45
	12-60	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	100	85-95	50-70	25-45
114 Imperial	0-12	Silty clay	CH	A-7	0	100	100	100	85-95	50-70	25-45
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
115*:											
Imperial	0-12	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
Glenbar	0-13	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
116*:											
Imperial	0-13	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	13-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
Glenbar	0-13	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
	13-60	Clay loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
117, 118 Indio	0-12	Loam	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
	12-72	Stratified loamy very fine sand to silt loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
119*:											
Indio	0-12	Loam	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
	12-72	Stratified loamy very fine sand to silt loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
Vint	0-10	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	25-35	---	NP
	10-60	Loamy sand, loamy fine sand.	SM	A-2	0	95-100	95-100	70-80	20-30	---	NP
120* Laveen	0-12	Loam	ML, CL-ML	A-4	0	100	95-100	75-85	55-65	20-30	NP-10
	12-60	Loam, very fine sandy loam.	ML, CL-ML	A-4	0	95-100	85-95	70-80	55-65	15-25	NP-10

See footnote at end of table.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 500 ft Scale: 1 : 17,600 Detail: 13-5 Datum: WGS84

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Geo-Engineers and Geologists

Project No.: LE09142

Topographic Map

Plate A-4

APPENDIX B

LOG OF BORING NO. 1

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
					SILTY CLAY (CL): Brown, moist, medium plasticity			LL=30% PI=13%
5			5	1.0	Soft	98.7	22.0	
10			6		SANDY SILT (ML): Brown, saturated, loose, with fine grained sand — GW=10 ft (8/03/09)			FINES = 52.9%
15			17	2.5	CLAY (CL-CH): Reddish brown, very moist, stiff, medium to high plasticity	94.7	31.3	
20			5	2.0			26.5	LL=41% PI=22%
25			8	2.5		93.5	31.4	c = 0.52 tsf
30			6	1.0				
35			17	2.5				
40			9	2.5	Thin interbedded silty sand layers			
45			13	2.0				
50			7	1.5	Thin interbedded silty sand layers			
55					Total Depth = 51.5' Groundwater was encountered at 10 ft.on 8/3/09 Backfilled with excavated soil			
60								

DATE DRILLED:	7/21/09	TOTAL DEPTH:	51.5 Feet	DEPTH TO WATER:	10.0 ft.
LOGGED BY:	J. Avalos	TYPE OF BIT:	Hollow Stem Auger	DIAMETER:	8 in.
SURFACE ELEVATION:	-45 ft	HAMMER WT.:	140 lbs.	DROP:	30 in.

PROJECT NO. LE09142

LANDMARK Geo-Engineers and Geologists

PLATE B-1

LOG OF BORING NO. 2

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
					SILT (ML): Brown, moist			LL=NV PI=NP
5			7	1.0	SILTY CLAY (CL): Brown, very moist, stiff, medium plasticity			LL=41% PI=27%
10			25		SANDY SILT (ML): Brown, wet, medium dense, some fine grained sand — Expected GW=10 ft	113.0	13.7	ø = 26° c = 0.44 ksf
15			4	1.5	CLAY (CL-CH): Reddish brown, very moist, stiff, medium to high plasticity			
20			11	1.5		90.2	32.7	
25			8	2.5				
30			9	3.0		92.2	31.9	c = 0.50 tsf
35			7	2.0				
40			22	2.0	Thin interbedded silty sand layers			
45			6	2.0				
50			19	1.5				
55					Total Depth = 51.5' Groundwater is expected at 10 ft Backfilled with excavated soil			
60								

DATE DRILLED:	7/21/09	TOTAL DEPTH:	51.5 Feet	DEPTH TO WATER:	10.0 ft.
LOGGED BY:	J. Avalos	TYPE OF BIT:	Hollow Stem Auger	DIAMETER:	8 in.
SURFACE ELEVATION:	-45 ft	HAMMER WT.:	140 lbs.	DROP:	30 in.

PROJECT NO. LE09142

LANDMARK Geo-Engineers and Geologists

PLATE B-2

LOG OF BORING NO. 3

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
					SILTY CLAY (CL): Brown, moist, low plasticity			LL=28% PI=10%
					SANDY SILT (ML): Brown, very moist, loose, with fine grained sand			
5			13	2.5	CLAY (CL-CH): Reddish brown, very moist, stiff, medium to high plasticity	97.0	23.0	
					SANDY SILT (ML): Brown, damp, medium dense, with fine grained sand — Expected GW=10 ft			
10			17					
15			9	2.5	CLAY (CL-CH): Reddish brown, very moist, stiff, medium to high plasticity	95.2	29.2	c = 0.46 tsf
20			6	2.0				
25					Total Depth = 21.5' Groundwater is expected at 10 ft Backfilled with excavated soil			
30								
35								
40								
45								
50								
55								
60								

DATE DRILLED:	7/21/09	TOTAL DEPTH:	21.5 Feet	DEPTH TO WATER:	10.0 ft.
LOGGED BY:	J. Avalos	TYPE OF BIT:	Hollow Stem Auger	DIAMETER:	8 in.
SURFACE ELEVATION:	-45 ft	HAMMER WT.:	140 lbs.	DROP:	30 in.

PROJECT NO. LE09142

LANDMARK Geo-Engineers and Geologists

PLATE B-3

LOG OF BORING NO. 4

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
					SILTY CLAY (CL): Light brown, dry, low plasticity			
5			21		SILT (ML): Light brown, dry, medium dense			LL=NV PI=NP
10			13		Expected GW=10 ft Very moist	96.9	23.1	
15			7		SANDY SILT (ML): Brown, wet, loose, with fine grained sand			
20			14	3.0	CLAY (CL-CH): Reddish brown, very moist, stiff, medium to high plasticity			
25					Total Depth = 21.5' Groundwater is expected at 10 ft Backfilled with excavated soil			
30								
35								
40								
45								
50								
55								
60								

DATE DRILLED:	7/21/09	TOTAL DEPTH:	21.5 Feet	DEPTH TO WATER:	10.0 ft.
LOGGED BY:	J. Avalos	TYPE OF BIT:	Hollow Stem Auger	DIAMETER:	8 in.
SURFACE ELEVATION:	-30 ft	HAMMER WT.:	140 lbs.	DROP:	30 in.

PROJECT NO. LE09142

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Geo-Engineers and Geologists

PLATE B-4

DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
Coarse grained soils More than half of material is larger than No. 200 sieve	**Gravels** More than half of coarse fraction is larger than No. 4 sieve	Clean gravels (less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, or gravel-sand mixtures, little or no fines
		Gravel with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	Sands More than half of coarse fraction is smaller than No. 4 sieve	Clean sands (less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
Fine grained soils More than half of material is smaller than No. 200 sieve	**Silts and clays** Liquid limit is less than 50%		ML	Inorganic silts, clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravely, sandy, or lean clays
			OL	Organic silts and organic clays of low plasticity
	Silts and clays Liquid limit is more than 50%		MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
Highly organic soils			PT	Peat and other highly organic soils

GRAIN SIZES

Silts and Clays	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

200 40 10 4 — US Standard Series Sieve

3/4" 3" 12" — Clear Square Openings

Sands, Gravels, etc.	Blows/ft. *
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Clays & Plastic Silts	Strength **	Blows/ft. *
Very Soft	0-0.25	0-2
Soft	0.25-0.5	2-4
Firm	0.5-1.0	4-8
Stiff	1.0-2.0	8-16
Very Stiff	2.0-4.0	16-32
Hard	Over 4.0	Over 32

* Number of blows of 140 lb. hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 in. I.D.) split spoon (ASTM D1586).

** Unconfined compressive strength in tons/s.f. as determined by laboratory testing or approximated by the Standard Penetration Test (ASTM D1586), Pocket Penetrometer, Torvane, or visual observation.

Type of Samples:

Ring Sample — Standard Penetration Test — Shelby Tube — Bulk (Bag) Sample

Drilling Notes:

1. Sampling and Blow Counts
   - Ring Sampler - Number of blows per foot of a 140 lb. hammer falling 30 inches.
   - Standard Penetration Test - Number of blows per foot.
   - Shelby Tube - Three (3) inch nominal diameter tube hydraulically pushed.
2. P. P. = Pocket Penetrometer (tons/s.f.).
3. NR = No recovery.
4. GWT = Ground Water Table observed @ specified time.

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Project No: LE09142

Key to Logs

Plate B-5

APPENDIX C

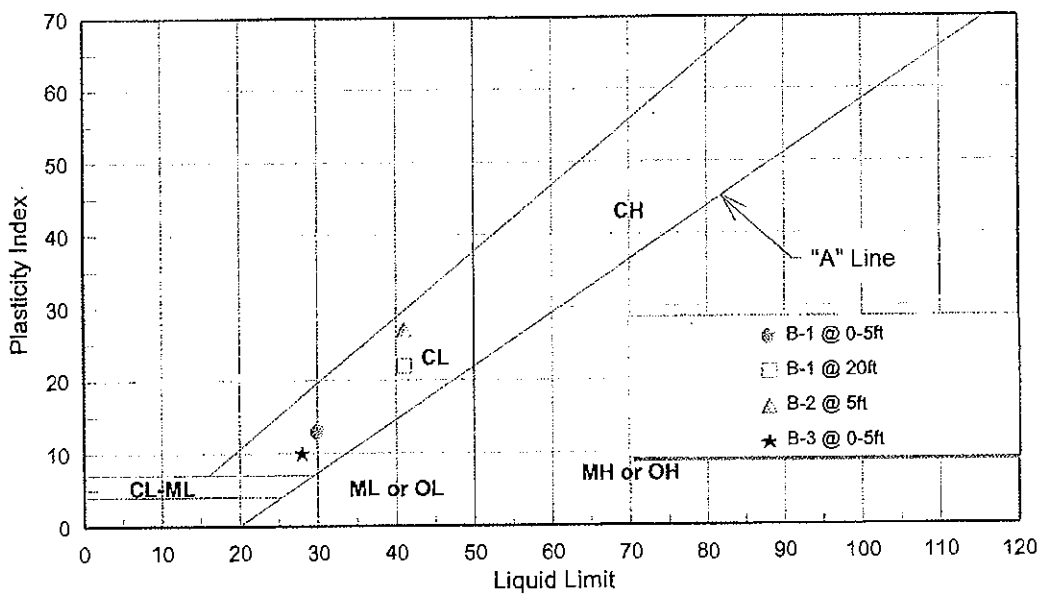
LANDMARK CONSULTANTS, INC.

CLIENT: DUDEK
PROJECT: Water Reclamation Facility -- Seeley, CA
JOB NO: LE09142
DATE: 08/05/09

ATTERBERG LIMITS (ASTM D4318)

Sample Location	Sample Depth (ft)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	USCS Classif-ation
B-1	0-5	30	17	13	CL
B-1	20	41	19	22	CL
B-2	0-5	NV	NP	NP	ML
B-2	5	41	14	27	CL
B-3	0-5	28	18	10	CL
B-4	5	NV	NP	NP	ML

PLASTICITY CHART



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Project No: LE09142

Atterberg Limits Test Results

Plate C-1

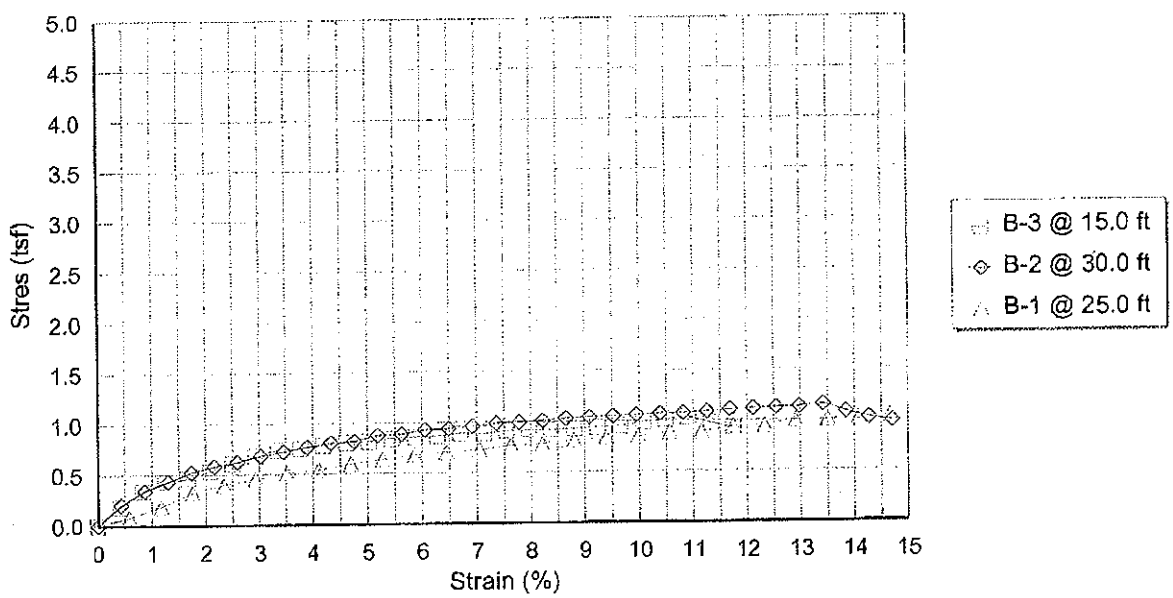
LANDMARK CONSULTANTS, INC.

CLIENT: DUDEK
PROJECT: Water Reclamation Facility -- Seeley, CA
JOB NO: LE09142
DATE: 08/05/09

UNCONFINED COMPRESSION TEST (ASTM D2166)

Boring No.	Sample Depth (ft)	Natural Moisture Content (%)	Unit Dry Weight (pcf)	Maximum Compressive Strength (tsf)	Cohesion (tsf)	Failure Strain (%)
B-3	15.0	29.2	95.2	0.91	0.46	7.6
B-2	30.0	31.9	92.2	1.00	0.50	7.8
B-1	25.0	31.4	93.5	1.04	0.52	14.7

STRESS-STRAIN PLOT



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Project No: LE09142

Unconfined Compression Test Results

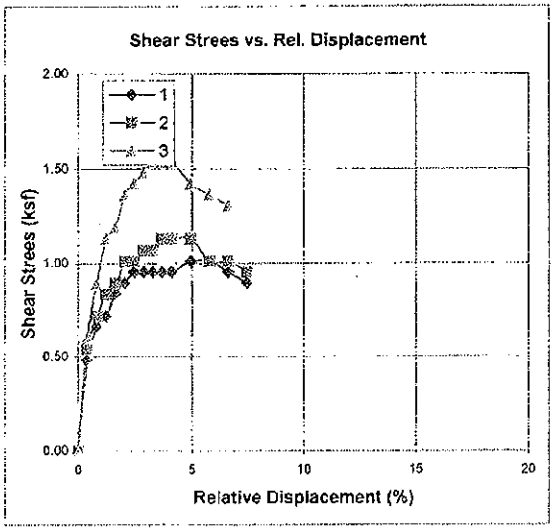
Plate C-2

LANDMARK CONSULTANTS, INC.

CLIENT: Dudek
PROJECT: Seeley Water Reclamation Facility -- Seeley, CA
PROJECT No: LE08142 **DATE:** 8/7/2009

DIRECT SHEAR TEST - INSITU (ASTM D3080)

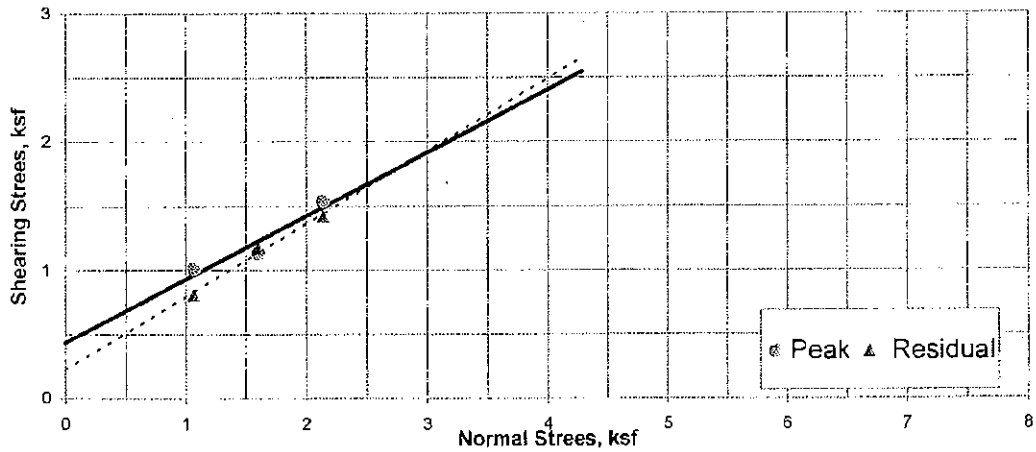
SAMPLE LOCATION: B-2 @ 10 ft
SAMPLE DESCRIPTION: Sandy Silt (ML)



	Specimen:	1	2	3	Avg.
Initial	Moisture Content, %:	13.7	13.7	13.7	13.7
	Dry Density, pcf:	111.6	114.0	113.4	113.0
	Saturation, %:	75	81	79	
Final	Moisture Content, %:	18.8	18.9	18.8	
	Dry Density, pcf:	106.3	111.0	107.9	
	Saturation, %:	90	102	93	
	Normal Stress, ksf:	1.07	1.61	2.15	
	Peak Shear Stress, ksf:	1.01	1.13	1.54	
	Residual Shear Stress, ksf:	0.81	1.18	1.42	
	Deformation Rate, in./min.	0.01	0.01	0.01	

	Peak	Residual
Angle of Internal Friction, deg.:	26	30
Cohesion, ksf:	0.44	0.22

DIRECT SHEAR TEST RESULTS



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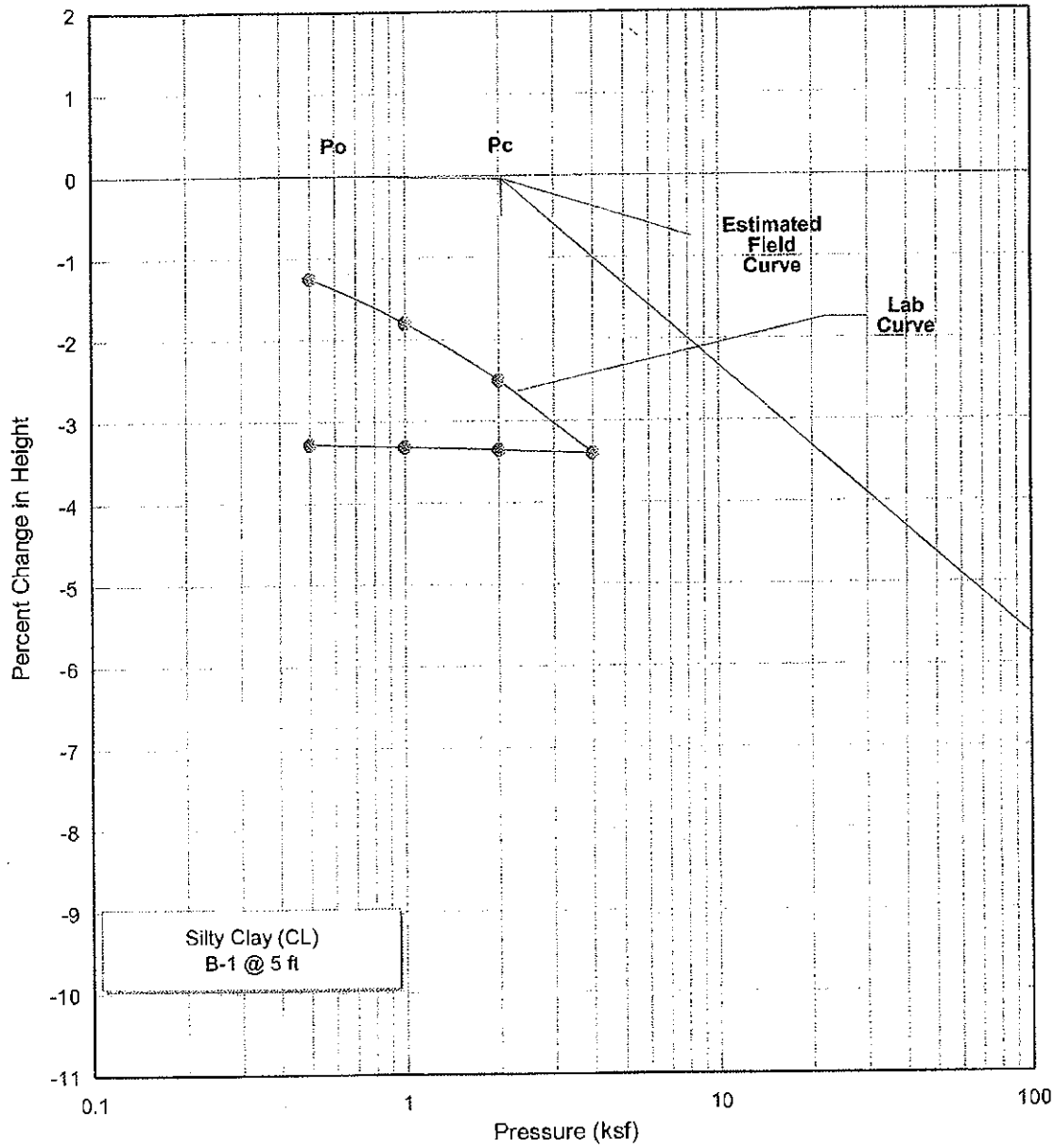
PROJECT No: LE08142

Direct Shear
Test Results

C-3

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)



	Initial	Final
Dry Density, pcf:	98.7	102.1
Water Content, %:	22.0	15.0
Void Ratio, e:	0.740	0.682
Saturation, %:	81.7	60.4

