Draft
Environmental Impact Report
Technical Appendices

SCH #2020099017

Volume 3 of 3
Appendices F to L

KUDU SOLAR PROJECT
by 69SV 8ME LLC (8Minute Energy) (PP20405)

Zone Change Case No. 14, Map No. 152;
Conditional Use Permit No. 28, Map No. 152;
General Plan Amendment No. 10, Map No. 152 (Circulation);
Non-Summary Vacations of Public Access Easements

Kern County
Planning and Natural Resources Department
Bakersfield, California

November 2021

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Kern County
Planning and Natural Resources Department

Technical Assistance by:
Michael Baker International

November 2021

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Appendix F

Energy Consumption
Technical Memorandum

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Memo

Date:	July 16, 2020
Project:	Kudu Solar Farm Project
To:	Erec DeVost, 8minute Solar Energy
From:	Sharyn Del Rosario, Project Manager, HDR
Subject:	Kudu Solar Farm – Energy Consumption Technical Memorandum

Introduction

This memorandum assesses possible construction and operational energy demand impacts by the development of the Kudu Solar Farm project.

Project Description

The project site is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. The majority of the project site is bisected by Washburn Boulevard (which is also the California City boundary) and Neuralia Road. State Route 14, a four-lane divided highway, provides regional access to the project site. The project site is adjacent to the approved Eland Solar Farm, south of the existing Springbok 1 and 2 Solar Farms and southeast of the Los Angeles Department of Water and Power Beacon solar facility.

The project proponent proposes to develop a photovoltaic solar facility and energy storage system capable of producing up to 500 megawatts (MW) of alternating current (AC) power, and 600 MW hours of storage capacity on approximately 1,955 acres of privately-owned land. The project would be supported by a 230-kilovolt gen-tie overhead and/or underground electrical transmission line(s) originating from one or more on-site substations and terminating at the Los Angeles Department of Water and Power's Barren Ridge Substation. The proposed project intends to share the Eland gen-tie line and right-of-way, which may require stringing additional line on the Eland transmission structures, or increasing the capacity of the Eland gen-tie by reconductoring the line with thicker cable. If the proposed project cannot share these facilities, a new gen-tie line would be developed within one of the routes previously analyzed in the Eland Solar Project Supplemental Environmental Impact Report (State Clearinghouse No. 2012011029). The project's permanent facilities would include, service roads, a power collection system, communication cables, overhead and underground transmission lines, electrical switchyards, project substations, energy storage system(s), and operations and maintenance facilities.

The construction period for the proposed project from site preparation through construction, testing, and commercial operation is expected to commence as early as Q4 2021 and would extend for approximately 12 to 18 months.

Fuel Consumption Standards of Significance

The 2019 CEQA Guidelines Appendix G includes Section VI – *Energy*, which is an analysis of potential impacts of a project related to the consumption of energy resources. The thresholds as written in the Guidelines are:

- Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

- Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

While no quantitative thresholds related to energy are included, the Guidelines states as follows:

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

1. Decreasing overall per capita energy consumption;

2. Decreasing reliance on natural gas and oil, and

3. Increasing reliance on renewable energy resources.

Fuel Consumption Impact Analysis

Methodology

The diesel and gasoline fuel consumptions were calculated using the CO_2 emissions contained in the *Air Quality and Greenhouse Gas Assessment* (Stantec 2020) and EPA's default emission rates of 19.4 pounds of CO_2 per gallon of gasoline and 22.2 pounds of CO_2 per gallon of diesel[1]. The fuel consumption calculations are provided in Appendix A. Fuel consumption calculations are based on the emissions estimates provided in Appendix C of the Kudu Solar Farm Project *Air Quality and Greenhouse Gas Assessment* (Stantec 2020).

CONSTRUCTION PHASE ENERGY USAGE

Electricity. Electricity is not expected to be consumed in large quantity during project construction, as construction equipment and vehicles are typically diesel- or gas-powered, not electric. Electricity for construction would be provided by Southern California Edison and a hookup would be installed on the project site (and this hookup would also provide electricity onsite for the operational phase of the project); however, electricity usage from such connection is anticipated to be minimal (i.e. mostly for security lighting). Therefore, electricity associated with construction- or decommissioning-related activities was not calculated.

[1] U.S. EPA, Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel, February 2005.

Natural Gas. Natural gas is not expected to be consumed in large quantity during project construction (i.e., no natural gas-powered equipment or vehicles). Therefore, natural gas associated with construction activities was not calculated.