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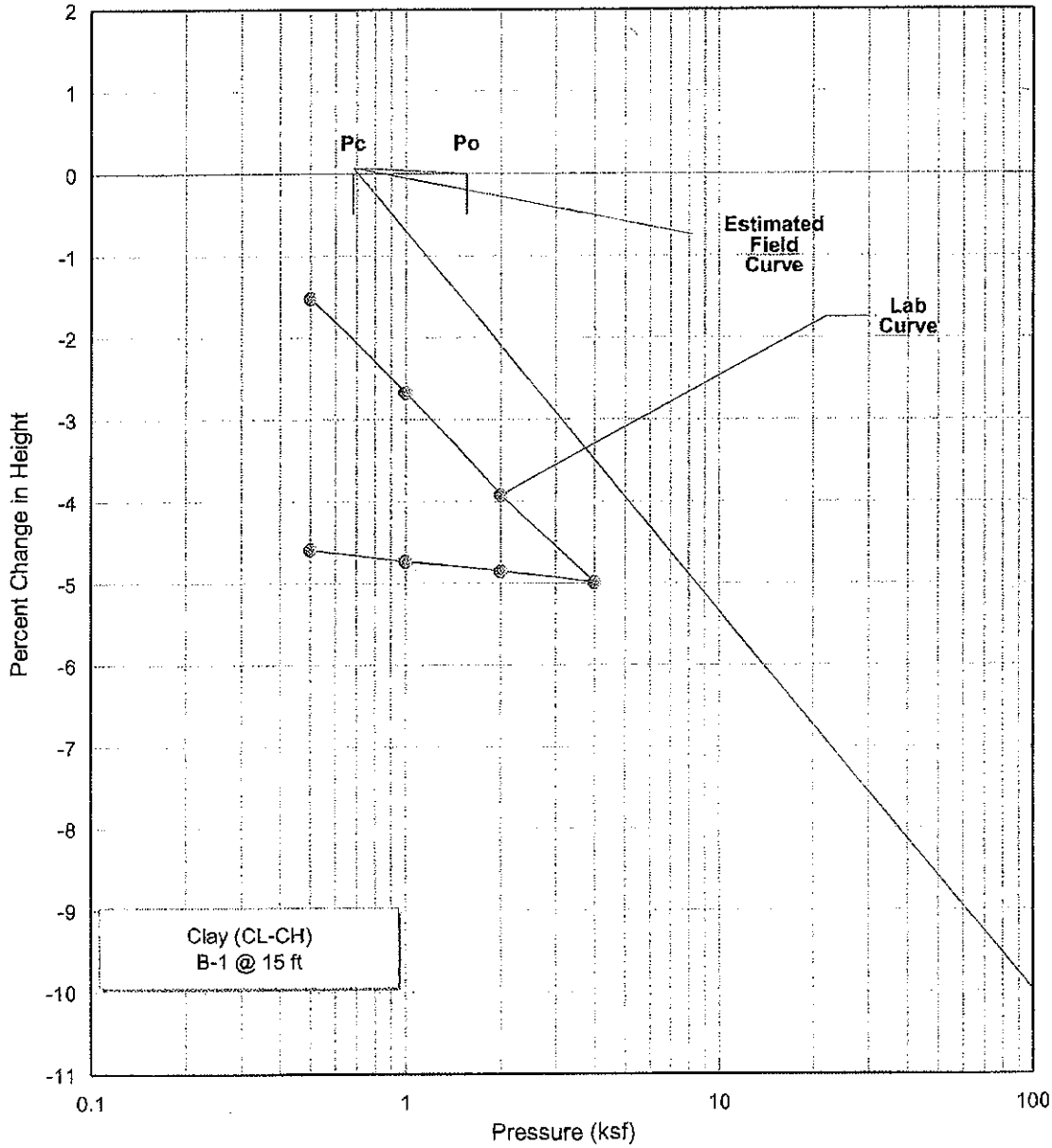
Geo-Engineers and Geologists

Project No: LE09142

Consolidation Test Results

Plate C-4

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)



	Initial	Final
Dry Density, pcf:	94.7	99.4
Water Content, %:	31.3	27.1
Void Ratio, e:	0.812	0.727
Saturation, %:	105.9	100.0

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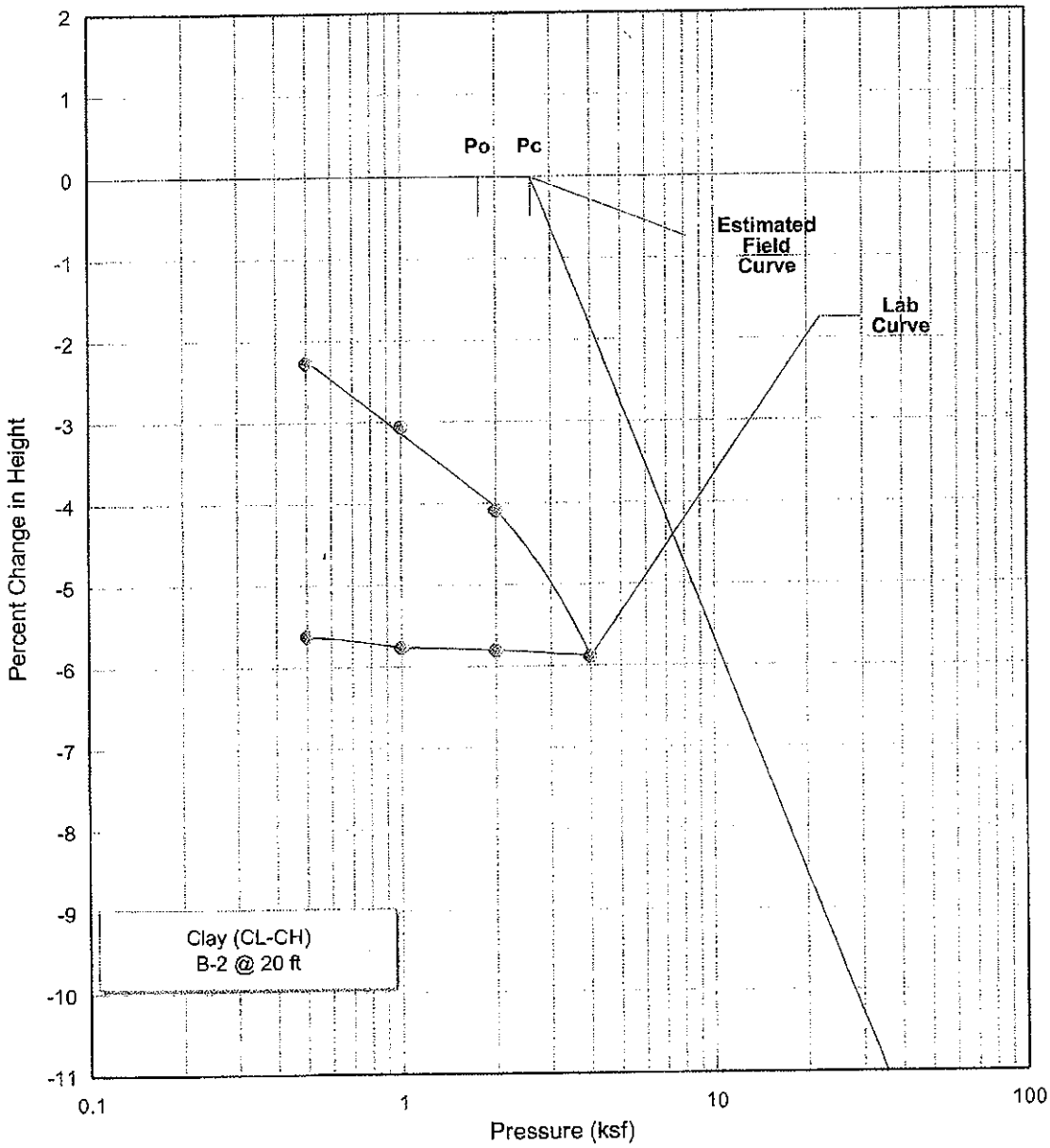
Geo-Engineers and Geologists

Project No: LE09142

Consolidation Test Results

Plate C-5

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)



	Initial	Final
Dry Density, pcf:	90.2	95.6
Water Content, %:	32.7	27.7
Void Ratio, e:	0.903	0.795
Saturation, %:	99.6	95.7

LANDMARK
Geo-Engineers and Geologists

Project No: LE09142

Consolidation Test Results

Plate C-6

LANDMARK CONSULTANTS, INC.

CLIENT: DUDEK
PROJECT: Water Reclamation Facility -- Seeley, CA
JOB NO: LE09142
DATE: 08/05/09

CHEMICAL ANALYSES

Boring:	B-1	B-2	B-3	CalTrans
Sample Depth, ft:	0-5	0-5	0-5	Method
pH:	7.2	7.7	7.4	643
Electrical Conductivity (mmhos):	2.2	0.7	2.0	424
Resistivity (ohm-cm):	250	350	200	643
Chloride (Cl), ppm:	4,060	190	1,410	422
Sulfate (SO4), ppm:	2,415	683	1,631	417

General Guidelines for Soil Corrosivity

Material Affected	Chemical Agent	Amount in Soil (ppm)	Degree of Corrosivity
Concrete	Soluble Sulfates	0 -1000	Low
		1000 - 2000	Moderate
		2000 - 20,000	Severe
		> 20,000	Very Severe
Normal Grade Steel	Soluble Chlorides	0 - 200	Low
		200 - 700	Moderate
		700 - 1500	Severe
		> 1500	Very Severe
Normal Grade Steel	Resistivity	1-1000	Very Severe
		1000-2000	Severe
		2000-10,000	Moderate
		10,000+	Low

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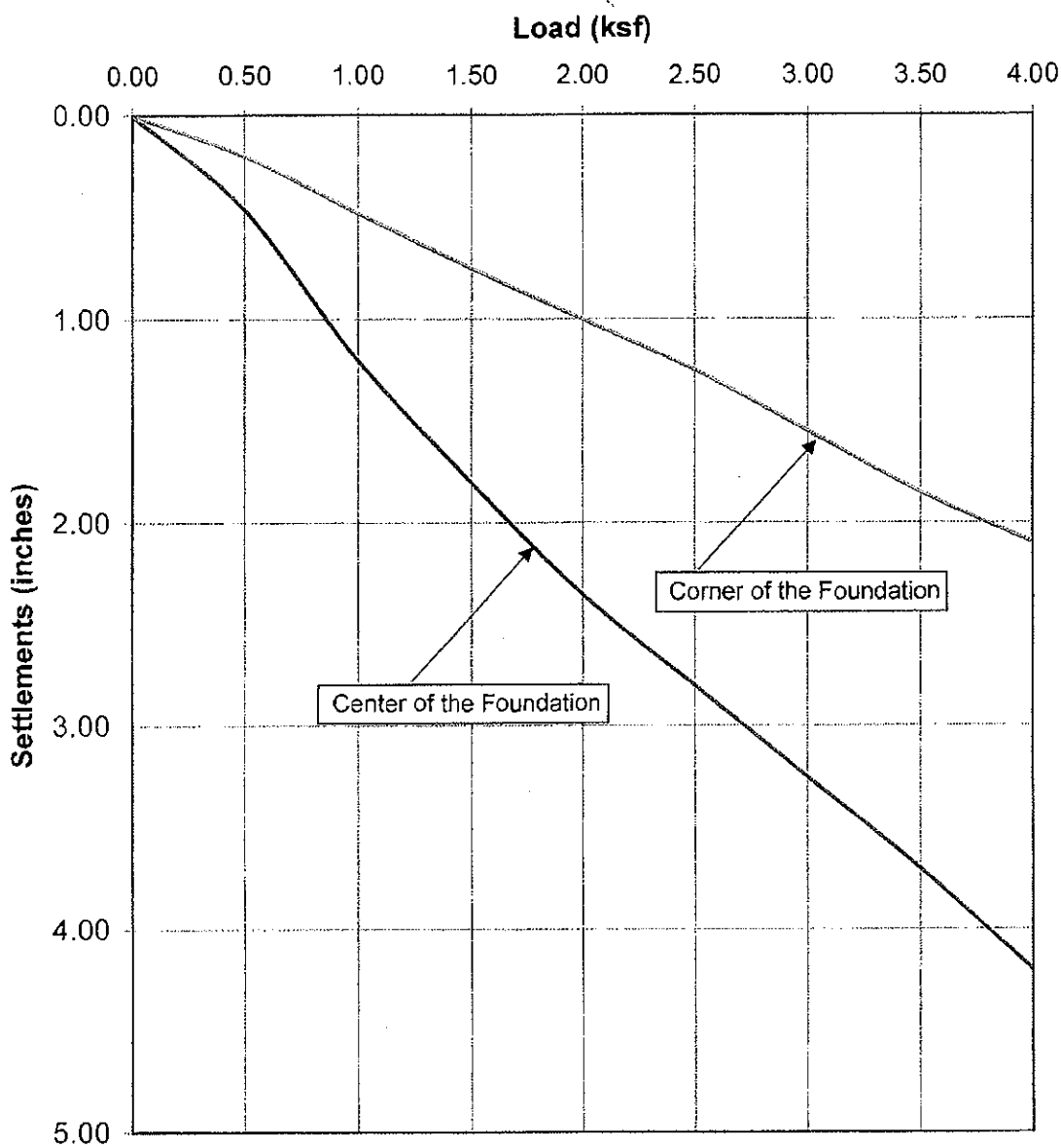
Geo-Engineers and Geologists
Project No: LE09142

Selected Chemical Analyses Results

Plate C-7

APPENDIX D

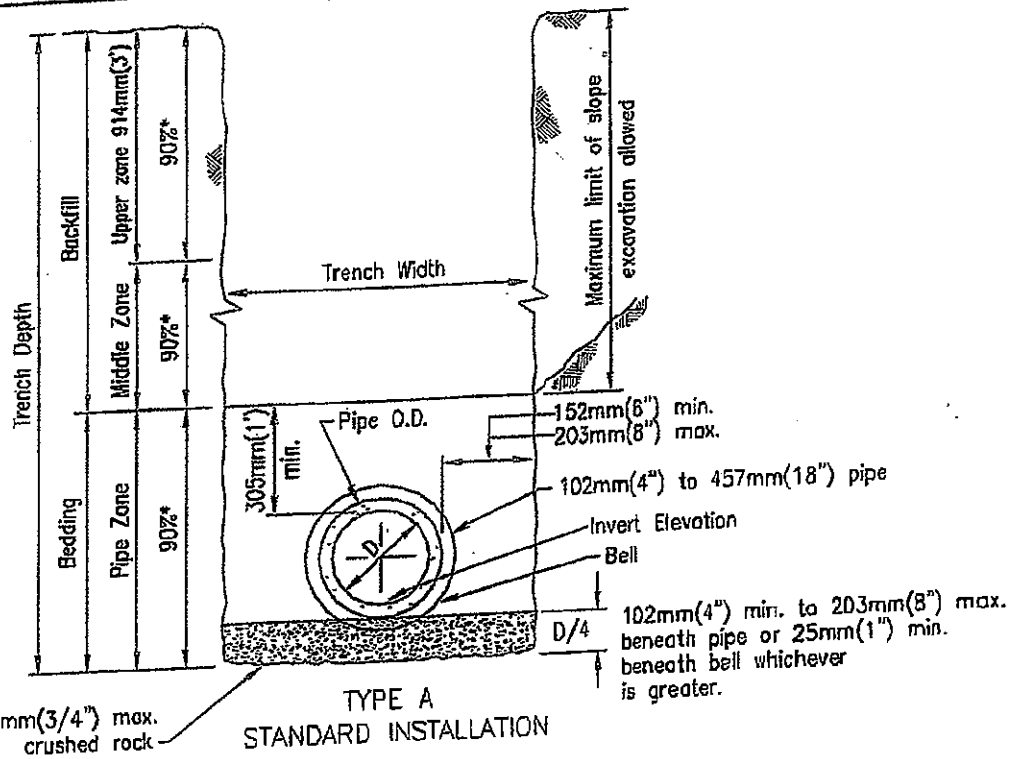


Notes:

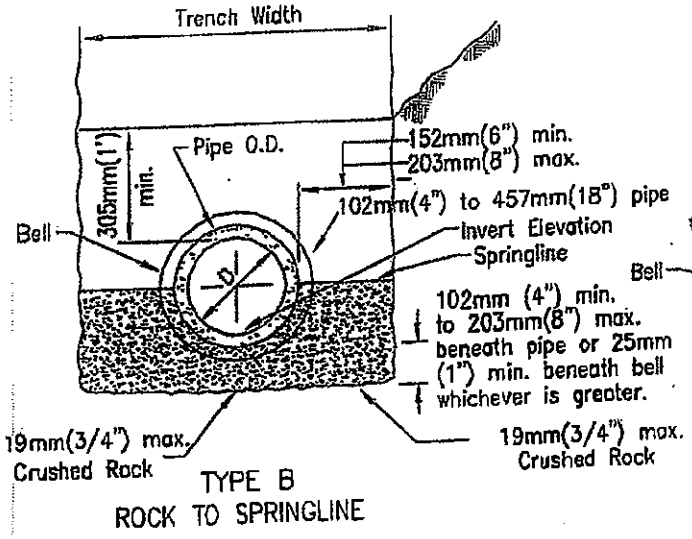
1. A 30 ft by 25 ft foundation and 12' of embedment depth was used for settlement analysis

LANDMARK Geo-Engineers and Geologists *a DBE/MBE/SBE Company* **Project No.: LE09142**	**Total Settlements for a 30-ft by 25-ft Clarifier Foundation at Seeley WWTP Improvements - Seeley, CA**	**Plate D-1**

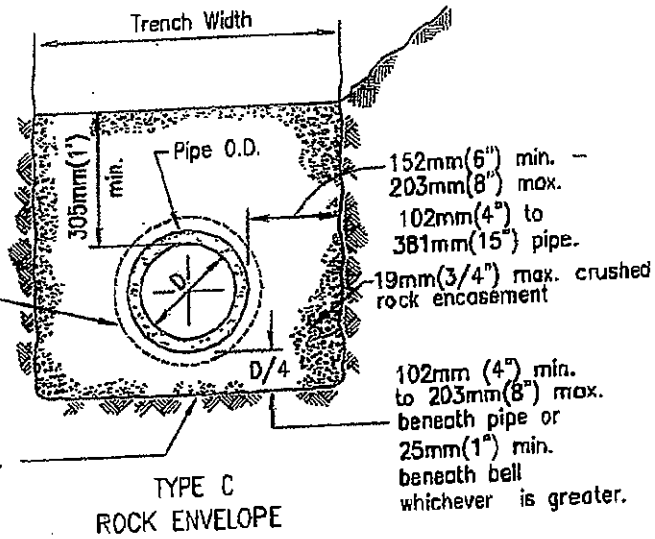
APPENDIX E



TYPE A
STANDARD INSTALLATION



TYPE B
ROCK TO SPRINGLINE



TYPE C
ROCK ENVELOPE

NOTES

1. For trenching in improved streets, see Standard Drawings G-24 or G-25 for trench resurfacing.
2. (*) indicates minimum relative compaction.
3. Minimum depth of cover from the top of pipe to finish grade for all sanitary sewer installations shall be 914mm(3')
   For cover less than 914mm(3'), see Standard Drawing S-7 for concrete encasement.
4. See Type A installation for details not shown for Types B and C.

Revision	By	Approved	Date
ORIGINAL		A.Kerchevel	12/75
And Metric		T. Stanton	03/03

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

3/04/2003

Chairperson R.C.E. 19246 Date

DRAWING NUMBER S-4

APPENDIX F

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Seeley Water Reclamation Facility
1898 West Main Street
Seeley, CA 92243

Inquiry Number: 2719957.5
March 16, 2010

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

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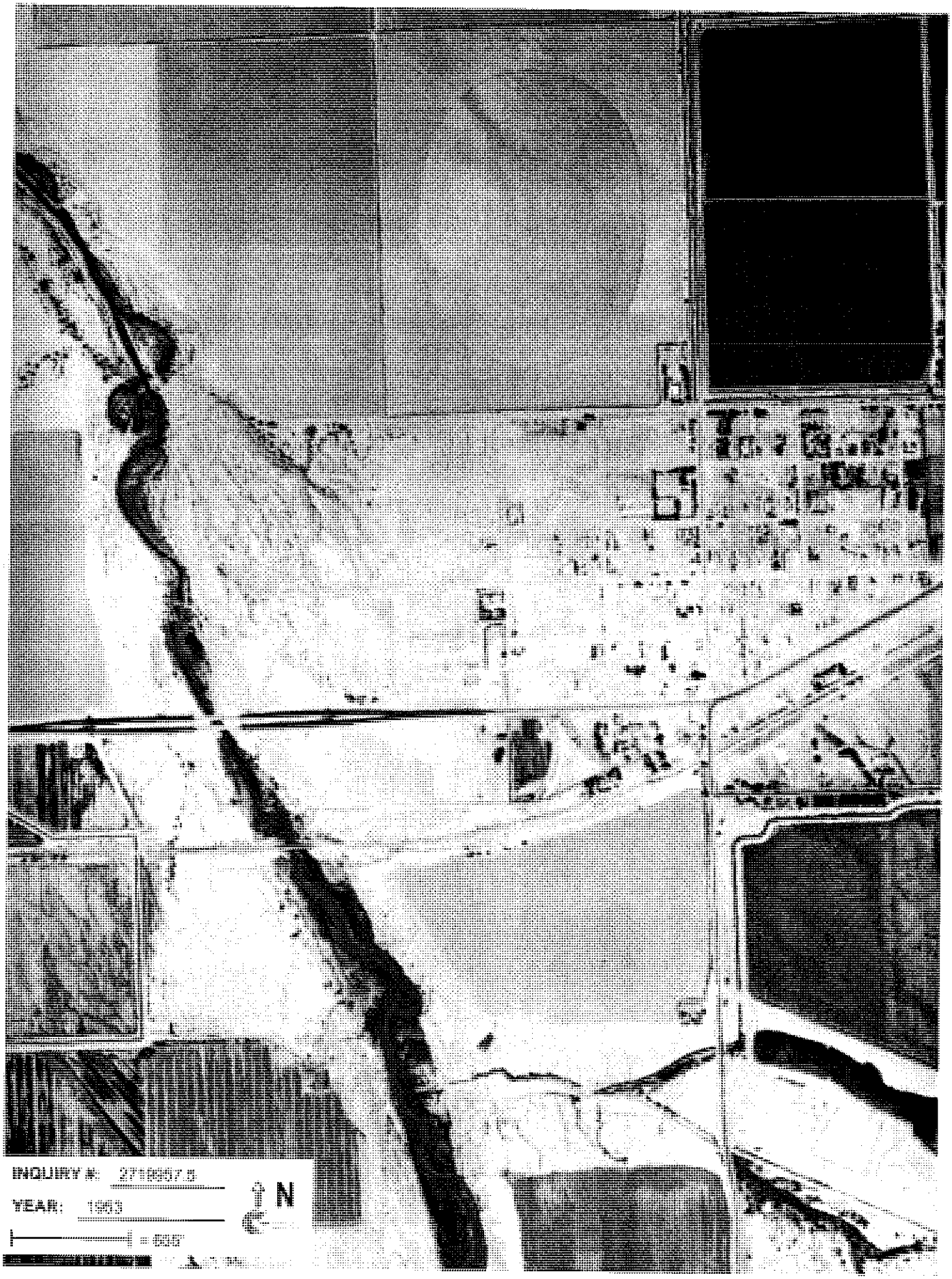
Date EDR Searched Historical Sources:

Aerial Photography March 16, 2010

Target Property:

1898 West Main Street
Seeley, CA 92243

Year	*Scale*	*Details*	*Source*
1953	Aerial Photograph. Scale: 1"=655'	Flight Year: 1953	USGS
1974	Aerial Photograph. Scale: 1"=566'	Flight Year: 1974	NASA
1984	Aerial Photograph. Scale: 1"=690'	Flight Year: 1984	USGS
1996	Aerial Photograph. Scale: 1"=666'	Flight Year: 1996	USGS
2002	Aerial Photograph. Scale: 1"=666'	Flight Year: 2002	USGS
2005	Aerial Photograph. 1" = 604'	Flight Year: 2005	EDR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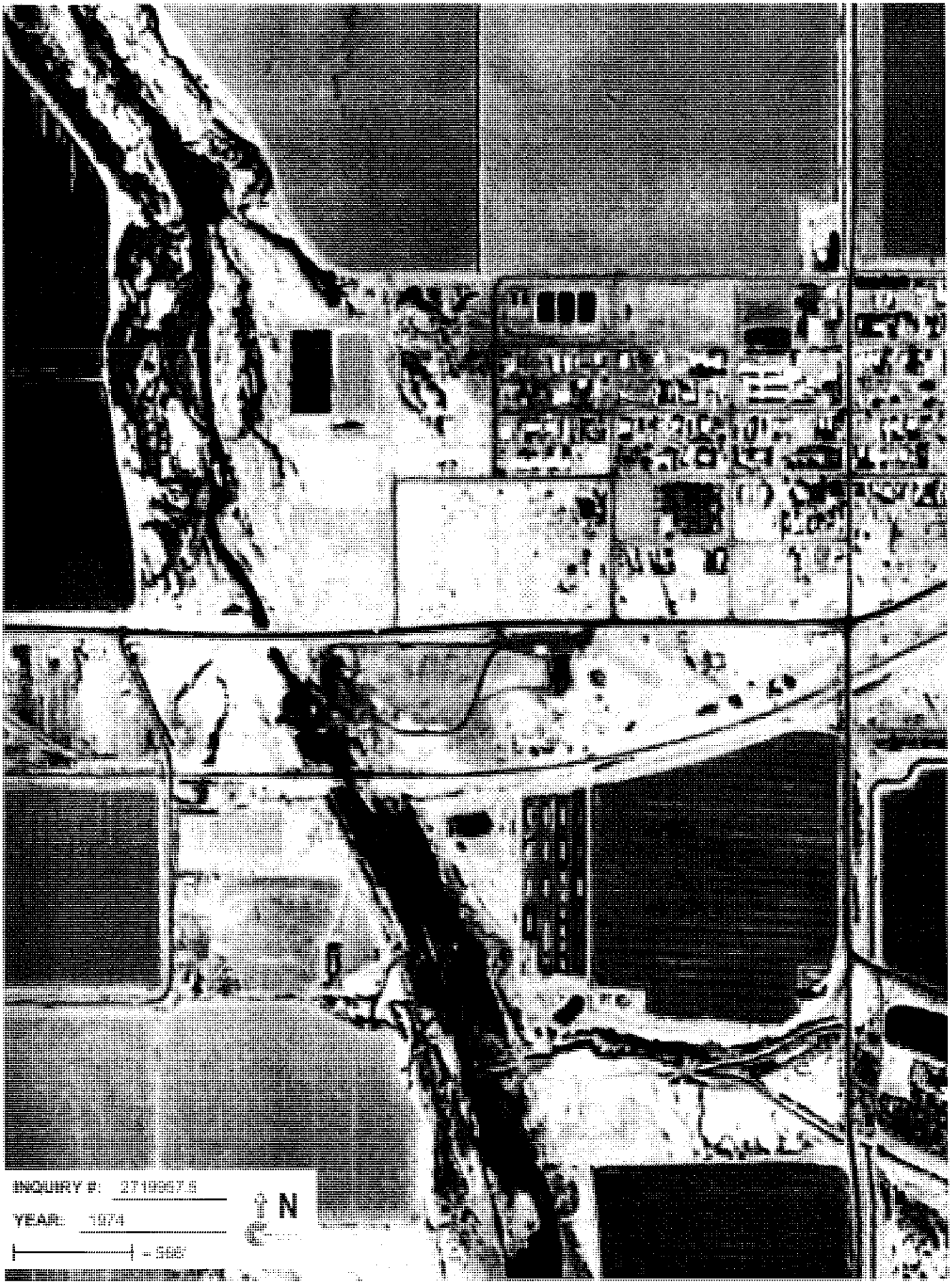
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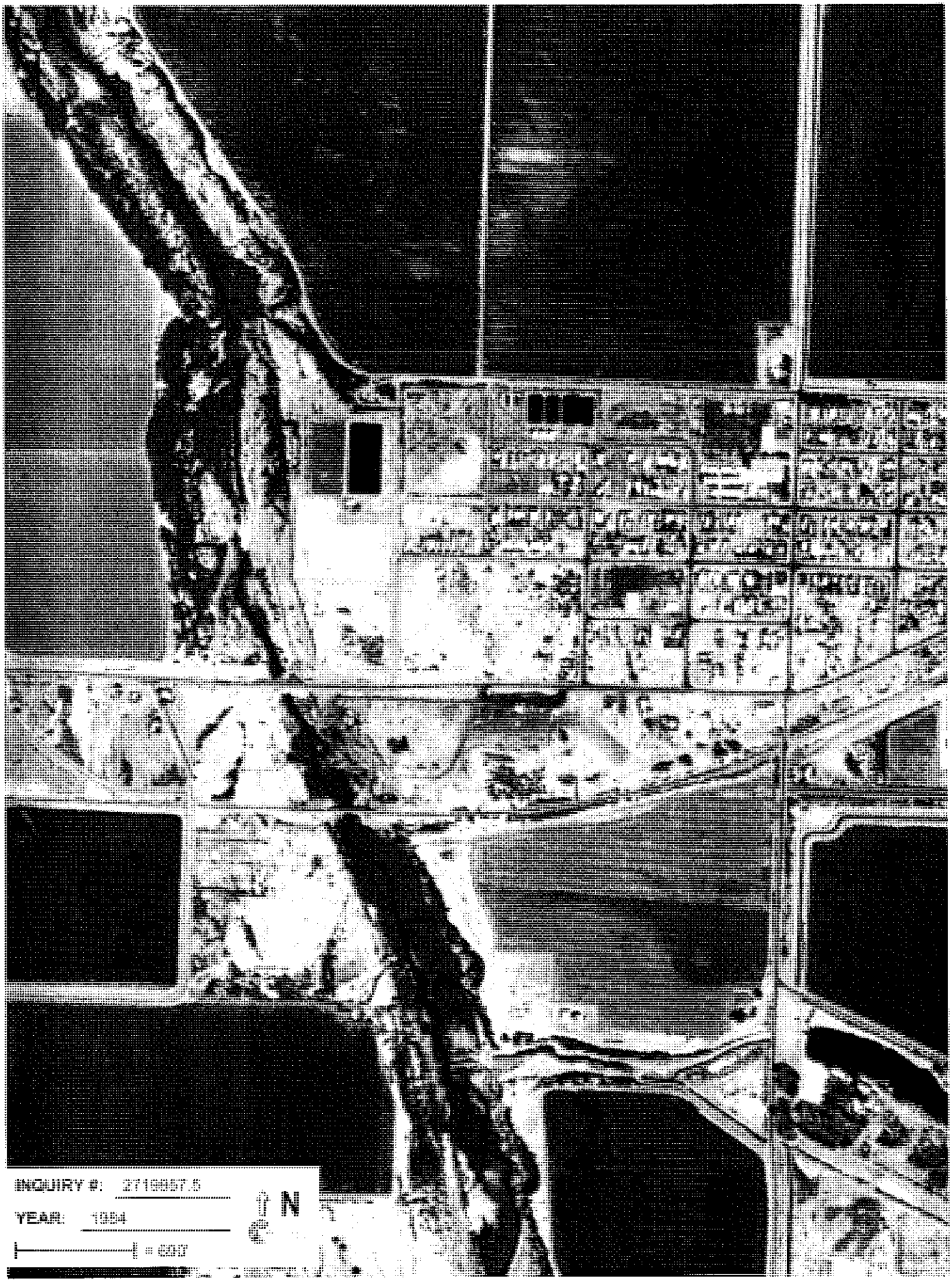
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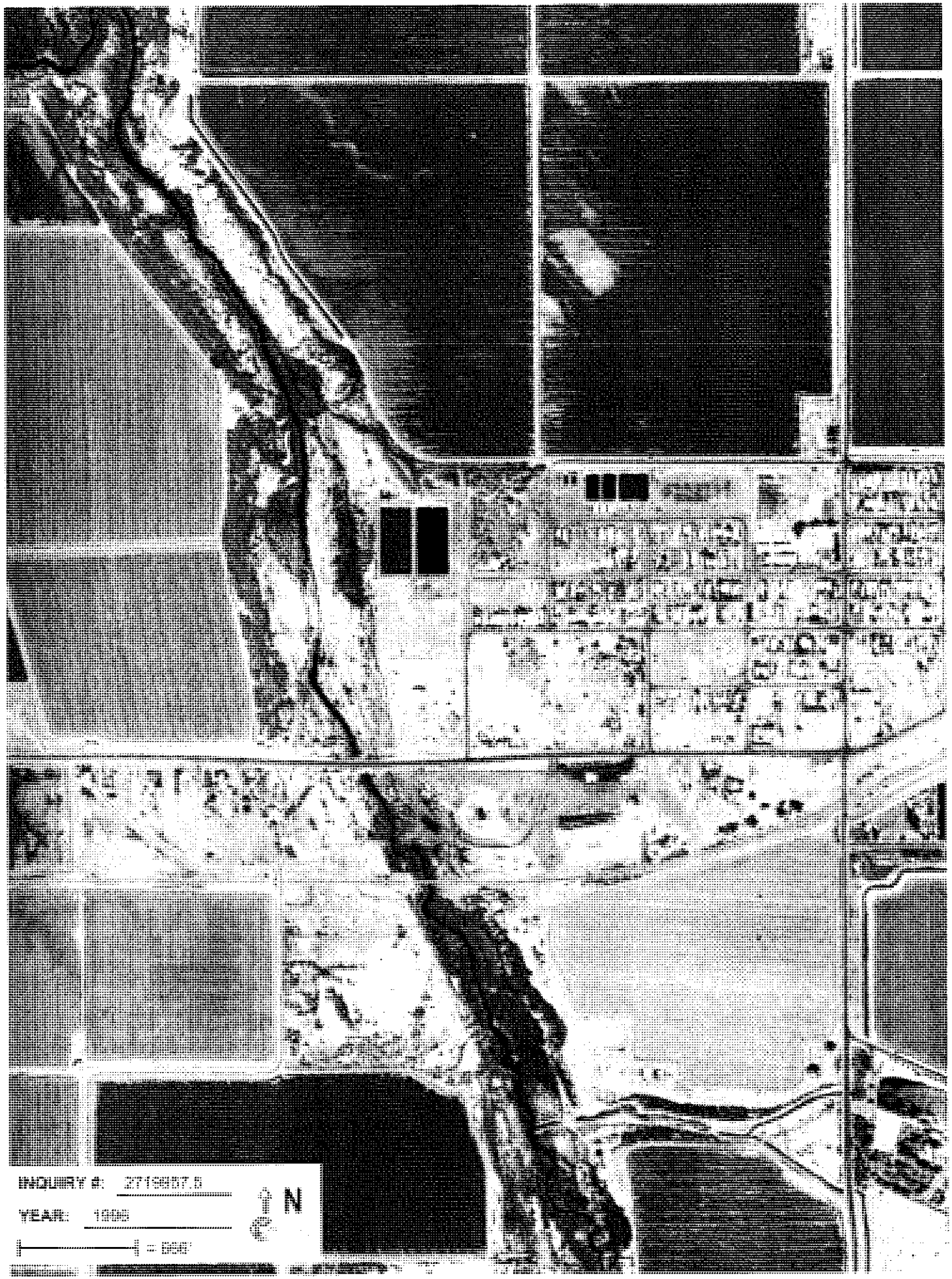
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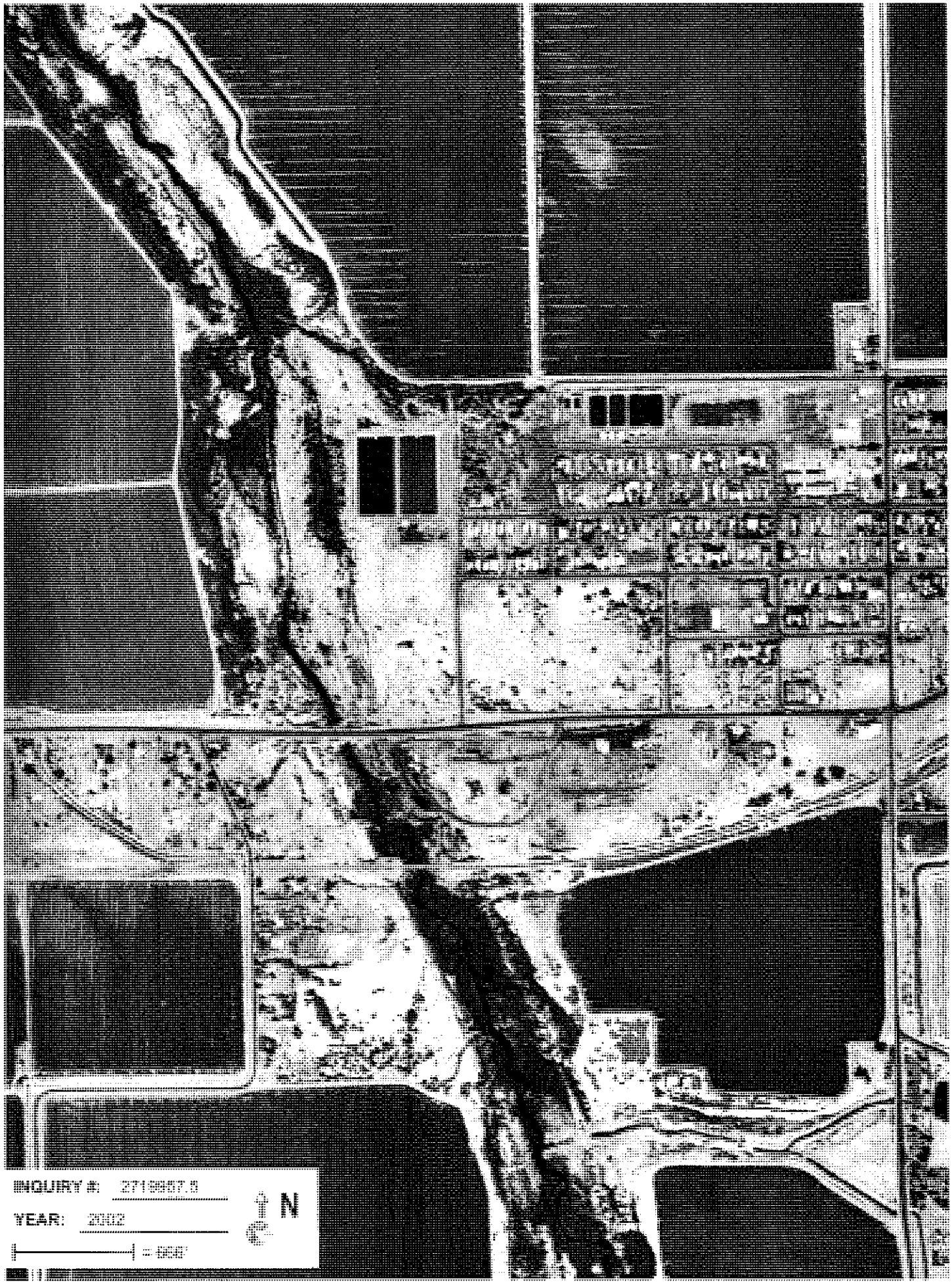
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YEAR: 2002
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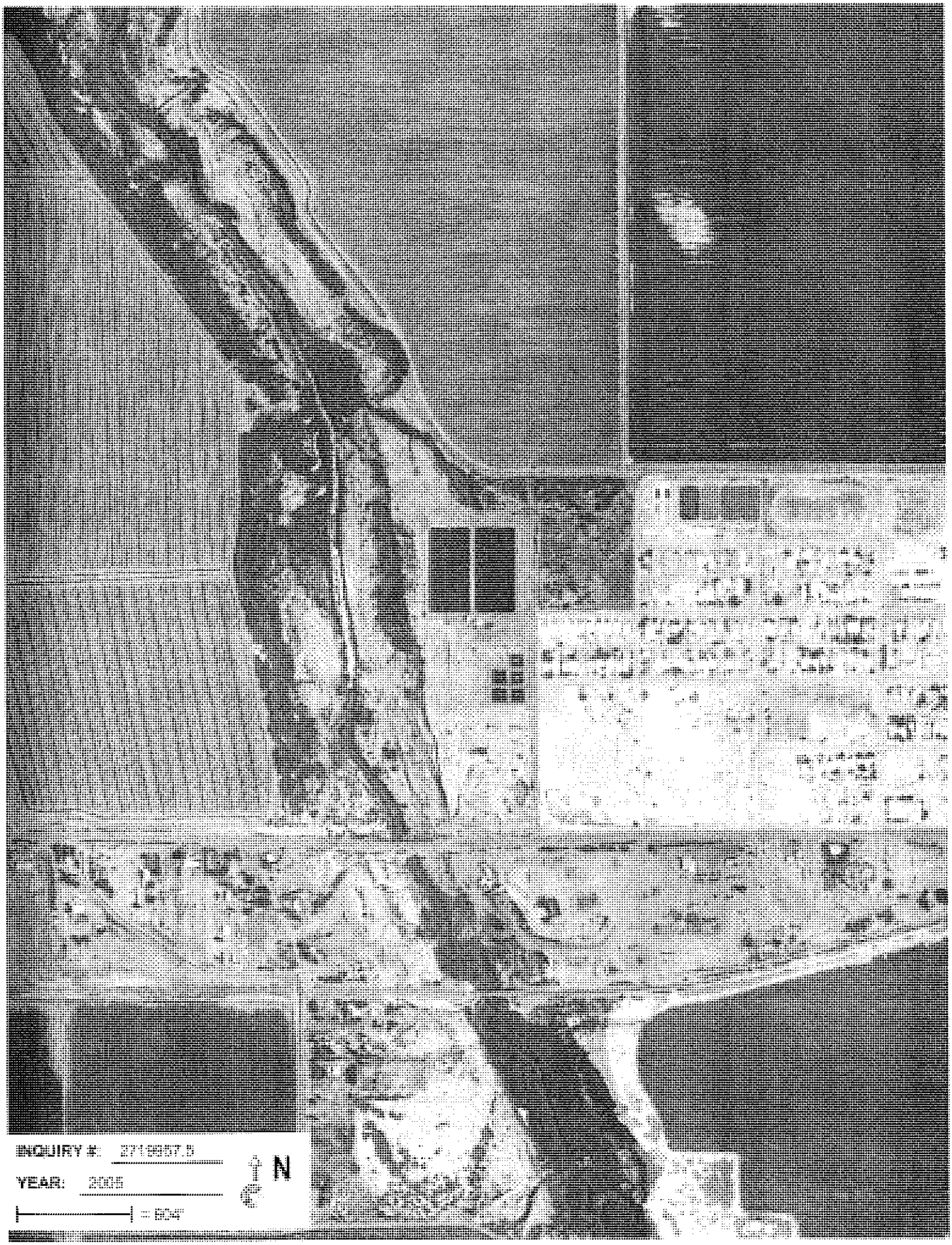
INQUIRY #:
YEAR:
N