Diesel and Gasoline. Regarding transportation-related fuel consumption during construction, it is assumed that only diesel fuel would be used in off-road construction equipment and for haul trucks used during delivery of solar panels to the project site. On-road vehicles for construction workers are assumed to be solely powered by gasoline.

Construction of the project would result in fuel consumption from the use of construction tools and equipment, haul truck trips, and vehicle trips generated from construction workers traveling to and from the site. Project construction is expected to consume a total of approximately 640,000 gallons of diesel fuel from construction equipment and vendor, hauling, and water truck trips, and approximately 350,000 gallons of gasoline from construction worker vehicle trips.

Construction activities and corresponding fuel energy consumption would be temporary and localized, as the use of diesel fuel and heavy-duty equipment would not be a typical condition of the project. The gasoline consumed during construction represents approximately 0.09 percent of all gasoline sold within Kern County in 2018 (396 millions of gallons) (California Energy Commission 2019). The diesel consumed during project construction would represent approximately 0.6 percent of all diesel sold in Kern County in 2018 (108 millions of gallons) (California Energy Commission 2019). In addition, there are no unusual project characteristics that would cause the use of construction equipment to be less energy efficient compared with other similar construction sites in other parts of the State. Therefore, construction-related fuel consumption by the project would not result in inefficient, wasteful, or unnecessary energy use compared with other construction sites in the region. The project would have a less than significant impact on gasoline and diesel consumption.

OPERATION PHASE ENERGY USAGE

Operational energy usage would be minimal involving a very limited amount of worker trips for facility maintenance including the occasional washing of solar panels.

Electricity. Electricity required during operation (e.g., to operate lights and air conditioners) would be greatly offset by the electricity produced by the solar facility. As discussed in Section 4.8, *Greenhouse Gas Emissions*, of this EIR, construction and operation of renewable energy facilities would offset GHG emissions by replacing energy generated by fossil-fueled power plants. The project would generate solar-generated electricity that would be added to the power grid and be used in place of electricity generated by fossil-fuel sources. Based on these considerations, the project would have a less than significant impact on electricity consumption.

Natural Gas. Natural gas is not expected to be consumed during construction-, decommissioning-, or operation-related activities by construction equipment (i.e., no natural gas-powered equipment or vehicles). Therefore, the proposed project would have no significant impact on natural gas consumption.

Diesel and Gasoline. During operation, it is estimated that the operational and maintenance activities would consume approximately 18,421 gasoline gallons annually. The proposed project would not consume diesel during operation.

Potential Changes in Electricity Usage

No major changes in electricity usage are anticipated throughout the construction and operation of the proposed project. The project would generate solar-generated electricity over a 30-year life span and this production is anticipated to remain relatively constant throughout the operation of the proposed project. Additionally, the electricity required to construct and operate the project is anticipated to be negligible compared to the amount of electricity generated by the project. Activities involved with the decommissioning of the solar facility would be similar to those involved with construction but would be expected to result in lower fuel demand, as technology improves, and equipment becomes more fuel efficient.

Compliance with State and Local Renewable Energy Plans

Executive Order S-14-08

Executive Order S-14-08 was established by California Governor Schwarzenegger in November 2008. The order establishes a Renewables Portfolio Standard (RPS) for all retail sellers of electricity. The specifics of this executive order including the following:

- Requires retail sellers of electricity to serve 33 percent of their load with renewable energy by 2020;
- Requires various state agencies to streamline processes for the approval of new renewable energy facilities and determine priority renewable energy zones; and.
- Establishes the requirement for the creation/adoption of the Desert Renewable Energy Conservation Plan (DRECP) process for the Mojave and Colorado Desert regions.

Climate Change Scoping Plan/California's Renewable Portfolio Standard (RPS) Program

First established in 2002 under Senate Bill (SB) 1078, California's RPS requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent by 2020 and 50 percent by 2030 (California Public Utilities Commission 2019).

In 2018, SB 100 further increased California's RPS and required retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by the end of 2024, 52 percent by the end of 2027, and 60 percent by the end of 2030; and that the California Air Resources Board (CARB) should plan for 100 percent eligible renewable energy resources and zero-carbon resources by the end of 2045. The California Public Utilities Commission (CPUC) and the California Energy Commission jointly implement the RPS program. The CPUC's responsibilities include: (1) determining annual procurement targets and enforcing compliance; (2) reviewing and approving each investor-owned utility's renewable energy procurement plan; (3) reviewing contracts for RPS-eligible energy; and (4) establishing the standard terms and conditions used in contracts for eligible renewable energy. Refer to Section 4.8, *Greenhouse Gas Emissions*, of the Kudu Solar Farm EIR for additional details regarding this regulation.

KERN COUNTY GENERAL PLAN

The goals, policies, and implementation measures in the Energy Element of the Kern County General Plan (Kern County 2009) applicable to energy, as related to the project, are provided below. The Kern County General Plan contains additional policies, goals, and implementation measures that are more general in nature and not specific to development such as the project. Therefore, they are not listed below.

Chapter 5. Energy Element

5.4.5 Solar Energy Development

Goal

Goal 1: Encourage safe and orderly commercial solar development.

Policies

Policy 1: The County shall encourage domestic and commercial solar energy uses to conserve fossil fuels and improve air quality.

Policy 3: The County should permit solar energy development in the desert and valley planning regions that does not pose significant environmental or public health and safety hazards.

Construction

Construction equipment would comply with federal, State, and regional requirements where applicable. With respect to truck fleet operators, the U.S. Environmental Protection Agency (USEPA) and National Highway Traffic Safety Administration (NHTSA) have adopted fuel efficiency standards for medium- and heavy-duty trucks. The Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018 and will result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type. The USEPA and NHTSA also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type. The energy modeling for trucks does not take into account specific fuel reductions from these regulations, since they would apply to fleets as they incorporate newer trucks meeting the regulatory standards; however, these regulations would have an overall beneficial effect on reducing fuel consumption from trucks over time as older trucks are replaced with newer models that meet the standards.

In addition, construction equipment and trucks are required to comply with CARB regulations regarding heavy-duty truck idling limits of five minutes at a location and the phase-in of off-road emission standards that result in an increase in energy savings in the form of reduced fuel consumption from more fuel efficient engines. Although these regulations are intended to reduce criteria pollutant emissions, compliance with the anti-idling and emissions regulations would also result in the efficient use of construction-related energy.

Operations

In order to meet the AB 32 GHG emissions reduction mandate, the Climate Change Scoping Plan relies on achievement of the 33 percent RPS by 2020 and 50 percent by 2030. The project and other similar projects are essential to achieving the RPS. Further, as discussed previously, the project is reasonably expected to displace region-wide and statewide emissions of GHGs over the expected life of the project. The reduction in GHG emissions are a direct result of increasing the share of renewable energy available to investor owned utilities required to meet RPS. The project directly aligns with the goals of RPS by generating solar-generated electricity.

Furthermore, as the project would have an electric power generating capacity of approximately 500 MW alternating current, the project would be consistent with the Attorney General's recommended measures to reduce GHG emissions. Specifically, the project complies with the Attorney General's Recommended Measure to "Install solar and wind power systems, solar and tankless hot water heaters, and energy efficient heating ventilation and air conditioning." Therefore, the project would be compliant with the Attorney General's Recommended Measure regarding renewable energy. Because the project is below regional regulatory thresholds and could result in a reduction of GHG emissions, no mitigation measures are required. Additionally, development of the project would be consistent with the goal and related policies in the Energy Element of the Kern County General Plan to encourage safe and orderly commercial solar development, like the project.

Overall, because the main objectives of the project are to assist California Investor-Owned utilities in meeting their obligations under California's RPS Program and assist California in meeting the GHG emissions reduction goal of 1990 level GHG emissions by 2020, as required by AB 32, and the future reduction goal of 40 percent below 1990 levels by 2030, the project would be compliant with the applicable recommended actions of the CARB Climate Change Scoping Plan, as well as applicable federal, State, and local policies. Specifically, the project would assist the State and regulated utility providers to generate a greater portion of energy from renewable sources consistent with the 2020 and 2030 RPS. Therefore, this impact would be less than significant.

Energy Saving Measures Included in the Project

The construction of the proposed project would result in the annual generation of 500 MW of electricity over a 30-year life span. Because the project is intended to generate electricity from a renewable source of energy, operation of the project would displace energy production that would otherwise be generated by non-renewable energy facilities using either natural gas or coal.