Seeley Water Reclamation Facility
1898 West Main Street
Seeley, CA 92243

Inquiry Number: 2719957.4
March 15, 2010

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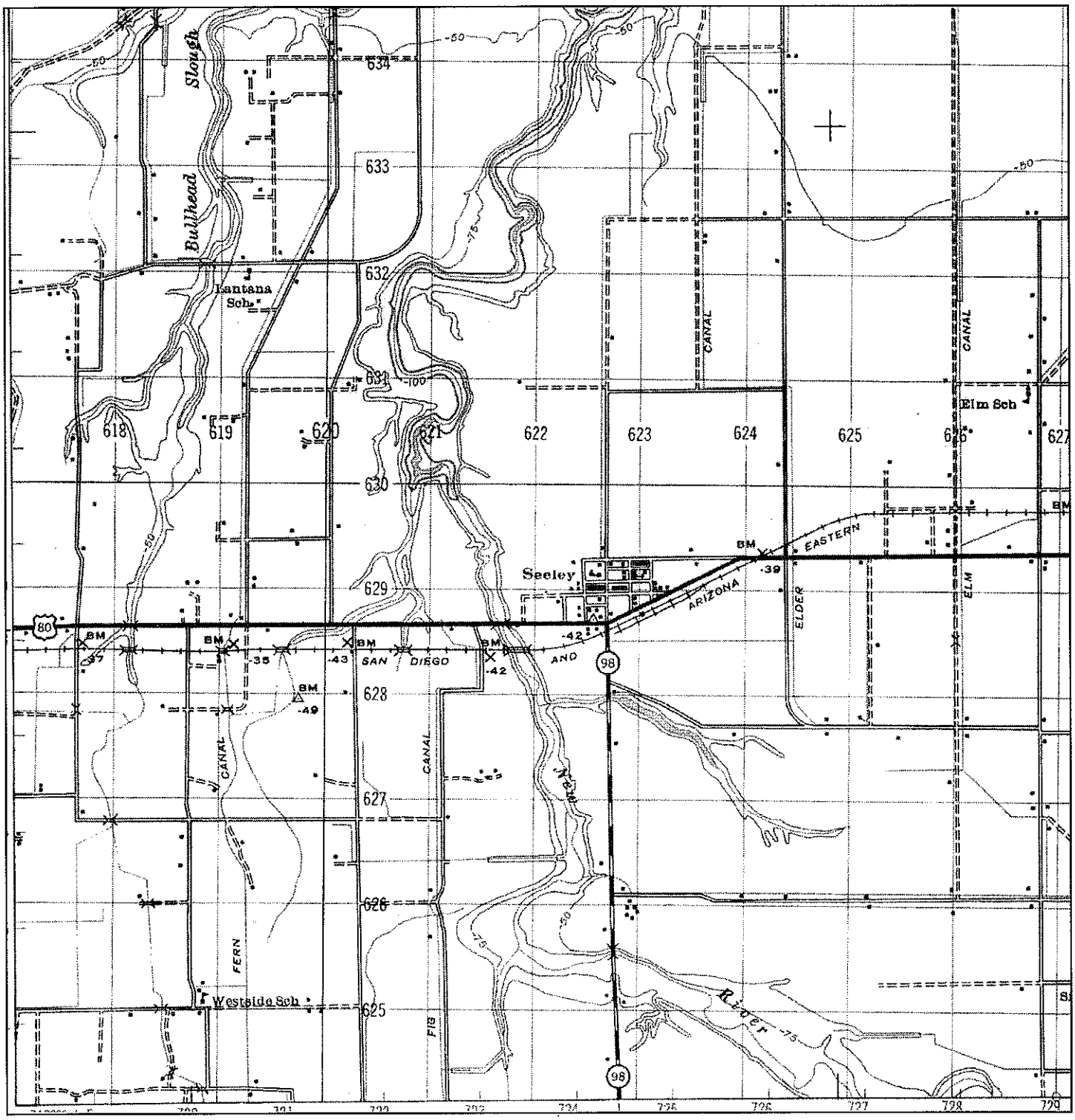
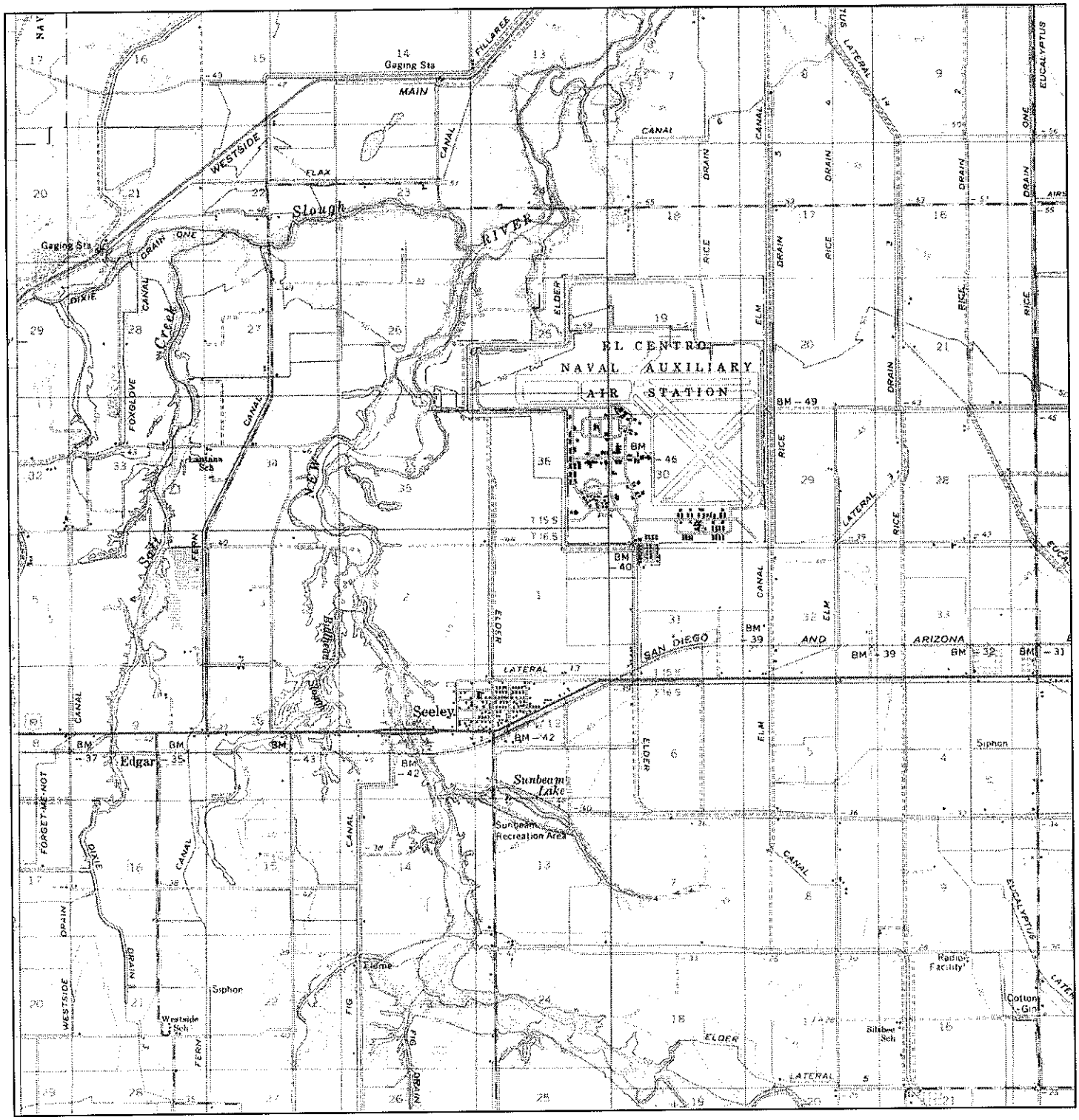
Historical Topographic Map



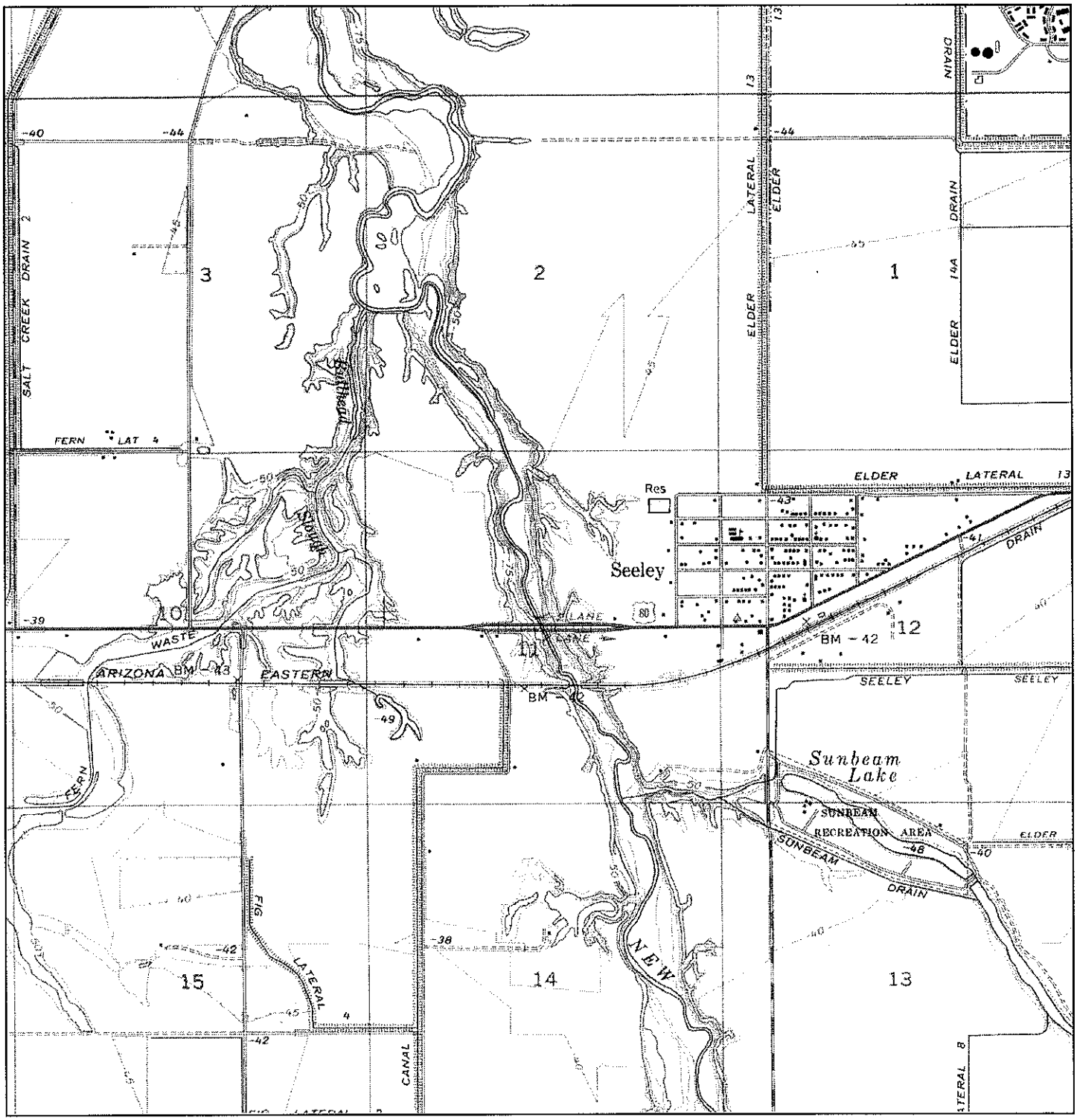
N	TARGET QUAD NAME: BRAWLEY MAP YEAR: 1948 SERIES: 15 SCALE: 1:50000	SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley, CA 92243 LAT/LONG: 32.7943 / 115.7	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY#: 2719957.4 RESEARCH DATE: 03/15/2010

Historical Topographic Map



N	TARGET QUAD NAME: BRAWLEY MAP YEAR: 1957 SERIES: 15 SCALE: 1:62500	SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley, CA 92243 LAT/LONG: 32.7943 / 115.7	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY#: 2719957.4 RESEARCH DATE: 03/15/2010

Historical Topographic Map



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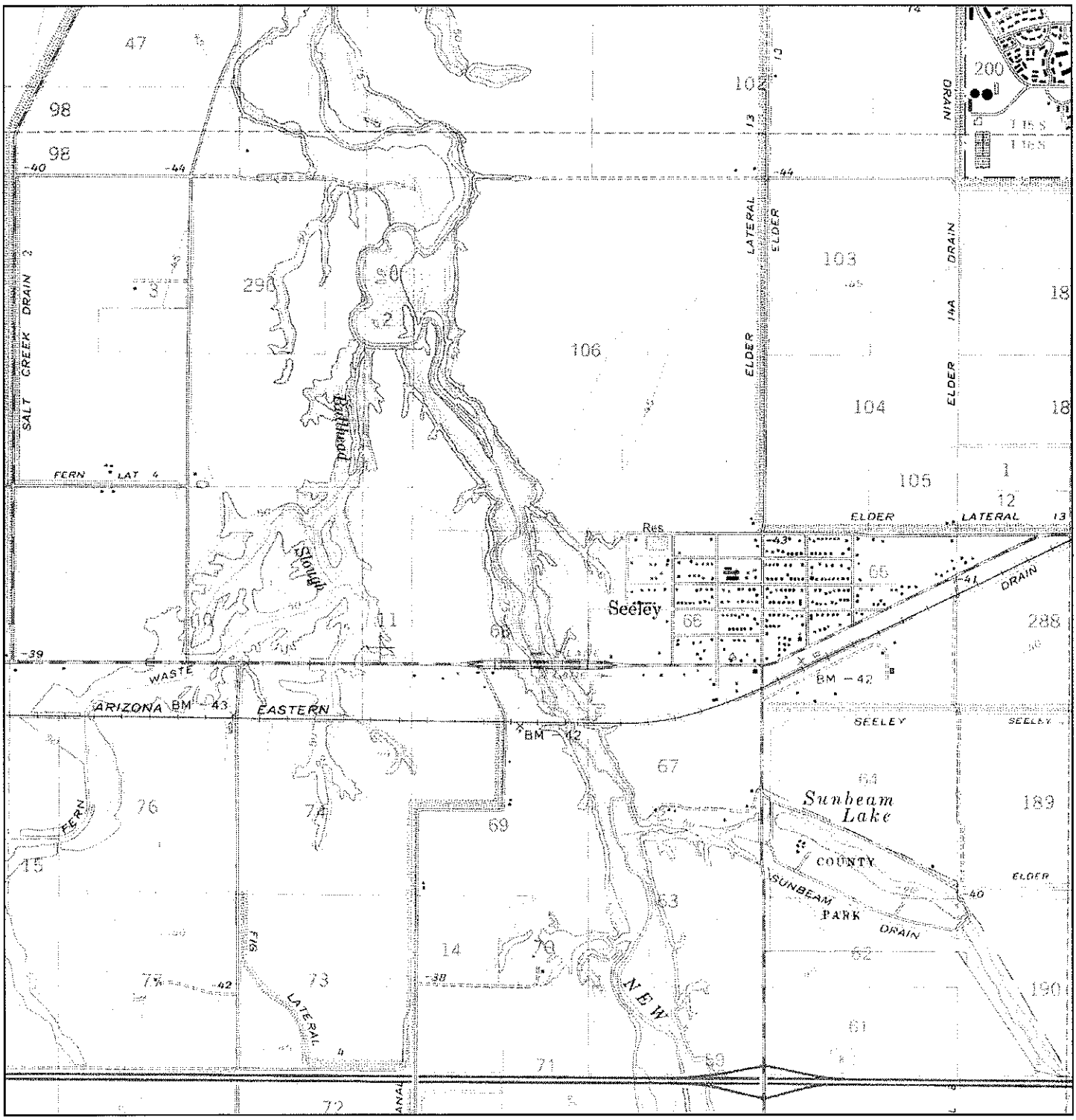
Historical Topographic Map



N	TARGET QUAD NAME: SEELEY MAP YEAR: 1979 PHOTOREVISED FROM:1957 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley, CA 92243 LAT/LONG: 32.7943 / 115.7	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY#: 2719957.4 RESEARCH DATE: 03/15/2010

Seeley Water Reclamation Facility
1898 West Main Street
Seeley, CA 92243

Inquiry Number: 2719957.6
March 17, 2010

The EDR-City Directory Abstract

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New for 2009, the EDR City Directory Abstract has been enhanced with additional information and features. These enhancements will make your city directory research process more efficient, flexible, and insightful than ever before. The enhancements will improve the options for selecting adjoining properties, and will speed up your review of the report.

City Directory Report. Three important enhancements have been made to the EDR City Directory Abstract:

1. *Executive Summary.* The report begins with an Executive Summary that lists the sources consulted in the preparation of the report. Where available, a parcel map is also provided within the report, showing the locations of properties researched.

2. *Page Images.* Where available, the actual page source images will be included in the Appendix, so that you can review them for information that may provide additional insight. EDR has copyright permission to include these images.

3. *Findings Listed by Location.* Another useful enhancement is that findings are now grouped by address. This will significantly reduce the time you need to review your abstracts. Findings are provided under each property address, listed in reverse chronological order and referencing the source for each entry.

Options for Selecting Adjoining Properties. Ensuring that the right adjoining property addresses are searched is one of the biggest challenges that environmental professionals face when conducting city directory historical research. EDR's new enhancements make it easier for you to meet this challenge. Now, when you place an order for the EDR City Directory Abstract, you have the following choices for determining which addresses should be researched.

1. *You Select Addresses and EDR Selects Addresses.* Use the "Add Another Address" feature to specify the addresses you want researched. Your selections will be supplemented by addresses selected by EDR researchers using our established research methods. Where available, a digital map will be shown, indicating property lines overlaid on a color aerial photo and their corresponding addresses. Simply use the address list below the map to check off which properties shown on the map you want to include. You may also select other addresses using the "Add Another Address" feature at the bottom of the list.

2. *EDR Selects Addresses.* Choose this method if you want EDR's researchers to select the addresses to be researched for you, using our established research methods.

3. *You Select Addresses.* Use this method for research based solely on the addresses you select or enter into the system.

4. *Hold City Directory Research Option.* If you choose to select your own adjoining addresses, you may pause production of your EDR City Directory Abstract report until you have had a chance to look at your other EDR reports and sources. Sources for property addresses include: your Certified Sanborn Map Report may show you the location of property addresses; the new EDR Property Tax Map Report may show the location of property addresses; and your field research can supplement these sources with additional address information. To use this capability, simply click "Hold City Directory research" box under "Other Options" at the bottom of the page. Once you have determined what addresses you want researched, go to your EDR Order Status page, select the EDR City Directory Abstract, and enter the addresses and submit for production.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
1993	Polk's City Directory	X	X	X	-
1988	Polk's City Directory	X	X	X	-
1983	Polk's City Directory	X	X	X	-
1978	Polk's City Directory	X	X	X	-
1973	Polk's City Directory	-	X	X	-
1968	Polk's City Directory	-	X	X	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

1898 West Main Street
Seeley, CA 92243

FINDINGS DETAIL

Target Property research detail.

Year	Uses	Source
1993	Seeley County Water District	Polk's City Directory
1988	Seeley County Water District	Polk's City Directory
1983	Seeley County Water District	Polk's City Directory
1978	Seeley County Water District	Polk's City Directory

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

Laguna

Laguna

Year	Uses	Source
1968	Address numbers on street shift -- no longer correspond	Polk's City Directory

1956 Laguna

Year	Uses	Source
1993	Not Verified	Polk's City Directory
1988	Residential	Polk's City Directory
1983	Residential	Polk's City Directory
1978	Residential	Polk's City Directory
1973	Residential	Polk's City Directory

Rio Vista St

Rio Vista St

Year	Uses	Source
1968	Address numbers on street shift -- no longer correspond	Polk's City Directory

1869 Rio Vista St

Year	Uses	Source
1993	Not Verified	Polk's City Directory
1988	No Return	Polk's City Directory
1983	Residential	Polk's City Directory
1978	Residential	Polk's City Directory
1973	Residential	Polk's City Directory

1898 Rio Vista St

Year	Uses	Source
1973	Seeley County Water Dist	Polk's City Directory

Unnumbered Rio Vista St

Year	Uses	Source
1968	Seeley County Water Dist	Polk's City Directory

FINDINGS

West Main Street

West Main Street

Year	Uses	Source
1993	No addresses listed past 1898	Polk's City Directory
1988	No addresses listed past 1898	Polk's City Directory
1983	No addresses listed past 1898	Polk's City Directory
1978	No addresses listed past 1898	Polk's City Directory
1973	No addresses listed past 1872	Polk's City Directory
1968	Address numbers on street shift -- no longer correspond	Polk's City Directory

1890 West Main Street

Year	Uses	Source
1993	Residential	Polk's City Directory
1988	Residential	Polk's City Directory

1892 West Main Street

Year	Uses	Source
1993	Not Verified	Polk's City Directory
1988	Residential	Polk's City Directory
1983	Residential	Polk's City Directory

1896 West Main Street

Year	Uses	Source
1993	Not Verified	Polk's City Directory
1988	Residential	Polk's City Directory

FINDINGS

TARGET PROPERTY: ADDRESS NOT LISTED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not listed in the research source.

Address Researched	Address Not Listed in Research Source
1898 West Main Street	1973, 1968

ADJOINING PROPERTY: ADDRESSES NOT LISTED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not listed in research source.

Address Researched	Address Not Listed in Research Source
1869 Rio Vista St	1968
1890 West Main Street	1983, 1978, 1973, 1968
1892 West Main Street	1978, 1973, 1968
1896 West Main Street	1983, 1978, 1973, 1968
1898 Rio Vista St	1968
1956 Laguna	1968

Seeley Water Reclamation Facility
1898 West Main Street
Seeley, CA 92243

Inquiry Number: 2719957.2s
March 15, 2010

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

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FORM-STD-KEN

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with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

1898 WEST MAIN STREET
SEELEY, CA 92243

COORDINATES

Latitude (North):	32.794300 - 32' 47' 39.5"
Longitude (West):	115.700000 - 115' 42' 0.0"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	621728.6
UTM Y (Meters):	3629041.0
Elevation:	39 ft. below sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	32115-G6 SEELEY, CA
Most Recent Revision:	1979

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 7 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
SEELEY CWD WWTP 1898 WEST MAIN STREET SEELEY, CA 92273	NPDES	N/A
SEELEY CWD WWTP 02-126 1898 WEST MAIN ST SEELEY, CA 92273	CA WDS	N/A
SEELEY CWD WWTP 1898 WEST MAIN STREET SEELEY, CA 92273	FINDS	N/A

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE..... State Response Sites

EXECUTIVE SUMMARY

State- and tribal - equivalent CERCLIS

ENVIROSTOR..... EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Solid Waste Information System

State and tribal leaking storage tank lists

LUST..... Geotracker's Leaking Underground Fuel Tank Report
SLIC..... Statewide SLIC Cases
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST..... Active UST Facilities
AST..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL..... Clandestine Drug Labs
HIST Cal-Sites..... Historical Calsites Database
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST..... Facility Inventory Database

EXECUTIVE SUMMARY

HIST UST..... Hazardous Substance Storage Container Database
SWEEPS UST..... SWEEPS UST Listing

Local Land Records

LIENS 2..... CERCLA Lien Information
LUCIS..... Land Use Control Information System
LIENS..... Environmental Liens Listing
DEED..... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
CHMIRS..... California Hazardous Material Incident Report System
LDS..... Land Disposal Sites Listing
MCS..... Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen..... RCRA - Non Generators
DOT OPS..... Incident and Accident Data
DOD..... Department of Defense Sites
FUDS..... Formerly Used Defense Sites
CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
UMTRA..... Uranium Mill Tailings Sites
MINES..... Mines Master Index File
TRIS..... Toxic Chemical Release Inventory System
TSCA..... Toxic Substances Control Act
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
SSTS..... Section 7 Tracking Systems
ICIS..... Integrated Compliance Information System
PADS..... PCB Activity Database System
MLTS..... Material Licensing Tracking System
RADINFO..... Radiation Information Database
RAATS..... RCRA Administrative Action Tracking System
CA BOND EXP. PLAN..... Bond Expenditure Plan
Cortese..... "Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE..... Hazardous Waste & Substance Site List
Notify 65..... Proposition 65 Records
DRYCLEANERS..... Cleaner Facilities
WIP..... Well Investigation Program Case List
HAZNET..... Facility and Manifest Data
EMI..... Emissions Inventory Data
INDIAN RESERV..... Indian Reservations
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
FINANCIAL ASSURANCE..... Financial Assurance Information Listing
HWP..... EnviroStor Permitted Facilities Listing
HWT..... Registered Hazardous Waste Transporter Database
COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER..... PCB Transformer Registration Database
COAL ASH DOE..... Sleam-Electric Plan Operation Data
MWMP..... Medical Waste Management Program Listing

EXECUTIVE SUMMARY

PROC..... Certified Processors Database

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants..... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

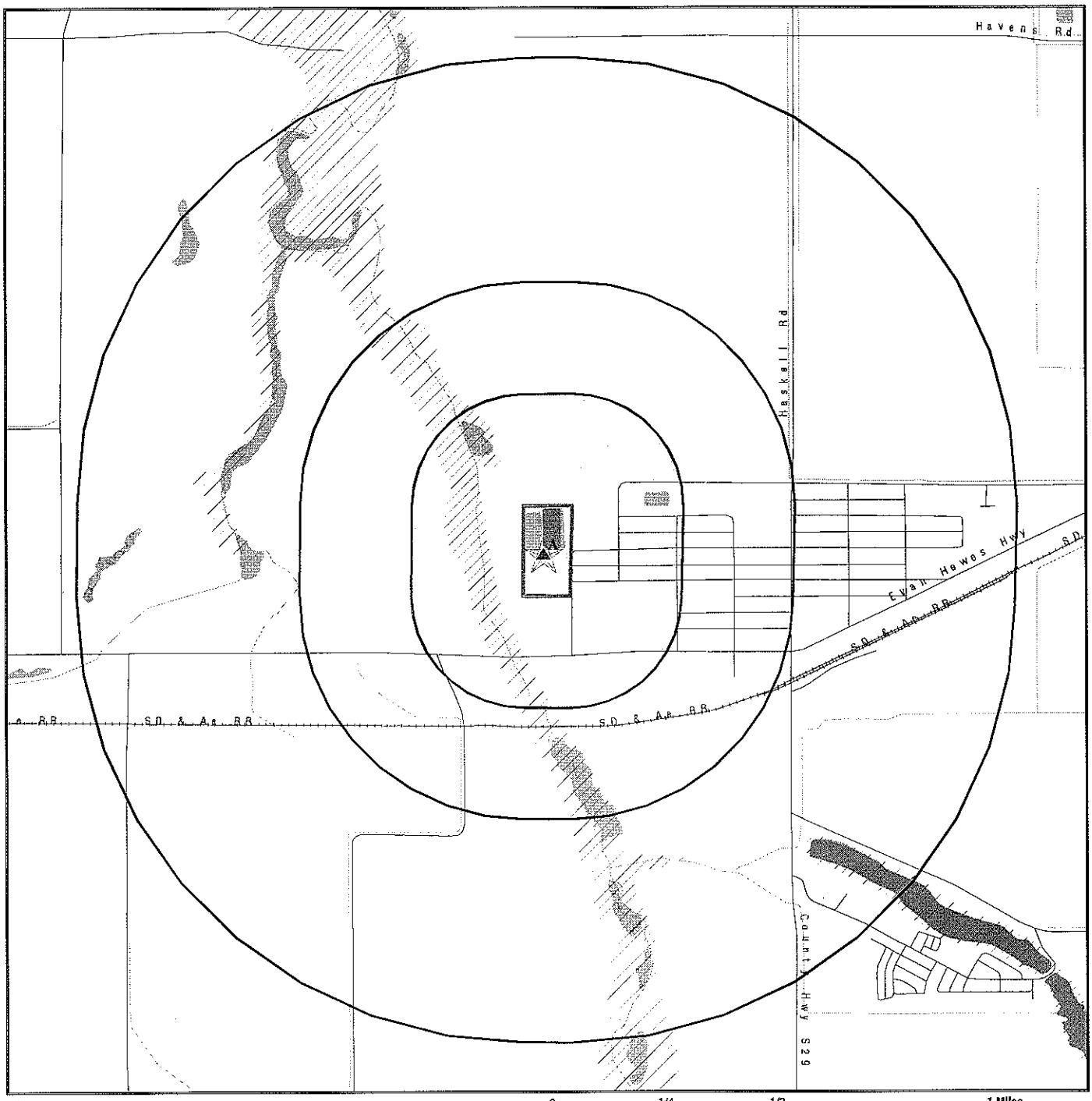
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
BENNEY'S RENTALS	PROP65,LUST SAN MATEO,HIST CORTESE
EL CENTRO NAVAL AIR STATI	HIST CORTESE
IMPERIAL MACHINERY	LUST SAN MATEO,HIST CORTESE
THOMAS MOTORS	LUST SAN MATEO,HIST CORTESE
NAVAL AIR FACILITY	FID,SWEEPS UST
USG PLASTER CITY	RCRA-SQG,FINDS,FID,HIST UST,WDS,SWEEPS UST,HAZNET
ELMS EQUIPMENT RENTAL/GLEN HUBER	FID,SWEEPS UST
KANE SPRINGS SBT (#62)	AWP,ENVIROSTOR
NAVAL AIR FACILITY EL CENTRO	AWP,ENVIROSTOR,CORTESE,HIST CALSITES
NAVAL AIR FACILITY	PROP65
JR SIMPLOT, EL CENTRO	TOXIC
IMPERIAL IRR DIST, EL CENTRO	TOXIC
SW MRKT'G,COTTON SEED DELINT'G	TOXIC
VALLEY IRON AND METAL (EDMAN CORP.	CERCLIS-NFRAP
QUECHAN LANDFILL	CERCLIS-NFRAP
CRUICKSHANK ROAD - IMPERIAL COUNTY	LF
OREPEZA SANITATION COMPANY	LUST SAN MATEO
CALIFORNIA HIGHWAY PATROL	UST ALAMEDA
EL CENTRO HOT PLANT	HIST UST
IMPERIAL MACHINERY	RCRA-SQG,HIST UST,FINDS
CIRCLE K #1443	RCRA-SQG,FINDS,HIST UST
US GYPSUM CO.	AST
IMPERIAL VALLEY RESOURCE & RECOVER	AST
WESTERN SUN PRODUCTS	AST
NATIONS RENT	AST
EMPIRE SOUTHWEST, LLC	AST
PRESSLEY PETERBILT	RCRA-SQG,FINDS,HAZNET
NAVAL AIR FACILITY/EL CENTRO	FINDS,HAZNET
USA GASOLINE CORPORATION FACILITY	FINDS,HAZNET
EL CENTRO MOTORS	RCRA-SQG,HAZNET,FINDS
EL CENTRO MOTORS	RCRA-SQG,FINDS,HAZNET
UNOCAL SVC STA #6228	FINDS,RCRA-NLR
9 MILES WEST OF NAVAL AIR FACILITY	ERNS
CITY OF EL CENTRO WATER TREATMENT	FINDS
NAVAL AIR FACILITY EL CENTRO	FINDS
USA GASOLINE CORPORATION FACILITY	FINDS
NAVAL AIR FACILITY EL CENTRO	FINDS
ONE ELEVEN TRUCK STOP	SLIC REGION 2
U.S. GYPSUM CO.	SLIC REGION 2
15TH STREET MIDDLE SCHOOL	SCH,ENVIROSTOR
GRANITE CONSTRUCTION CO.	MINES
IMPERIAL CUT AND FILL	ENVIROSTOR

OVERVIEW MAP - 2719957.2s



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley CA 92243 LAT/LONG: 32.7943 / 115.7000	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY #: 2719957.2s DATE: March 15, 2010 1:36 pm

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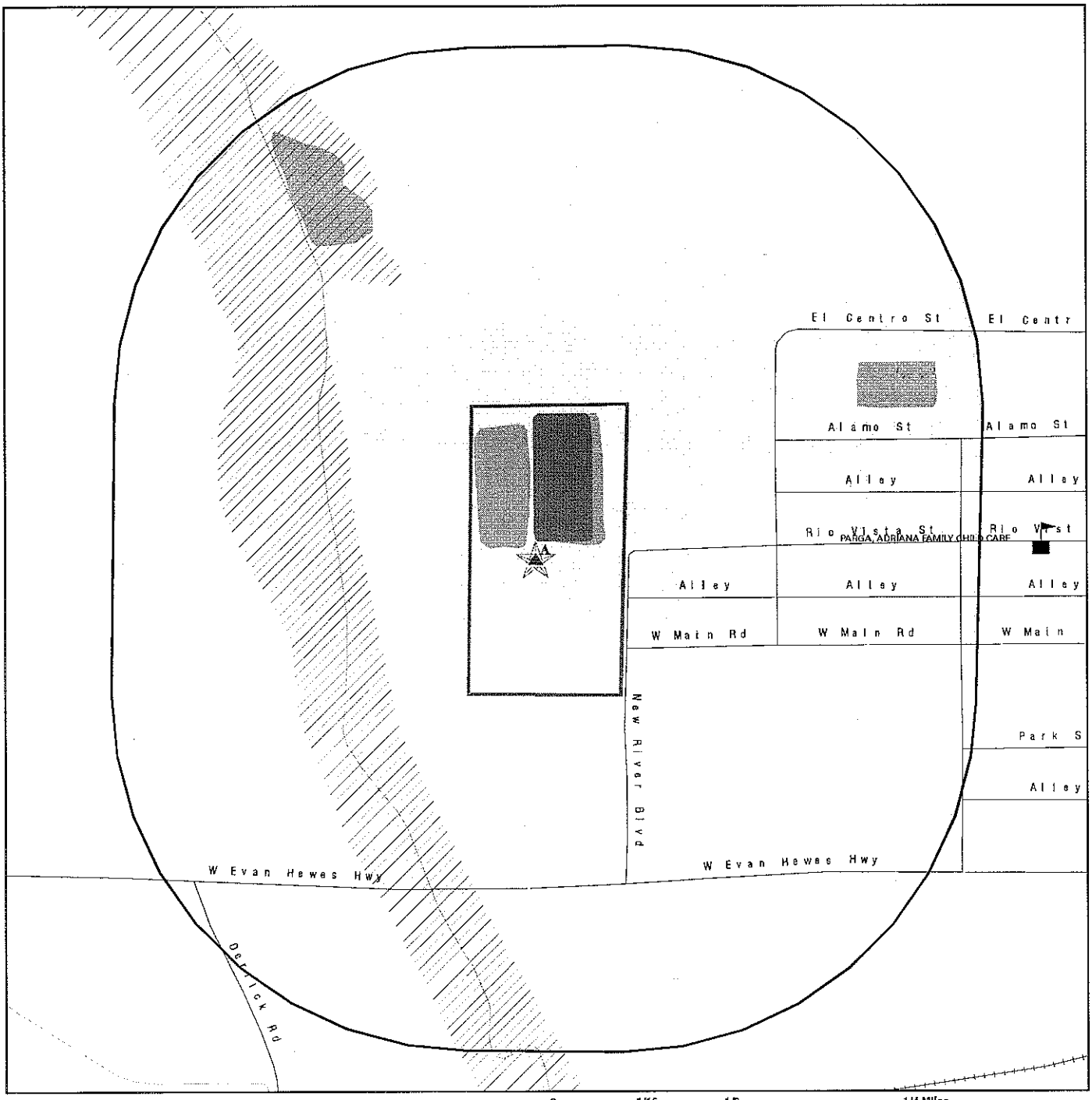
DETAIL MAP - 2719957.2s



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

0 1/16 1/8 1/4 Miles

Indian Reservations BIA

Oil & Gas pipelines

100-year flood zone

500-year flood zone

National Wetland Inventory

Areas of Concern

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	0	0	0	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		0.500	0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	0	NR	NR	NR	0
HIST UST		0.250	0	0	NR	NR	NR	0
SWEEPS UST		0.250	0	0	NR	NR	NR	0
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS	X	TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS	X	TP	NR	NR	NR	NR	NR	0
NPDES	X	TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
HIST CORTESE		0.500	0	0	0	NR	NR	0
Notify 65		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
HWP		1.000	0	0	0	0	NR	0
HWT		0.250	0	0	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
MWMP		0.250	0	0	NR	NR	NR	0
PROC		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
EDR Proprietary Records								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 Target Property | **SEELEY CWD WWTP**
1898 WEST MAIN STREET
SEELEY, CA 92273 | **NPDES** | **S109693739**
N/A

Site 1 of 3 in cluster A

Actual: -39 ft.

NPDES:

Npdes Number:	CA0105023
Facility Status:	Historical
Agency Id:	40389
Region:	7
Regulatory Measure Id:	131510
Order No:	R7-2002-0126
Regulatory Measure Type:	NPDES Permits
Place Id:	256217
WDID:	7A130111013
Program Type:	NPDES
Adoption Date Of Regulatory Measure:	6/26/2002
Effective Date Of Regulatory Measure:	6/26/2002
Expiration Date Of Regulatory Measure:	6/26/2007
Termination Date Of Regulatory Measure:	9/18/2007
Discharge Name:	Seeley Cnty WD
Discharge Address:	Po Box 161
Discharge City:	Seeley
Discharge State:	CA
Discharge Zip:	92273

Npdes Number:	CA0105023
Facility Status:	Active
Agency Id:	40389
Region:	7
Regulatory Measure Id:	333812
Order No:	R7-2007-0036
Regulatory Measure Type:	NPDES Permits
Place Id:	256217
WDID:	7A130111013
Program Type:	NPDES
Adoption Date Of Regulatory Measure:	9/19/2007
Effective Date Of Regulatory Measure:	9/19/2007
Expiration Date Of Regulatory Measure:	9/19/2012
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Seeley Cnty WD
Discharge Address:	Po Box 161
Discharge City:	Seeley
Discharge State:	CA
Discharge Zip:	92273

A2 Target Property | **SEELEY CWD WWTP** **02-126**
1898 WEST MAIN ST
SEELEY, CA 92273 | **CA WDS** | **S102003415**
N/A

Site 2 of 3 in cluster A

Actual: -39 ft.

CA WDS:

Facility ID:	West Colorado River 130111013
Facility Type:	Municipal/Domestic - Facility that treats sewage or a mixture of predominantly sewage and other waste from districts, municipalities, communities, hospitals, schools, and publicly or privately owned systems (excluding individual subsurface leaching systems disposing of less than 1,000 gallons per day).

SEELEY CWD WWTP 02-126 (Continued) **S102003415**

Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CA0105023 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	7
Facility Telephone:	7603324107
Facility Contact:	FRANK CORNEJO
Agency Name:	SEELEY COUNTY WATER DISTRICT
Agency Address:	PO BOX 161
Agency City,St,Zip:	SEELEY 92273
Agency Contact:	ROCKY VANDERGRIFF
Agency Telephone:	7603526612
Agency Type:	Special District (Includes districts established under general acts, sanitary districts, water districts irrigation districts, etc.)
SIC Code:	4952
SIC Code 2:	Not reported
Primary Waste:	Domestic Sewage
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	No reclamation requirements associated with this facility.
POTW:	The POTW Does not have an approved pretreatment program. Some POTWs may have local pretreatment programs that have not been approved by the regional board and/or EPA.
Treat To Water:	Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.
Complexity:	Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities.

A3 Target Property **SEELEY CWD WWTP**
1898 WEST MAIN STREET
SEELEY, CA 92273

FINDS **1005489013**
N/A

Site 3 of 3 in cluster A

Actual: -39 ft.

FINDS:

Registry ID: 110006657554

Environmental Interest/Information System
US National Pollutant Discharge Elimination System (NPDES) module of the Compliance Information System (ICIS) tracks surface water permits issued under the Clean Water Act. Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. The permit will likely contain limits on what can be discharged, impose monitoring and reporting requirements, and include other provisions to ensure that the

SEELEY CWD WWTP (Continued) **1005489013**

discharge does not adversely affect water quality.

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
IMPERIAL	1000166695	UNOCAL SVC STA #6228	9093 IMPERIAL HWY	92251	FINDS,RCRA-NLR
IMPERIAL	1000174110	CIRCLE K #1443	115 EAST MAIN	92251	RCRA-SQG,FINDS,HIST UST
IMPERIAL	1000215271	IMPERIAL MACHINERY	3275 HIGHWAY 86	92251	RCRA-SQG,HIST UST,FINDS
EL CENTRO	1000386792	PRESSLEY PETERBILT	HWY 8 / DOGWOOD	92243	RCRA-SQG,FINDS,HAZNET
PLASTER CITY	1000399364	USG PLASTER CITY	3810 W EVAN HEWES HWY	92269	RCRA-SQG,FINDS,FID,HIST UST,WDS,SWEEPS UST,HAZNET
EL CENTRO	1000685777	EL CENTRO MOTORS	385 MAIN ST	92244	RCRA-SQG,HAZNET,FINDS
EL CENTRO	1000857413	EL CENTRO MOTORS	422 STATE ST	92243	RCRA-SQG,FINDS,HAZNET
IMPERIAL	1003879889	QUECHAN LANDFILL	FORT YUMA INDIAN RESERVATION	92251	CERCLIS-NFRAP
EL CENTRO	1003879891	VALLEY IRON AND METAL (EDMAN CORP.	2004 HIGHWAY 111	92243	CERCLIS-NFRAP
EL CENTRO	1007737814	USA GASOLINE CORPORATION FACILITY	1497 WEST ADAMS	92243	FINDS,HAZNET
EL CENTRO	1008039401	NAVAL AIR FACILITY EL CENTRO	BUILDING 214	92243	FINDS
EL CENTRO	1008152415	NAVAL AIR FACILITY/EL CENTRO	ROUTE 80	92234	FINDS,HAZNET
EL CENTRO	1008152673	USA GASOLINE CORPORATION FACILITY	960 IMPERIAL HWY	92243	FINDS
EL CENTRO	1010726437	NAVAL AIR FACILITY EL CENTRO	OFF OLD HWY 80	92243	FINDS
EL CENTRO	1012067534	CITY OF EL CENTRO WATER TREATMENT	3010 SOUTH 8TH STREET	92243	FINDS
EL CENTRO	96493039	9 MILES WEST OF NAVAL AIR FACILITY	9 MILES WEST OF NAVAL AIR FACI		ERNS
IMPERIAL	A100323692	EMPIRE SOUTHWEST, LLC	3393 HIGHWAY 86	92251	AST
IMPERIAL	A100324045	IMPERIAL VALLEY RESOURCE & RECOVER	3505 HIGHWAY 111	92251	AST
IMPERIAL	A100324482	NATIONS RENT	2396 HIGHWAY 86	92251	AST
EL CENTRO	A100325336	US GYPSUM CO.	3810 W EVAN HEWES HWY.	92243	AST
IMPERIAL	A100325482	WESTERN SUN PRODUCTS	3502 HIGHWAY 86	92251	AST
	M300003075	GRANITE CONSTRUCTION CO.	EL CENTRO AGGREGATE		MINES
EL CENTRO	S100179081	BENNEY'S RENTALS	196 MAIN STREET		PROP65,LUST SAN MATEO,HIST CORTESE
IMPERIAL	S100180364	IMPERIAL CUT AND FILL	WORTHINGTON RD. / NEW RIVER	92251	ENVIROSTOR
EL CENTRO	S100207791	NAVAL AIR FACILITY	EIGHTH STREET (FUEL FARM)		PROP65
IMPERIAL	S100676251	SW MRKT'G,COTTON SEED DELINT'G	IMPERIAL COUNTY FAIRGROUNDS	92251	TOXIC
EL CENTRO	S100676262	JR SIMPLOT, EL CENTRO	50 W. DANENBERG RD.	92244	TOXIC
EL CENTRO	S100676358	IMPERIAL IRR DIST, EL CENTRO	STEAM PLANT/ DOGWOOD ROAD		TOXIC
EL CENTRO	S101619134	NAVAL AIR FACILITY	BENNETT RD	92243	FID,SWEEPS UST
EL CENTRO	S101619138	ELMS EQUIPMENT RENTAL/GLEN HUBER	239 E MAIN EL CENTRO	92244	FID,SWEEPS UST
EL CENTRO	S102434724	OREPEZA SANITATION COMPANY	207 EAST HIGHWAY 80		LUST SAN MATEO
EL CENTRO	S105023598	EL CENTRO NAVAL AIR STATI	OFF OLD HWY 80 7 MI W. OF	92243	HIST CORTESE
IMPERIAL	S105024173	THOMAS MOTORS	2329 HIGHWAY 86		LUST SAN MATEO,HIST CORTESE
IMPERIAL	S105024175	IMPERIAL MACHINERY	3175 HIGHWAY 86		LUST SAN MATEO,HIST CORTESE
PLASTER	S105756785	U.S. GYPSUM CO.	SOUTH SIDE OF EVAN HEWES HIGHW	92243	SLIC REGION 2
EL CENTRO	S106800170	NAVAL AIR FACILITY EL CENTRO	OFF OLD HWY 80, 7 MILES W OF E	92243	AWP,ENVIROSTOR,CORTESE,HIST CALSITES
IMPERIAL	S107735766	15TH STREET MIDDLE SCHOOL	15TH STREET/HIGHWAY 86	92251	SCH,ENVIROSTOR
EL CENTRO	S108935394	CRUICKSHANK ROAD - IMPERIAL COUNTY	CRUICKSHANK RD / HWY 111 NW		LF
EL CENTRO	S108937549	ONE ELEVEN TRUCK STOP	1963 SOUTH HIGHWAY 111	92243	SLIC REGION 2
EL CENTRO	S109348568	KANE SPRINGS SBT (#62)	3.42 MILES SOUTH OF KANE SPRIN	92244	AWP,ENVIROSTOR

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
EL CENTRO	U001573888	EL CENTRO HOT PLANT	51 EAST HIGHWAY 80	92243	HIST UST
IMPERIAL	U004050514	CALIFORNIA HIGHWAY PATROL	2331 HIGHWAY 86	92251	UST ALAMEDA

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 01/14/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 35

Source: EPA
Telephone: N/A
Last EDR Contact: 03/03/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites
A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 01/14/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 35

Source: EPA
Telephone: N/A
Last EDR Contact: 03/03/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 01/14/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 35

Source: EPA
Telephone: N/A
Last EDR Contact: 03/03/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/30/2009
Date Data Arrived at EDR: 08/11/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 41

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of NPL and Base Realighnment & Closure sites found in the CERCLIS database where FERRO is involved in cleanup projects.

Date of Government Version: 06/23/2009
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/15/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 06/23/2009
Date Data Arrived at EDR: 09/02/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 19

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 03/11/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2009
Date Data Arrived at EDR: 12/29/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 43

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 01/13/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/19/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 01/13/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/19/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 01/13/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/19/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 01/13/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/19/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 10/09/2009
Date Made Active in Reports: 11/09/2009
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 10/09/2009
Date Made Active in Reports: 11/09/2009
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/22/2010
Date Made Active in Reports: 02/11/2010
Number of Days to Update: 20

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/15/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/22/2010
Date Data Arrived at EDR: 02/24/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 8

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 02/24/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 12/23/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 01/05/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 12/18/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 02/05/2010
Date Data Arrived at EDR: 02/05/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 13

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 02/05/2010
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 02/05/2010
Date Data Arrived at EDR: 02/05/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 13

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 02/05/2010
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 12/18/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 01/05/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 12/10/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 02/08/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/02/2010
Date Data Arrived at EDR: 02/03/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 15

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 15

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 11/12/2009
Date Data Arrived at EDR: 11/12/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 12/07/2009
Date Data Arrived at EDR: 12/09/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 7

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 11/24/2009
Date Data Arrived at EDR: 11/25/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/24/2009
Date Data Arrived at EDR: 05/20/2009
Date Made Active in Reports: 06/17/2009
Number of Days to Update: 28

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

State and tribal registered storage tank lists

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 02/05/2010
Date Data Arrived at EDR: 02/05/2010
Date Made Active in Reports: 02/23/2010
Number of Days to Update: 18

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 02/05/2010
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 01/11/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/02/2010
Date Data Arrived at EDR: 02/03/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 15

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/17/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 11/12/2009
Date Data Arrived at EDR: 11/20/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 26

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 15

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 12/30/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 76

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2009
Date Data Arrived at EDR: 11/05/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 41

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 12/07/2009
Date Data Arrived at EDR: 12/09/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 7

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 10/29/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 48

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 02/22/2010
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 01/05/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 11/04/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 01/07/2010
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 12/18/2009
Date Data Arrived at EDR: 12/21/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 28

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/21/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 01/11/2010
Date Data Arrived at EDR: 01/12/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 6

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 02/08/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/19/2009
Date Data Arrived at EDR: 12/29/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 43

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 12/14/2009
Next Scheduled EDR Contact: 03/22/2010
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs
A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Varies

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 11/03/2009
Date Data Arrived at EDR: 11/05/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 41

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/23/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 01/28/2010
Date Data Arrived at EDR: 01/29/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 20

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Varies

DEED: Deed Restriction Listing
Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 12/15/2009
Date Data Arrived at EDR: 12/15/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/30/2009
Next Scheduled EDR Contact: 12/28/2009
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 35

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/06/2010
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 05/09/2008
Date Made Active in Reports: 06/20/2008
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing
The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 02/05/2010
Date Data Arrived at EDR: 02/05/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 13

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 02/05/2010
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing
The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 02/05/2010
Date Data Arrived at EDR: 02/05/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 13

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 02/05/2010
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 01/13/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/19/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 10/13/2009
Date Data Arrived at EDR: 11/10/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 36

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 01/19/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/30/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 62

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/18/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 08/03/2009
Date Data Arrived at EDR: 10/27/2009
Date Made Active in Reports: 11/09/2009
Number of Days to Update: 13

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/05/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/01/2009
Date Data Arrived at EDR: 12/15/2009
Date Made Active in Reports: 01/19/2010
Number of Days to Update: 35

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/15/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 01/05/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 05/08/2009
Number of Days to Update: 1

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 01/21/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 11/17/2009
Date Data Arrived at EDR: 12/08/2009
Date Made Active in Reports: 01/19/2010
Number of Days to Update: 42

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/10/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/13/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 36

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 03/02/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 01/20/2010
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/10/2009
Date Data Arrived at EDR: 11/18/2009
Date Made Active in Reports: 01/19/2010
Number of Days to Update: 62

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 12/23/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/01/2009
Date Data Arrived at EDR: 10/21/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 41

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 02/16/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 12/24/2009
Date Data Arrived at EDR: 12/31/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 41

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 12/14/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/12/2010
Date Data Arrived at EDR: 01/13/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/13/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/19/2009
Date Data Arrived at EDR: 10/22/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 40

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 05/22/2009
Number of Days to Update: 92

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/25/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Quarterly

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 02/22/2010
Date Data Arrived at EDR: 02/24/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/24/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 01/06/2010
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 12

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/06/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 12/23/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/22/2009
Date Data Arrived at EDR: 01/25/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 4

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 01/07/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 10/21/2009
Date Made Active in Reports: 10/28/2009
Number of Days to Update: 7

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/21/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/23/2009
Number of Days to Update: 9

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 01/06/2010
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/19/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 11/16/2009
Date Data Arrived at EDR: 11/16/2009
Date Made Active in Reports: 01/19/2010
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/08/2010
Next Scheduled EDR Contact: 05/10/2010
Data Release Frequency: Varies

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 12/18/2009
Date Data Arrived at EDR: 12/21/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 28

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/21/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 11/24/2009
Date Data Arrived at EDR: 12/17/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 32

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 12/15/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/27/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 11/09/2009
Date Data Arrived at EDR: 12/18/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/15/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/18/2010
Date Data Arrived at EDR: 01/19/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 10

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/19/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action (a??cleanupsa??) tracked in EnviroStor.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 01/11/2010
Date Data Arrived at EDR: 01/12/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 6

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Varies

FINANCIAL ASSURANCE: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 03/12/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/19/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: N/A

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 02/24/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites
A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/19/2010
Date Data Arrived at EDR: 01/21/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 8

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Semi-Annually

Underground Tanks
Underground storage tank sites located in Alameda county.

Date of Government Version: 01/19/2010
Date Data Arrived at EDR: 01/21/2010
Date Made Active in Reports: 02/02/2010
Number of Days to Update: 12

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/10/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 7

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 02/08/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/20/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 9

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 11/18/2009
Date Data Arrived at EDR: 11/20/2009
Date Made Active in Reports: 12/08/2009
Number of Days to Update: 18

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 12/28/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 09/30/2009
Date Data Arrived at EDR: 12/28/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 21

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/25/2010
Date Data Arrived at EDR: 01/27/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 22

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/25/2010
Next Scheduled EDR Contact: 05/10/2010
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 03/02/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 20

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/25/2010
Next Scheduled EDR Contact: 05/10/2010
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/25/2010
Date Data Arrived at EDR: 01/25/2010
Date Made Active in Reports: 02/02/2010
Number of Days to Update: 8

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/25/2010
Next Scheduled EDR Contact: 05/10/2010
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/25/2010
Date Made Active in Reports: 02/02/2010
Number of Days to Update: 8

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/18/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 01/20/2010
Date Data Arrived at EDR: 02/03/2010
Date Made Active in Reports: 02/23/2010
Number of Days to Update: 20

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/11/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Semi-Annually

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Annually

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 12/02/2009
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 02/23/2010
Number of Days to Update: 11

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 12/29/2009
Date Data Arrived at EDR: 12/29/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 20

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/27/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 22

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 12/28/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/27/2010
Date Made Active in Reports: 02/02/2010
Number of Days to Update: 6

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 12/28/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 01/05/2010
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 14

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/12/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 02/02/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 16

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/22/2010
Next Scheduled EDR Contact: 04/26/2010
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 12/08/2009
Date Data Arrived at EDR: 12/09/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 40

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 12/22/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 12/04/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 45

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 12/15/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 34

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 12/15/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 12

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 10/14/2009
Date Data Arrived at EDR: 10/15/2009
Date Made Active in Reports: 11/02/2009
Number of Days to Update: 18

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 12/28/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/05/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 13

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/18/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 04/07/2009
Date Data Arrived at EDR: 04/07/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 34

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/18/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 05/29/2009
Date Data Arrived at EDR: 06/01/2009
Date Made Active in Reports: 06/15/2009
Number of Days to Update: 14

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Varies

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/31/2009
Date Data Arrived at EDR: 08/31/2009
Date Made Active in Reports: 09/18/2009
Number of Days to Update: 18

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 12/07/2009
Date Data Arrived at EDR: 12/10/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 39

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 12/07/2009
Date Data Arrived at EDR: 12/10/2009
Date Made Active in Reports: 12/22/2009
Number of Days to Update: 12

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/05/2010
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 12

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 01/05/2010
Next Scheduled EDR Contact: 04/19/2010
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 04/01/2009
Date Data Arrived at EDR: 04/02/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 7

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 01/26/2010
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 7

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/23/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 10/05/2009
Date Made Active in Reports: 10/13/2009
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/23/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 11/27/2009
Date Data Arrived at EDR: 12/21/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 28

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/21/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 12/28/2009
Date Data Arrived at EDR: 12/31/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 18

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 12/28/2009
Next Scheduled EDR Contact: 04/12/2010
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/26/2009
Date Made Active in Reports: 09/11/2009
Number of Days to Update: 16

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 03/02/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/20/2010
Date Made Active in Reports: 02/05/2010
Number of Days to Update: 16

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/20/2010
Next Scheduled EDR Contact: 05/03/2010
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 10/27/2009
Date Data Arrived at EDR: 11/10/2009
Date Made Active in Reports: 12/09/2009
Number of Days to Update: 29

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/11/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/14/2009
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 02/23/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 11/03/2009
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 02/22/2010
Number of Days to Update: 10

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 07/17/2009
Date Made Active in Reports: 08/10/2009
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/21/2009
Next Scheduled EDR Contact: 04/05/2010
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SEELEY WATER RECLAMATION FACILITY
1898 WEST MAIN STREET
SEELEY, CA 92243

TARGET PROPERTY COORDINATES

Latitude (North):	32.79430 - 32° 47' 39.5"
Longitude (West):	115.7 - 115° 41' 60.0"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	621728.6
UTM Y (Meters):	3629041.0
Elevation:	39 ft. below sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	32115-G6 SEELEY, CA
Most Recent Revision:	1979

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

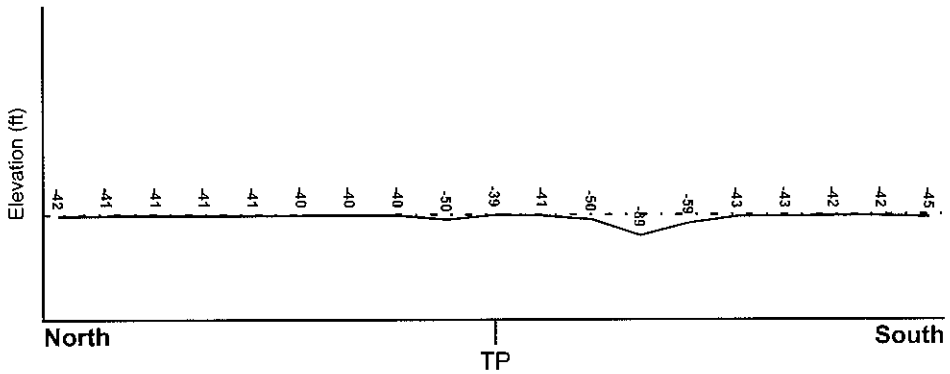
TOPOGRAPHIC INFORMATION

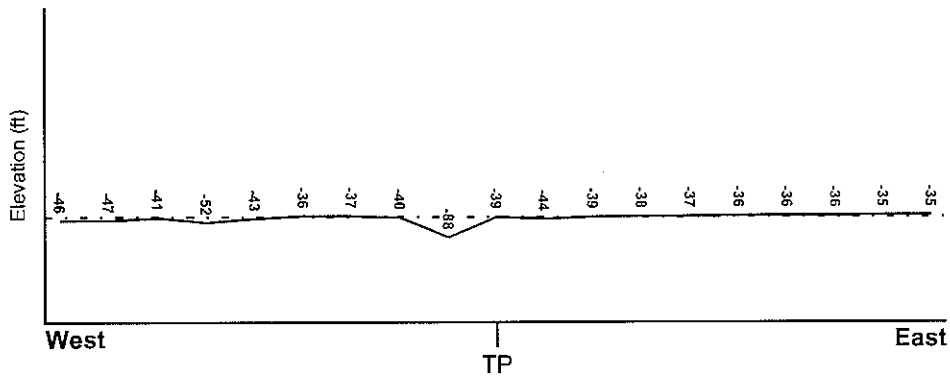
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: -39 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
IMPERIAL, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06025C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
SEELEY	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

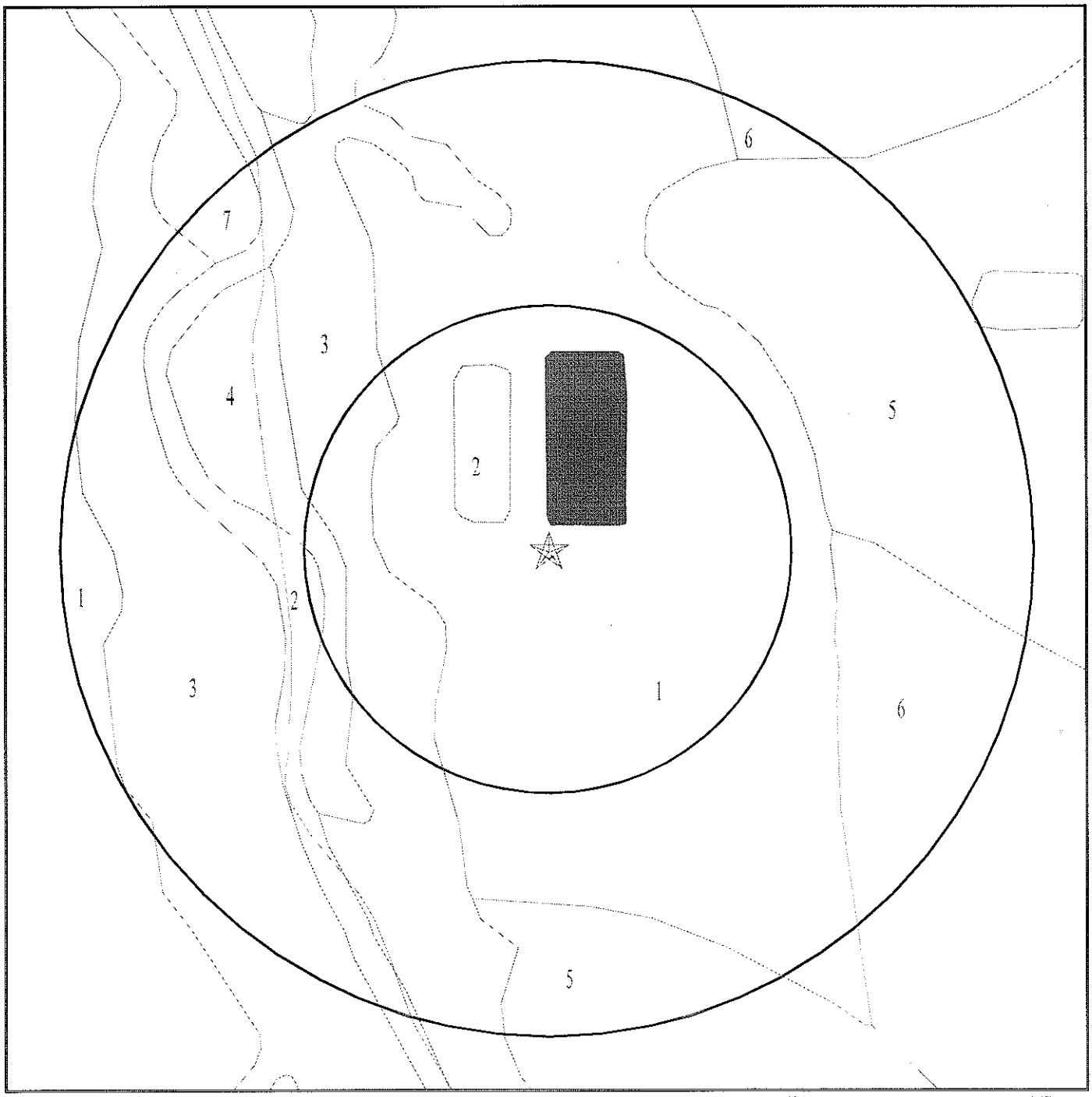
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 2719957.2s



SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley CA 92243 LAT/LONG: 32.7943 / 115.7000	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY #: 2719957.2s DATE: March 15, 2010 1:37 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Holtville

Soil Surface Texture: silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
2	16 inches	24 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
3	24 inches	35 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
4	35 inches	59 inches	loamy very fine sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 2

Soil Component Name: Water

Soil Surface Texture: silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class:
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

Soil Map ID: 3

Soil Component Name: Badland

Soil Surface Texture:
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class:
Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	3 inches		Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 4

Soil Component Name: Fluvaquents

Soil Surface Texture:
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	59 inches		Not reported	Not reported	Max: Min:	Max: 9.6 Min: 8.4

Soil Map ID: 5

Soil Component Name: Imperial

Soil Surface Texture: silty clay loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 122 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9
2	11 inches	59 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.9

Soil Map ID: 6

Soil Component Name: Holtville

Soil Surface Texture: silty clay

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 122 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	16 inches	24 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
3	24 inches	35 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4
4	35 inches	59 inches	loamy very fine sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 7.4

Soil Map ID: 7

Soil Component Name: Indio

Soil Surface Texture: loam

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 4	Max: 8.4 Min: 7.9
2	11 inches	72 inches	stratified loamy very fine sand to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 42 Min: 4	Max: 8.4 Min: 7.9

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CA1300628	1/2 - 1 Mile East

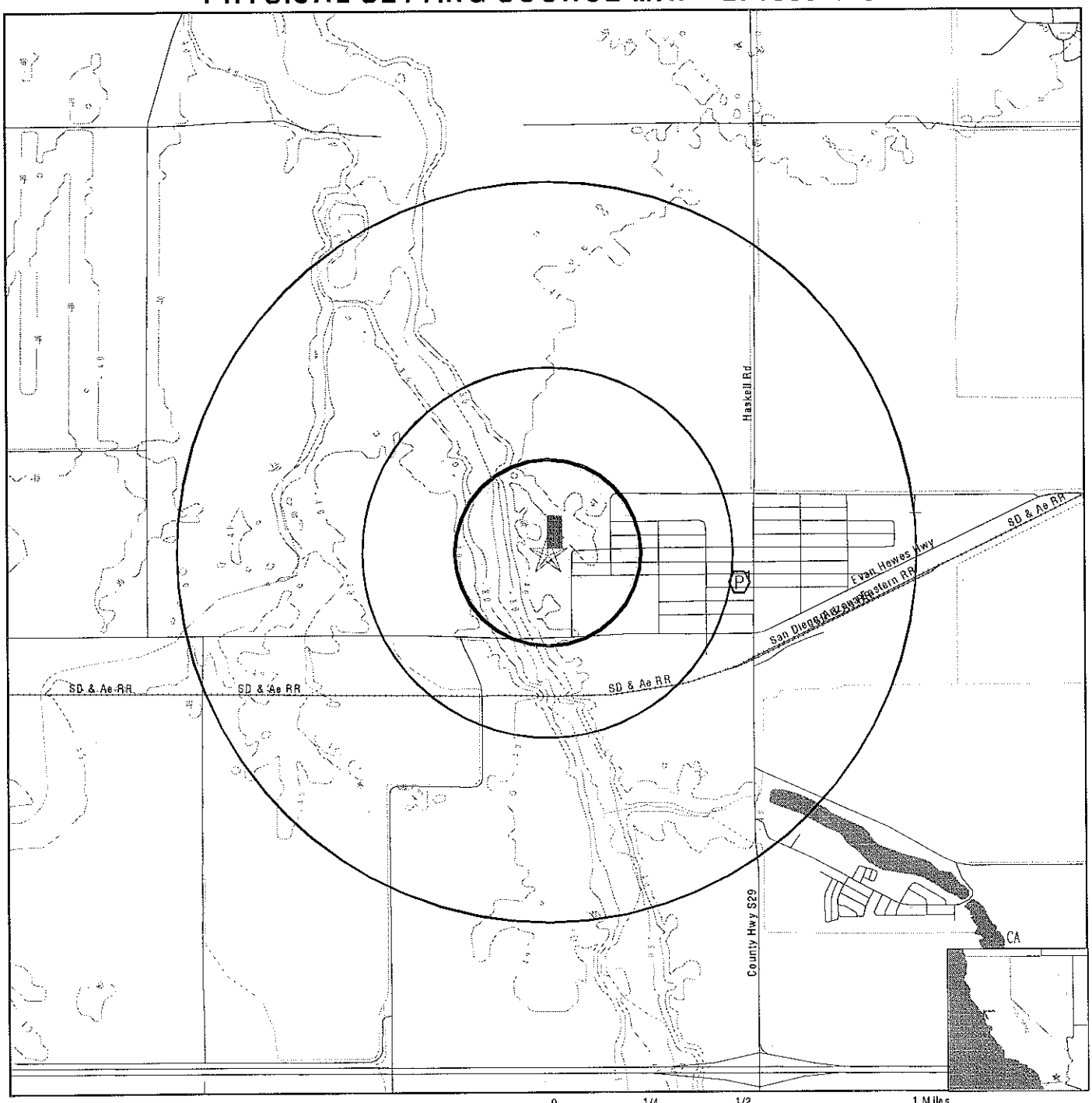
Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 2719957.2s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: Seeley Water Reclamation Facility ADDRESS: 1898 West Main Street Seeley CA 92243 LAT/LONG: 32.7943 / 115.7000	CLIENT: Dudek & Associates CONTACT: Rachel Ganiere INQUIRY #: 2719957.2s DATE: March 15, 2010 1:37 pm

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Map ID Direction Distance Elevation	Database	EDR ID Number
1 **East** **1/2 - 1 Mile** **Higher**	**FRDS PWS**	**CA1300628**

PWS ID:	CA1300628		
Date Initiated:	Not Reported	Date Deactivated:	Not Reported
PWS Name:	IMPERIAL LAKES MIKE HARTMAN 2828 EVAN HEWES SEELY, CA 92273		
Addressee / Facility:	System Owner/Responsible Party MIKE HARTMAN 1762 ELMHURST STREET CHULA VISTA, CA 91913		
Facility Latitude:	32 47 35	Facility Longitude:	115 41 25
City Served:	Not Reported		
Treatment Class:	Treated	Population:	00000070

Violations information not reported.

ENFORCEMENT INFORMATION:

System Name:	IMPERIAL LAKES, INC.		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-02-01 - 1998-02-28		
Violation ID:	98043009		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for IMPERIAL County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for IMPERIAL COUNTY, CA

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.450 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY

CAMP SEELEY
EL CENTRO, CALIFORNIA
SITE NO. J09CA029000

FINDINGS OF FACT

1. The Army acquired 434.42 acres for Camp Seeley from the Imperial Irrigation District by Lease No. W59-QM-715, dated 1 November 1940.

2. The Army used Camp Seeley initially as a campsite for the 11th U.S. Cavalry, and the 75th Field Artillery. It was later occupied by the Desert Test Command which was charged with the testing of transport and combat vehicles, including tires, fuels, lubricants, cooling systems, and other automotive equipment in soft sand terrain and under high temperature conditions. Tests were conducted both at the camp and at sites away from the camp. Testing did not include ordnance or explosive materials. Camp Seeley was a semi-permanent camp which consisted mostly of tents with wood floors, in addition to temporary wooden buildings which numbered 65 at the time of disposal. A water supply system consisted of a concrete settling basin, pumps, and two pressure tanks for distribution. A lake was constructed on the site to swim the Cavalry's horses and may have also been used as a fording basin to test automotive equipment.

3. Camp Seeley was classified as surplus in February 1944, and Lease No. W59-QM-715 (434.42 acres) was terminated on 28 March 1945. Currently, the Imperial Irrigation District owns about 54 acres of the site, and three private entities own the remainder. A home and farm maintenance compound located on the southeast corner of the site are on a 3.0-acre parcel owned by Charles and David Dessert. Except for the farm maintenance compound, the majority of the site is under cultivation. Remaining DOD improvements include the lake, and a concrete foundation reportedly installed by the Army which currently supports a farm maintenance shop. Other improvements of possible DOD origin include an underground water storage tank and two concrete tank cradles. The concrete foundation and water storage tank are both in beneficial use. Other improvements, consisting of 65 buildings, were transferred or donated to other agencies.

DETERMINATION

Based on the foregoing Findings of Fact, this site has been determined to be formerly used by the Department of Defense. It is therefore eligible for the Defense Environmental Restoration Program - Formerly Used Defense Sites, established under 10 USC 2701 et seq.

_____
DATE

_____
J. RICHARD CAPKA
Brigadier General, U.S. Army
Commanding

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. J09CA029000
CAMP SEELEY
18 May 1997

SITE NAME: CAMP SEELEY; also referred to as Ordnance Desert Proving Ground.

LOCATION: The Camp Seeley site is located in Imperial County, California, one mile north of the Town of Seeley and approximately 8 miles northwest of the City of El Centro.

SITE HISTORY: The Army acquired Camp Seeley in November 1940. It was used as a campsite by the 11th U.S. Cavalry from November 1940 to December 1941. A Battalion of the 75th Field Artillery occupied the site from late 1941 or early 1942 until May 1942. In March 1942, the Quartermaster Test Command established the Desert Test Command Headquarters at Camp Seeley. Their mission was to test transport vehicles, ordnance combat tanks, and other combat vehicles and automotive equipment in soft sand terrain and under high temperature conditions. Testing also included tires, fuels, lubricants, cooling systems, and other components. Test activities were conducted both at the camp and at sites away from the camp. Tests did not involve ordnance or explosive materials. In August 1942 responsibilities of the Quartermaster Test Command were transferred to the Ordnance Department, and the Desert Test Command activity became the Ordnance Desert Test Command. In 1943 the Ordnance Desert Test Command activity was renamed the Ordnance Desert Proving Ground.

Camp Seeley was a semi-permanent camp which contained tents with wood floors, temporary wood buildings, pit latrines, a motor pool shed, several sheds for horses and transport equipment, and a headquarters building. Buildings were heated with coal and wood stoves. Water was delivered from the nearby Elder canal by the Imperial Irrigation District. A water supply system constructed by the Army consisted of a concrete settling basin, pumps, and pressure tanks for distribution. Wastewater was disposed of by way of an open drainage ditch to the nearby New River. The 11th Cavalry constructed a lake on the camp to swim their horses. The lake may have also been used as a fording basin for the testing of automotive equipment.

At the time of disposal, 65 temporary buildings on the site were transferred or donated to other agencies. Currently a home and farm compound are located on the property, the majority of which is under cultivation. Remaining improvements include the lake, and a concrete foundation reportedly installed by the Army which currently supports a farm maintenance shop. Other improvements of possible DOD origin include an underground water storage tank and two concrete tank cradles. The concrete foundation and water storage tank are in beneficial use.

Three other sites associated with Camp Seeley include Camp Seeley Combat Firing Range (J09CA029100), Camp Seeley Ordnance Desert Proving Ground (J09CA029200), and Camp Seeley Ordnance Training Center (J09CA029300). Each site was located between four and eight miles from Camp Seeley.

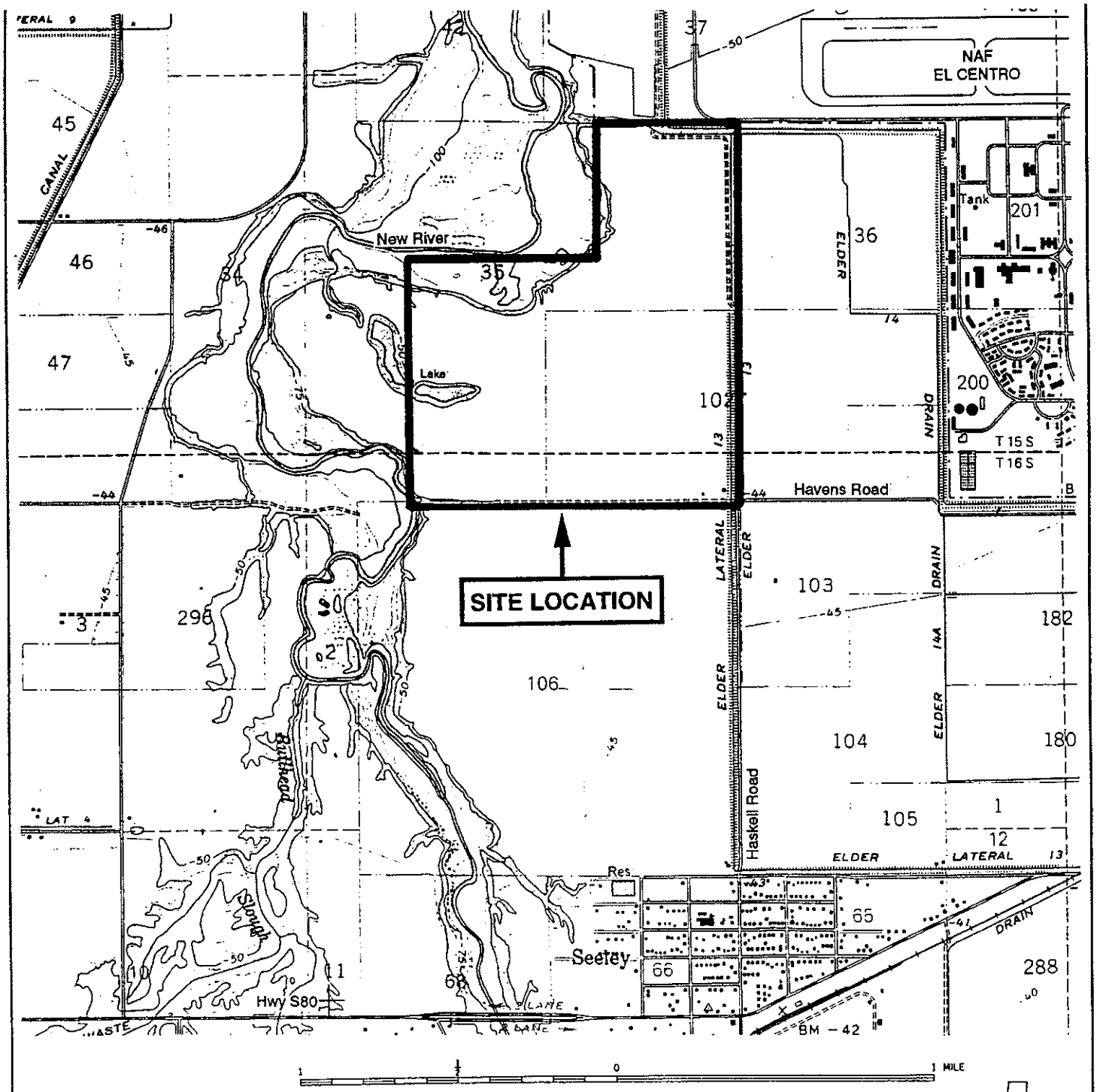
SITE VISIT: The site was visited on 21 and 22 November 1995, and on 11 January 1996 by Steve Cameron of Science Applications International Corporation, San Diego, California. The primary site contact was Mr. Charlie Dessert, Charles C. Dessert Farms, El Centro, California.

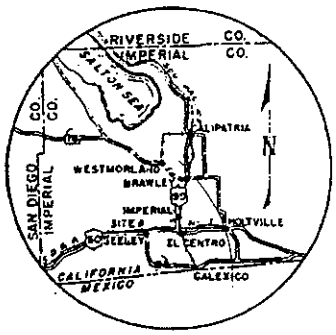
CATEGORY OF HAZARD: None.

PROJECT DESCRIPTION: No potential Projects at this site.

AVAILABLE STUDIES AND REPORTS: The U.S. Army Corps of Engineers, L.A. District Real Estate Division maintains a real estate file for Camp Seeley. Historical information pertaining to the 11th U.S. Cavalry at Camp Seeley is contained in "11th U.S. Cavalry, California-Mexican Border," 1941. An historical account of activities conducted by the Desert Test Command while at Camp Seeley is provided in "The Ordnance Desert Proving Ground, Its History and What It Does," Lt. Col. J.E. Engler, 7 January 1944.

DISTRICT POC: Jeffery B. Armentrout, Los Angeles District, (213) 452-3720.





VICINITY MAP

0 5 10 20 30 40
SCALE IN MILES

N

QUADRANGLE LOCATION

Reference: USGS Quadrangle Seeley, Calif., 1957, Photorevised 1979.

SAIC®
Science Applications International Corporation
An Employee-Owned Company

SITE LOCATION
CAMP SEELEY
J09CA029000
El Centro, CA

PROJECT NO.		
01-0255-04-4875		
DRAWN BY	CHECKED BY	DATE
SC	JS	5-97

18 Apr 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR
ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name Camp Seeley
Site Location 8 miles Northwest of El Centro, CA
DERP Project # J09CA029000
Date Completed 12 January 1996

Rater's Name Steve Cameron, SAIC
Phone No. (619) 458-2631
Organization Los Angeles District
RAC Score 5

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability**. Personnel involved in visits to potential OEW sites should view the CEHND videotape entitled "A Life Threatening Encounter: OEW."

Part I. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPE OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuzes, Boosters, Bursters	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	1
Conventional Ordnance and Ammunition (Select the largest single value)	0

What evidence do you have regarding conventional OEW? _____

B. Pyrotechnics (For munitions not described above.)

	VALUE
Munition (Container) Containing White Phosphorus (WP) or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing A Flame or Incendiary Material (i.e., Napalm, Triethylaluminum Metal Incendiaries)	6
Flares, Signals, Simulators, Screening Smokes (other than WP)	4

Pyrotechnics (Select the largest single value) 0

What evidence do you have regarding pyrotechnics? _____

C. Bulk High Explosives (Not an integral part of conventional ordnance; uncontainerized.)

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3

High Explosives (Select the largest single value) 0

What evidence do you have regarding bulk explosives? _____

D. Bulk Propellants (Not an integral part of rockets, guided missiles, or other conventional ordnance; uncontainerized)

	VALUE
Solid or Liquid Propellants	6

Propellants 0

What evidence do you have regarding bulk propellants? _____

E. Chemical Warfare Materiel and Radiological Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control Agents (Vomiting, Tear)	5

Chemical and Radiological (Select the largest single value) 0

What evidence do you have of chemical/radiological OEW? _____

_____

==========

TOTAL HAZARD SEVERITY VALUE ___
(Sum of Largest Values for A through E--Maximum of 61)
Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY*

Description	Category	Hazard Severity Value
CATASTROPHIC	I	21 and greater
CRITICAL	II	10 to 20
MARGINAL	III	5 to 9
NEGLIGIBLE	IV	1 to 4
**NONE		0

*** Apply Hazard Severity Category to Table 3.**

**If Hazard Severity Value is 0, you do not need to complete Part II. Proceed to Part III and use a RAC Score of 5 to determine your appropriate action.

Part II. Hazard Probability. The probability that a hazard has been or will be created due to the presence and other rated factors of unexploded ordnance or explosive materials on a formerly used DOD site.

AREA, EXTENT, ACCESSIBILITY OF OEW HAZARD
(Circle all values that apply)

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations.	4
Inside walls, ceilings, or other parts of Buildings or Structures.	3
Subsurface	2

Location (Select the single largest value) ____

What evidence do you have regarding location of OEW? _____

_____

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

	VALUE
Less than 1250 feet	5
1250 feet to 0.5 miles	4
0.5 miles to 1.0 mile	3
1.0 mile to 2.0 miles	2
Over 2 miles	1

Distance (Select the single largest value) ____

What are the nearest inhabited structures? _____

_____

C. Numbers of buildings within a 2 mile radius measured from the OEW hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0

Number of Buildings (Select the single largest value) ___

Narrative _____

_____

D. Types of Buildings (within a 2 mile radius)

	VALUE
Educational, Child Care, Residential, Hospitals, Hotels, Commercial, Shopping Centers	5
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
No Buildings	0

Types of Buildings (Select the largest single value) ___

Describe types of buildings in the area. _____

_____

E. Accessibility to site refers to access by humans to ordnance and explosive wastes. Use the following guidance:

BARRIER	VALUE
No barrier or security system	5
Barrier is incomplete (e.g., in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but no barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) ___

Describe the site accessibility. _____

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Examples would be excessive soil erosion by beaches or streams, increasing land development that could reduce distances from the site to inhabitated areas or otherwise increase accessability.

	VALUE
Expected	5
None Anticipated	0

Site Dynamics (Select largest value) ___

Describe the site dynamics. _____

TOTAL HAZARD PROBABILITY VALUE
(Sum of Largest Values for A through F--Maximum of 30)
Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY

Description	Level	Hazard Probability Value
FREQUENT	A	27 or greater
PROBABLE	B	21 to 26
OCCASIONAL	C	15 to 20
REMOTE	D	8 to 14
IMPROBABLE	E	less than 8

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLE 3

Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

RAC 1 Expedite INPR, recommending further action by CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend further action by CEHND.

RAC 4 Complete INPR - Recommend further action by CEHND.

RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

Part IV. Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.

See attached justification.

RISK ASSESSMENT PROCEDURES FOR
ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES
FOR
DERP-FUDS SITE NO. J09CA029000
CAMP SEELEY
EL CENTRO, CALIFORNIA

JUSTIFICATION

The Camp Seeley site consists of 434.42 acres in Imperial County, California. Currently, the property is privately owned. The site is located approximately 8 miles northwest of the City of El Centro, about one mile north of the Town of Seeley, and one half mile west of the Naval Air Facility El Centro. Haskell Road is located on the east boundary of the site and Havens Road is located on the south boundary of the site. The Town of Seeley contains 200 to 300 dwellings. A three-acre farm compound containing a home and farm maintenance shop are located on the site. The remainder of the site is under cultivation.

Camp Seeley was used initially as a campsite for the 11th Cavalry and the 75th Field Artillery and later as a test and staging area for the Desert Test Command. The 11th Cavalry and the 75th Field Artillery trained with arms and ammunition, however such activities were conducted elsewhere. The Desert Test Command which eventually became the activity known as the Ordnance Desert Proving Ground tested various transport and combat vehicles, however test work did not involve ordnance or explosive materials. No evidence was found in the real estate or historical records to indicate that DOD used ordnance or explosive materials on the property. No OEW of DOD origin was reported or observed on the site. Three individuals having been associated with farming activities on the property since the 1950s had never encountered waste ordnance or explosive materials of DOD origin.

An OEW risk assessment score of five has been calculated, based on a Hazard Severity value of 0 (none). This seems appropriate based on available information.

OPEN-FILE REPORT 2000-19

A GENERAL LOCATION GUIDE FOR ULTRAMAFIC ROCKS IN CALIFORNIA - AREAS MORE LIKELY TO CONTAIN NATURALLY OCCURRING ASBESTOS

August, 2000

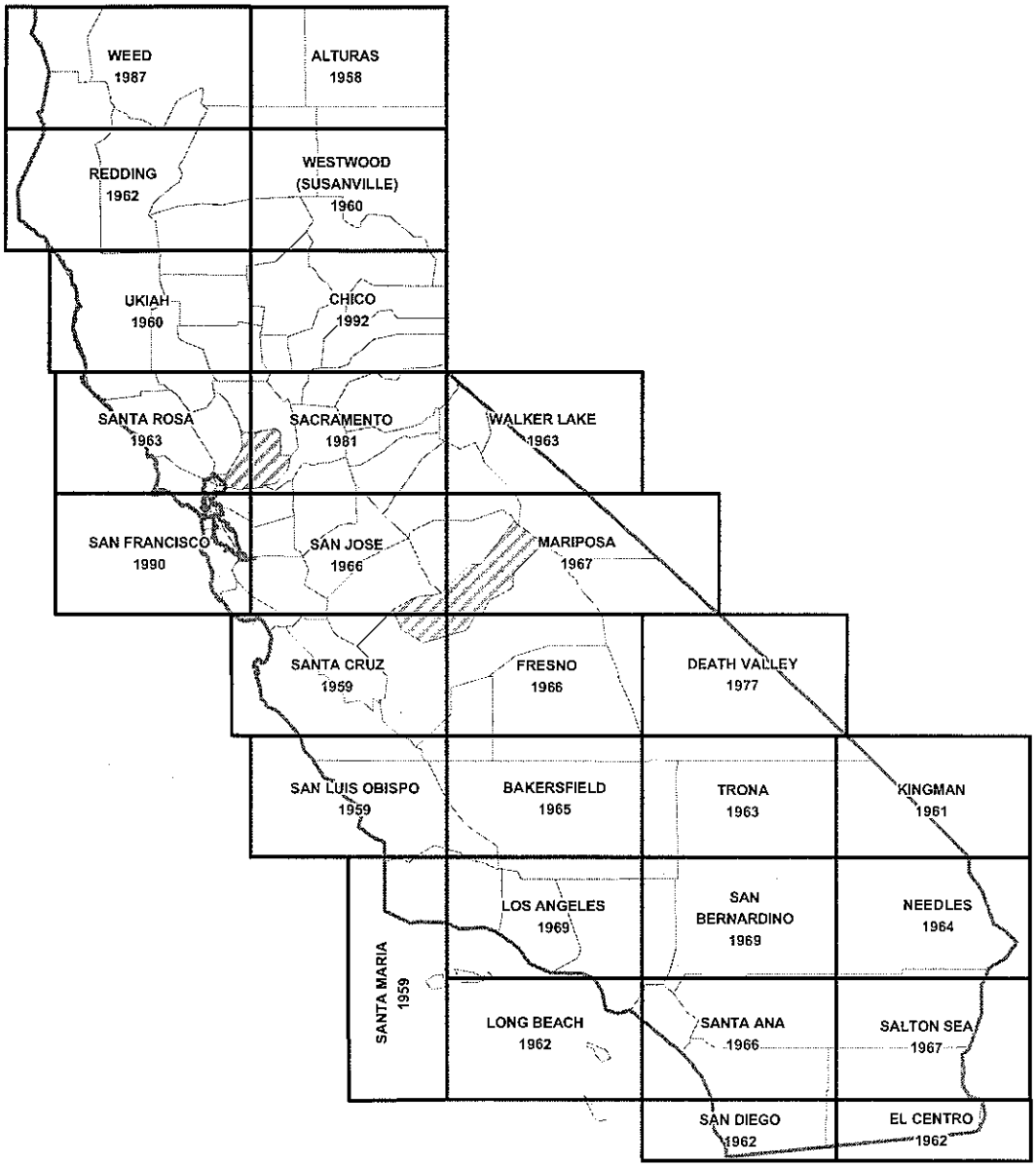
DEPARTMENT OF CONSERVATION
Division of Mines and Geology

STATE OF CALIFORNIA
GRAY DAVIS
GOVERNOR

THE RESOURCES AGENCY
MARY D. NICHOLS
SECRETARY FOR RESOURCES

DEPARTMENT OF CONSERVATION
DARRYL YOUNG
DIRECTOR

INDEX TO GEOLOGIC ATLAS SERIES AND REGIONAL GEOLOGIC MAP SERIES MAPS



Counties in solid green contain ultramafic rock areas shown on the adjacent map. These areas are shown in more detail on the Division of Mines and Geology 1:250,000 scale Geologic Atlas and Regional Geologic Map Series maps. Madera and Solano counties, in diagonal pattern, have ultramafic rock areas shown on the Geologic Atlas and Regional Geologic Map Series maps that are too small to show on the adjacent map. Los Angeles County has small utramafic rock occurrences on Catalina Island and a small occurrence is present in Kern County.

EXPLANATION TEXT FOR MAP

A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos

MAP PURPOSE

This map shows the areas more likely to contain natural occurrences of asbestos in California. Its purpose is to inform government agencies, private industry and the public of the areas in the State where natural occurrences of asbestos may be an issue. In these areas, consideration of the implications of the presence or absence of asbestos through examination of more detailed maps and site-specific investigations could be warranted as part of public or private decision making. Natural occurrences of asbestos are more likely to be encountered in, and immediately adjacent to, areas of ultramafic rocks. The general location of these rocks is noted on this map. While geologic conditions are more likely for asbestos formation in or near these areas, its presence is not certain. The only way to establish the presence or absence of asbestos at a specific location is through a detailed site examination by a qualified geologist.

EXPLANATION OF ULTRAMAFIC ROCK UNIT

Ultramafic rocks are dunite, peridotite, pyroxenite, and less common in California, hornblendite (IUGS classification of ultramafic rocks, in Philpotts, 1990*). These igneous rocks contain 90 percent or more of the dark colored iron-magnesium-silicate minerals olivine, augite, hypersthene, or less commonly hornblende. Ultramafic rocks form in high temperature environments well below the surface of the earth. By the time they are exposed at the surface by uplift and erosion, ultramafic rocks may be partially to completely altered to serpentinite, a type of metamorphic rock. Sometimes the metamorphic conditions are right for the formation of chrysotile asbestos or tremolite-actinolite asbestos in bodies of ultramafic rock or along their boundaries. Note--occurrences of non-ultramafic rock types, such as gabbro or diabase, may be included within some of the ultramafic rock areas shown on this map. Asbestos is much less likely to be associated with these non-ultramafic rock types.

INFORMATION SOURCES

The ultramafic rock areas shown on this map are adapted from Jennings, C.W., 1977, Geologic Map of California, California Department of Conservation, Division of Mines and Geology, Geologic Data Map No. 2, scale 1:750,000.

*Philpotts, A.R., 1990, Principles of igneous and metamorphic petrology, Figure 6-3, IUGS (International Union of Geological Sciences) classification of ultramafic rocks: Prentice Hall, Englewood Cliffs, New Jersey, page 96.

This map may be viewed on the California Department of Conservation website at http://www.consrv.ca.gov, which includes links to other sites with asbestos information.

MAP USAGE AND LIMITATIONS

The small scale of this map (1:1,000,000) precludes showing detailed boundaries of ultramafic rock units and small occurrences of ultramafic rocks. It should be used only as a general guide to the presence of ultramafic rocks that may contain asbestos. This map is derived from the Geologic Map of California (1:750,000 scale - one inch equals about 12 miles), Jennings (1977). No ultramafic rocks are shown in Solano and Madera counties on this map. However, ultramafic rocks are shown as present in these counties on available more detailed maps at scales of 1:250,000 (one inch equals about 4 miles) and larger. In addition to association with ultramafic rock and serpentinite, asbestos minerals are also known to occur in association with some faults in particular geologic settings, certain non-ultramafic related metamorphic rock types, and magnesium-rich carbonate rocks such as dolomite. These asbestos occurrences are much less common and their locations less well known than for ultramafic rocks. Consequently, such occurrences are not shown on this map.
This map should not be used to determine whether bedrock or soil on a particular parcel of land in or adjacent to areas identified as ultramafic rocks contains asbestos. A site-specific investigation would be required to make such a determination.

Definitions

Asbestos -- Asbestos is the generic term for the naturally occurring fibrous (asbestiform) varieties of six silicate minerals. These minerals are: chrysotile, tremolite (when fibrous), actinolite (when fibrous), crocidolite (fibrous riebeckite), anthophyllite (when fibrous), and amosite (fibrous cummingonite-grunerite). Chrysotile is the most common asbestos mineral in California and belongs to the serpentine mineral group. The remaining asbestos minerals belong to the amphibole mineral group. Asbestos also refers to an industrial product obtained by mining and processing deposits of the asbestiform minerals listed above.

Serpentine --The serpentine group minerals are hydrous magnesium silicate minerals, of which lizardite, antigorite and chrysotile are the most common. Chrysotile forms crystals that are naturally fibrous. These fibers occur in serpentinite in small veins, where the fibers are oriented perpendicular to the vein walls (cross-fiber veins) or parallel to the vein walls (slip-fiber veins).

Chrysotile fibers are one type of asbestos. The other serpentine minerals usually do not occur as fibrous crystals and are not asbestos minerals. Although the term serpentine is commonly used to refer to the rock serpentinite, it is actually the name of the group of minerals that makes up the rock serpentinite.

Serpentinite -- Serpentinite is a rock consisting almost entirely of one or more serpentine minerals. Serpentinite is not identified as a separate rock unit on this map but is likely to be found within areas of ultramafic rock shown on the map. This rock type has a greasy or waxy appearance and may be dark to light green, brown, yellow or white. In addition to serpentine minerals, small amounts of other minerals such as magnetite, chromite, talc, brucite, and tremolite-actinolite maybe present. Small amounts of chrysotile asbestos are common in serpentinite because chrysotile is one of the serpentine group minerals. Tremolite-actinolite asbestos (amphibole asbestos) may also occur with serpentinite, but such occurrences are less common than chrysotile asbestos.

DISCLAIMER
The State of California and the California Department of Conservation, Division of Mines and Geology make no representations or warranties as to the actual presence or absence of natural asbestos at specific sites within or near the ultramafic rock areas shown on this map. Further, the State and the Department make no representations or warranties regarding the accuracy of the data shown on the map. Neither the State nor the Department shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

VIEWING AND PRINTING TIPS
A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos

Viewing the map

This map opens up in Acrobat Reader in "fit window" view. When you wish to zoom in and look at areas at a higher magnification, there are several ways to do so:

1. Use the magnifying glass icon on the left-hand tool bar and zoom in at preset increments, *or*
2. Click on the **View** pull-down menu for a variety of zoom options, *or*
3. Use the pop-up menu on the lower left toolbar to set exact zoom parameters.
4. To zoom back out with the magnifying glass icon active, press ctrl/alt/spacebar and click the mouse, *or*
5. Go back to **View** pull-down menu and change view, *or*
6. Use pop-up menu on the lower left toolbar to change view.

Printing the map

If you try to print this map, you'll find that Acrobat Reader will simply print the entire map at your printer's default page size. The resulting print isn't very useful if you can only print to an 8.5 x 11 inch page. To print portions of this map at 1:1,100,000 (the original scale of the map) you'll need Acrobat Reader and a graphics program such as Microsoft Paint, Paint Shop Pro, Corel Draw or Mac Paint. Armed with these tools, do the following:

1. Use Adobe Acrobat Reader to open map file.
2. To select an area, open the document and zoom to 100% at the area of interest. Hold mouse button down (if you have three buttons on your mouse, click on the left one) on the **Text Select** tool button, which will expand to three buttons. Choose the "grab graphics" tool button (last one on the right). Using this tool, select your area of interest..
3. Click on the **Edit** pull-down menu and select **Copy**. This places a copy of the selected area onto your computer's clipboard. At this point, you can close Adobe Acrobat if your paint program requires the memory to run. If not, you can leave it open.
4. Open your paint program. In Microsoft Paint, make sure that the image area is at least as wide or as tall as the map area that you've selected. Choose the **Edit** pull-down menu, and click on **Paste**. In Paint Shop Pro, select **Paste as New Image**. The selected map area will be pasted into the view and can be printed. This "bitmap" image may appear "pixilated" or have jagged edges.

To print the entire map at full-scale requires a large-format color plotter. If you don't have one, many reproduction firms do, and can plot the file for you.

DUDEK

CORPORATE OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
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MEMORANDUM

March 25, 2010

To : Sarah Lozano

From : Rachel Ganiere

CC :

RE : Seeley County Water District Wastewater Treatment Plant Expansion – Public Safety Memo (6382-5)

Dudek has evaluated public safety issues associated with the planned chemical storage associated with the proposed expansion at the Seeley County Water District Wastewater Treatment Plant.

The project includes on-site storage of the following chemicals:

Table 1
Hazardous Materials

Hazardous Material Type	*Existing Quantity Stored*	*Proposed Change in Quantity Stored*	*Proposed Storage Container(s)*	*Frequency of Delivery (existing)*	*Frequency of Delivery (proposed)*
Sodium Hypochlorite	**N/A**	**1,000**	**Dual Containment Tank**	**N/A**	**6 times per year (1,000 gallons)**
Citric Acid	**N/A**	**N/A**	**Neat Tote**	**N/A**	**2 times per year (26 gallons)**

Note: The above quantities include a worse-case analysis for hazardous materials that would be required for the treatment processes being considered as part of the proposed project.
Source: Dudek 2010

For the purposes of this EIR, Dudek assumes that sodium hypochlorite will be stored in a 1,000 gallon aboveground storage tank. Intermittent chemicals such as citric acid will be used for membrane cleaning. The intermittent chemicals will be used for "clean in place" recovery and will consist of 26 gallons of citric acid. The citric acid will be used upon delivery; no on-site storage is anticipated.

The sodium hypochlorite tank system shall be designed in accordance with the California Fire Code, Uniform Fire Code, International Fire Code, and other applicable Federal, State, and local regulations. Accordingly, the tank system shall be designed with secondary containment. Chemical storage shall be conducted in accordance with these regulations and in accordance with a Hazardous Materials Business Plan approved by the Imperial County CUPA Office.

The hazardous substance status, according to the various federal and state regulations, of the chemicals to be stored is as follows:

Table 2
Hazardous Substance Status

Hazardous Material Type	Hazardous material [1]	Extremely hazardous substance [2] *(threshold planning quantity)*	Federal or state regulated substance [3] *(threshold quantity)*
Sodium Hypochlorite	**Yes**	**No**	**No**
Citric Acid	**No**	**No**	**No**

Notes: 1 Title 8 Section 339 of the California Code of Regulations
2 Code of Federal Regulations, Title 40, Chapter 1, Part 355, Appendix A
3 Code of Federal Regulations Title 40, Chapter 1, Section 68.130 or the California Code of Regulations Title 19, Section 2770.5

The Certified Unified Program Agency (CUPA) is the local administrative agency that oversees regulation of hazardous materials. In Imperial County, the CUPA is the Department of Toxic Substances Control (DTSC) located in Imperial County. The DTSC inspects businesses or facilities that handle or store hazardous materials, generate hazardous waste, and own or operate underground storage tanks. The DTSC also oversees the California Accidental Release Program (CalARP) and hazardous materials disclosure (Emergency Planning Community Right to Know Act), including hazardous materials business plans Imperial County.

Risk Management Plan

CalARP requires businesses that store, handle, or use more than threshold quantities of a regulated substance to develop a plan (risk management plan) and prepare supporting documentation that summarizes the facility's potential risk to the local community and identifies safety measures to reduce potential risks to the public. The Risk Management Plan provides

information on the potential impact zone of a worst-case release and present plans and programs designed to minimize the probability of a release and mitigate potential impacts.

The facility does not maintain a Risk Management Plan since there is currently no existing chemical storage. The estimated amount of sodium hypochlorite to be stored on-site is 1,000 gallons. Since sodium hypochlorite is not a regulated substance, the facility is not required to maintain a Risk Management Plan/California Accidental Release Plan under the proposed project (EPA 40 CFR Part 68, March 2009).

Hazardous Materials Business Plan/Inventory

As on-site chemical storage will include storage of more than 55 gallons of sodium hypochlorite, mitigation is required to ensure proper employee safety training and emergency response procedures for a release or threatened release of sodium hypochlorite. Pursuant to Chapter 6.95, Division 20 of the California Health and Safety Code, an annual business plan, more commonly referred to as a Hazardous Materials Business Plan (HMBP) and Hazardous Materials Inventory for the proposed operation is required for submittal to the DTSC in Imperial County (the CUPA).

In addition to identifying hazardous substances, the HMBP includes details that facilitate coordination and emergency planning with on- and off-site response officials and facilities in the event of an emergency. As such, the plan includes an inventory of hazardous materials, emergency response plans and procedures, release reporting information, and training program information. The Hazardous Materials Business Plan and associated documents (Hazardous Materials Questionnaire and Inventory) will also discuss hazardous waste disposed of by the site. Chemical wastes are not currently generated at the WWTP and based on the proposed expansion no chemical wastes are anticipated to be generated at the WWTP.

The Emergency Planning Community Right to Know Act (EPCRA) requires facilities to disclose quantities and type of toxic chemicals stored to the State and Local Emergency Planning Committee. In order to avoid multiple reports to various agencies, California Health and Safety Code requires notification of chemical inventory to the Administering Agency, which is DTSC. Notification of chemical inventory is accomplished through completion of the HMBP and inventory.

Chemical Storage Summary

The following thresholds of significance were evaluated for the site:

1) Is the project a business or facility that proposes to handle hazardous substances in excess of the threshold quantities listed in Chapter 6.95 of the Health and Safety Code, generate hazardous waste regulated under Chapter 6.5 of the Health and Safety Code, and/or store hazardous substances in USTs regulated under Chapter 6.7 of the Health and Safety Code?

   Yes

2) Is the project a business or facility that would handle regulated substances subject to CalARP risk management plan requirements that in the event of a release could adversely affect children's health due to the presence of a school or day care within ¼ mile of the facility?

   No

Mitigation for Threshold 1 is achieved by completing an acceptable HMBP/Inventory under DTSC oversight, as discussed in the section above.

Air Quality

The subject property is required to maintain permits with the Imperial County Air Pollution Control District (APCD) for operation of equipment that emits hazardous air emissions. Air quality impacts are discussed in the Air Quality section of the EIR.

The proposed project does not involve hazardous air emissions within ¼ mile of a school.

Hazardous Materials Transportation

The proposed project involves transportation of the chemicals listed in Table 1 to the site. The delivery of the sodium hypochlorite will be concurrent with the delivery of chemicals to the SCWD Water Treatment Facility located 0.2 miles northeast of the WWTP. The delivery route to the site from the Water Treatment Facility is anticipated to be from Alamo Street to Laguna Avenue to Rio Vista Street. The one-way travel distance from Alamo Street is 0.2 miles. The delivery of citric acid was not considered in the following calculations of risk of incident during transportation as citric acid is not regulated by the Department of Transportation (CFR 49 Section 172.3 Subpart B).

The delivery route for sodium hypochlorite passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods. An alternate delivery route is from Alamo Street to Laguna Street to Main Street to New River Boulevard. The one-way travel distance from Alamo Street is 0.33 miles. This delivery route also passes, or is located within ¼ mile of, schools, a park, and residential neighborhoods.

According to the report, "Comparative Risks of Hazardous and Non-Hazardous Materials Truck Shipment Accidents/Incidents," (Battelle 2001), the hazardous materials transport accident/incident risk per mile is estimated at 0.507 in a million for all types of hazardous materials, including leak enroute incidents. The route from Alamo Street to the site is approximately 0.2 miles each way, thus the probability of a hazardous material incident occurring on this route is 0.101 in a million per delivery, for all types of hazardous materials.

The hazardous materials transport accident/incident risk per mile specific to the specific hazard class for sodium hypochlorite is shown in Table 3. The risk of incident for sodium hypochlorite deliveries is 0.082 in a million. This risk for incidents during sodium hypochlorite deliveries is less than the *de minimus* risk of one in a million.

Table 3
Risk of Incident

Hazardous Material Type	Hazard Class	Risk per Mile, Specific to the Hazard Class	Risk, Specific to the Hazard Class
Sodium Hypochlorite	8	0.409 in a million	0.082 in a million
Citric Acid	Not Regulated by DOT	N/A	N/A

Transportation of hazardous materials will comply with all DOT, California Department of Transportation (Caltrans), US EPA, DTSC, California Highway Patrol, and California State Fire Marshal regulations.

Biosolids Transportation

The proposed project involves biosolids transportation offsite. Since biosolids are non-hazardous and non-toxic, the transportation is not designated a hazard class and is not regulated by the DOT. However, in order to transport the biosolids offsite, the operational controls including quantity of material, solids concentration of materials, distance to final destination, number and capacity of vehicles, vehicle maintenance and appearance, and accident and spill control programs need to be considered prior to offsite transportation (USEPA, 2000). In addition, proper communication to the community regarding the increased traffic from operations must be considered in preparing the operational controls.

The biosolids may be disposed of at landfills or applied to land including agricultural land, forest lands, reclamation sites, and public contact sites. For application of biosolids as a soil amendment (offsite), the USEPA established ceiling concentrations for metals and pathogen and vector attraction reduction standards (Table 4); management criteria for the protection of water quality and public health; and annual and cumulative discharge limitations of persistent pollutants to land for the protection of livestock, crop, and human health and water quality protection (40 CFR Part 503).

Table 4
Pollutant Limits for Land Applied Biosolids[a]

Constituent	Ceiling Concentration[b] (mg/kg dry weight)	Pollution Concentration[c] (mg/kg dry weight)
Arsenic	75	41
Cadmium	85	39
Copper	4,300	1,500
Lead	840	300
Mercury	57	17
Molybdenum	75	--[d]
Nickel	420	420
Selenium	100	100
Zinc	7,500	2,800

a. 40 CFR Part 503 Chapter 2
b. Land applied biosolids cannot exceed the listed concentrations
c. Biosolids below the listed concentrations do not need a permit if other regulatory requirements are met.
d. The February 25, 1994 Part 503 Rule Amendment deleted the molybdenum limits but retained the molybdenum CCL.

References

Battele, (March 2001), "Comparative Risks of Hazardous Materials and Non-Hazardous Materials Truck Shipment Accident/Incidents"

Dudek, (March, 2010), Personal Communications with Tom Falk, Engineering Department

United States Environmental Protection Agency, (July 2000), "Guide to Field Storage of Biosolids" EPA/832-B-00-007

03/30/10
11:45:53

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

C:\Program Files\Lakes\Screen View\Projects\Seeley.scr

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.100000E-03
STACK HEIGHT (M) = 3.3528
STK INSIDE DIAM (M) = 0.1397
STK EXIT VELOCITY (M/S)= 58.1932
STK GAS EXIT TEMP (K) = 733.1500
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 1.5000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = 3.2004
MIN HORIZ BLDG DIM (M) = 1.2192
MAX HORIZ BLDG DIM (M) = 3.0480

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

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 0.89197981 (M**3/S)

BUOY. FLUX = 1.672 M**4/S**3; MOM. FLUX = 6.603 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** 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
69.	0.9085E-01	4	8.0	8.0	2560.0	4.60	5.78	4.06	SS
100.	0.6210E-01	4	8.0	8.0	2560.0	4.60	8.20	5.33	SS
200.	0.3397E-01	4	4.5	4.5	1440.0	8.08	15.56	8.52	SS

```
  300. 0.2277E-01   4    3.0    3.0  960.0   12.49   22.61   12.09    SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    69. M:
   69. 0.9085E-01   4    8.0    8.0 2560.0    4.60    5.78    4.06    SS

 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

****************************************
     *** NON-REGULATORY ***
   PERFORMING CAVITY CALCULATIONS
   WITH SCHULMAN-SCIRE (1993) MODEL
****************************************

Stack x/L (LONGER side ALONG flow) =   0.2000000
Stack x/L (SHORTER side ALONG flow)=   0.1500000


1)  SHORTER Side ALONG flow, STACK nearer UPWIND edge of building

*** CAVITY2 -- Version: 1.0       Level: 940325   ***
FLOW IS NOT REATTACHED
Stack distance from upwind face (m)  =  0.4267200
Cavity Length (m)                    =  5.965212
Cavity Height (m)                    =  3.881955

MAX Concentration =      1.1 (ug/m**3) for ws(10m)  =  20.0 (m/s)


2)  SHORTER Side ALONG flow, STACK nearer DOWNWIND edge of building

*** CAVITY2 -- Version: 1.0       Level: 940325   ***
FLOW IS NOT REATTACHED
Stack distance from upwind face (m)  =  0.7924800
Cavity Length (m)                    =  5.965212
Cavity Height (m)                    =  3.881955

MAX Concentration =      1.3 (ug/m**3) for ws(10m)  =  20.0 (m/s)


3)  LONGER Side ALONG flow, STACK nearer UPWIND edge of building
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*** CAVITY2 -- Version: 1.0       Level: 940325   ***
FLOW IS REATTACHED
Stack distance from upwind face (m)  =  0.9144000
Cavity Length (m)                    =  2.040370
Cavity Height (m)                    =  3.200400

MAX Concentration =      0.2 (ug/m**3) for ws(10m)  =  20.0 (m/s)


4)  LONGER Side ALONG flow, STACK nearer DOWNWIND edge of building

*** CAVITY2 -- Version: 1.0       Level: 940325   ***
FLOW IS REATTACHED
Stack distance from upwind face (m)  =  2.133600
Cavity Length (m)                    =  2.040370
Cavity Height (m)                    =  3.200400

MAX Concentration =      0.1 (ug/m**3) for ws(10m)  =  20.0 (m/s)

****************************************
   END OF CAVITY CALCULATIONS
****************************************


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

 CALCULATION       MAX CONC   DIST TO   TERRAIN
  PROCEDURE      (UG/M**3)   MAX (M)   HT (M)
--------------  -----------  -------  -------
SIMPLE TERRAIN    0.9085E-01     69.      0.

BUILDING CAVITY    1.131          6.     -- (SHORTER side ALONG flow;
                                 -- stack nearer upwind face)
BUILDING CAVITY    1.254          6.     -- (SHORTER side ALONG flow;
                                 -- stack nearer dnwind face)
BUILDING CAVITY   0.1526          2.     -- (LONGER  side ALONG flow;
                                 -- stack nearer upwind face)
BUILDING CAVITY   0.1282          2.     -- (LONGER  side ALONG flow;
                                 -- stack nearer dnwind face)
```