Approximately 398,439 $MTCO_2e$ of net greenhouse gases annually would be displaced by the implementation of the project. Over the lifetime of the project, the total displaced emissions would be approximately 11,953,170 $MTCO_2e$ which would assist in the attainment of the State's goal to reduced GHG emissions to 1990 levels by 2020.

Conclusion

The construction phase of the proposed project would result in the consumption of approximately 640,000 gallons of diesel fuel and 350,000 gallons of gasoline, while the operation phase would result in a yearly consumption of approximately 18,421 gallons of gasoline annually. The proposed project would not consume diesel during operation. Once operational, the project would result in the annual generation of 500 MW of electricity over a 30-year life span. Because the project is intended to generate electricity from a renewable source of energy, operation of the

project would displace energy production that would otherwise be generated by non-renewable energy facilities using either natural gas or coal.

The project would therefore not result in potentially significant impacts due to wasteful, inefficient or unnecessary consumption of energy resources. In addition, the project will be consistent and not conflict with or obstruct a State or local plan for renewable energy. Impacts would be less than significant.

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A

Fuel Consumption Calculations

July 16, 2020

Kudu Solar Project - Energy

Construction Activities

Construction - Off-road Emissions

		CO2 (Metric Tons)		Fuel (Gallons)	
Phase	**Duration (days)**	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**
Phase 1 - Site Prep and Grading	84	567.2	0.0	56,326.5	0.0
Phase 2 - Tracker Foundations	125	1,088.0	0.0	108,045.3	0.0
Phase 3 - Underground Cabling	125	585.4	0.0	58,133.9	0.0
Phase 4 - Mechanical Installation	146	1,451.5	0.0	144,143.1	0.0
Phase 5 - Electrical Installation	167	1,571.5	0.0	156,059.9	0.0
Total		**5,263.6**	**0.0**	**522,708.7**	**0.0**

Construction - On-road Emissions

		CO2 (Metric Tons)		Fuel (Gallons)	
Phase	**Duration (days)**	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**
Phase 1 - Site Prep and Grading	84	305.0	646.6	30,288.4	73,479.1
Phase 2 - Tracker Foundations	125	489.2	1,743.9	48,580.6	198,175.4
Phase 3 - Underground Cabling	125	74.3	62.3	7,378.5	7,079.7
Phase 4 - Mechanical Installation	146	76.6	72.8	7,606.9	8,272.9
Phase 5 - Electrical Installation	167	217.6	572.5	21,609.1	65,058.4
Total		**1,162.7**	**3,098.1**	**115,463.4**	**352,065.5**

Total Construction Diesel Gallons =	**638,172.1**
Total Construction Gasoline Gallons =	**352,065.5**

Operational Activities

		CO2 (Metric Tons)		Fuel (Gallons)	
Activity	**Duration (days)**	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**
On-road Mobile Emissions	244	0.0	162.1	0.0	18,420.9
		0.0	**162.1**	**0.0**	**18,420.9**

Annual Operational Diesel Gallons =	**0.0**
Annual Operational Gasoline Gallons =	**18,420.9**

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Appendix G-1

CEQA Level
Geotechnical Study

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CEQA Level Geotechnical Study

California City & Kern County

October 15, 2019

Prepared for:

69SV 8ME LLC
c/o 8minute Solar Energy
250 Sutter Street, Suite 600
San Francisco, CA 94108

Prepared by:

Stantec Consulting Services Inc.

This document entitled CEQA Level Geotechnical Study was prepared by Stantec Consulting Services Inc. (“Stantec”) for the account of 69SV 8me LLC (the “Client”).

Prepared by _____
(signature)

Jaret Fischer, PE

Principal Engineer

Reviewed by _____
(signature)

Evan Hsiao, PE, GE

Principal, Senior Geotechnical Engineer

Reviewed by _____
(signature)

Caitlin Barns

Senior Biologist, Project Manager

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Acronyms and Abbreviations

AC	alternating electrical current
Applicant	69SV 8me LLC
ASTM	ASTM International
CAL	California
CDMG	California Department of Conservation, Department of Mines and Geology
CEQA	California Environmental Quality Act
CO_2e	Carbon dioxide equivalent
CUP	Conditional Use Permit
CGS	California Geological Survey
Client	69SV 8me LLC
DC	direct electrical current
DWR	California Department of Water Resources
ESS	Energy Storage System
g	acceleration due to gravity
gen-tie	generation tie
ISO	International Organization for Standardization
kV	kilovolt
MW	megawatt
MWh	megawatt-hour
O&M	operations and maintenance
Project	Kudu Solar Farm Project
PV	photovoltaic
SCE	Southern California Edison
Stantec	Stantec Consulting Services Inc.
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey

Executive Summary

Stantec Consulting Services Inc. (Stantec) has prepared this California Environmental Quality Act (CEQA) Level Geotechnical Study for the proposed Kudu Solar Farm Project (Project), located approximately one mile northeast of the intersection of the State Route (SR) 14 and Phillips Road, in California City and unincorporated Kern County, California. 69SV 8me LLC (Applicant) is seeking approval of a conditional use permit (CUP) for the construction of an up to 500-megawatt (MW) alternating electrical current (AC) utility-scale solar farm with an up to 500 megawatt-hour (MWh) Energy Storage System (ESS). The Project is comprised of 79 assessor's parcels (Project area) totaling about 2,136 gross acres.

This geotechnical investigation report outlines subsurface information for the Project area, describes methods undertaken to excavate and sample test pits and perform soil mechanics laboratory testing on select soil samples, and presents results of Stantec's evaluations of the geotechnical properties of soils pertinent to the CEQA Guidelines and recommended mitigation.

Nineteen shallow test pits (KTP1 through KTP15 and KTP17 through KTP20) were advanced at locations throughout the Project area to a depth of 10 feet using a California (CAL) sampler and following ASTM International (ASTM) D3550 (Standard Practice for Ring-Lined Barrel Sampling of Soils) procedures. Disturbed bulk samples were excavated at locations where CAL sampling could not be completed. Samples were classified in the field using the Unified Soil Classification System (USCS), in accordance with ASTM D2488 (Standard Practice for Description and Identification of Soils [Visual-Manual Method]) procedures. The laboratory testing confirmed or modified field classifications for presentation on the boring logs.

The near surface (approximately 10 feet deep) soils encountered in the test pits performed are composed of sand (SP, SW, SW-SM, and SM USCS soil type), silt (ML USCS soil type), and gravel (GP and GP-GM USCS soil type). Near surface sandy soil with variable amounts of silt, gravel, and cobbles were encountered in most of the test pits. The near surface low plasticity silts were dry and were encountered in test pit KTP-2, KTP-4, KTP-11, and KTP-19 between approximately 2.5 and 10 feet. The near surface gravels were dry and encountered in test pit KTP17 through KTP19 between the ground surface and the maximum depth of exploration. Slight to moderately cemented soils were encountered at depths between approximately 7 feet and 10 feet in KTP-2, KTP-4, KTP-17, KTP-18, and KTP-20, respectively. Cobbles were encountered in KTP-7, KTP-8, KTP-15, and KTP-17 through KTP-20. Groundwater was not encountered in the test performed for this investigation, but groundwater data from a production well on the eastern end of the Project indicates that the depth to groundwater is approximately 255 feet below the ground surface (DWR 2010).

The Project site is not located within currently a mapped Alquist-Priolo Special Studies Fault Zone, California Liquefaction Hazard Zone, or subsidence area, and is not located near free faces, steep slopes, or bodies of water. Therefore, the following geologic hazards are considered to be low-risk: fault rupture, liquefaction-related ground failure including liquefaction, lateral spreading, subsidence, presence of expansive soils, and landslides. However, the predominately coarse-grained soils underlying the site are potentially susceptible to erosion or the loss of topsoil due to surface water flows. In addition, strong ground shaking can be expected at the site during moderate to severe earthquakes in the general region. This is common to most areas in southern California.

Mitigation of soil erosion may include selective grading, establishment of anchoring vegetation, design of runoff control features such as drainage ditches, and construction of erosion control features such as pavements and surface mats. These mitigation options should be addressed in the design level evaluations for the Project.

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this California Environmental Quality Act (CEQA) Level Geotechnical Study to provide support documentation for the Environmental Checklist Form in accordance with the CEQA Guidelines for the proposed Kudu Solar Farm, located approximately 1 mile northeast of the intersection of the State Route (SR) 14 and Phillips Road, in California City and unincorporated Kern County, California.

1.2 PROJECT INFORMATION

69SV 8me LLC (applicant) is seeking approval of a conditional use permits (CUPs) for the construction and operation of an up to 500 megawatt (MW)-alternating electrical current (AC) utility-scale solar farm with energy storage, known as the Kudu Solar Project (Project) in unincorporated Kern County and California City, California (Figure 1). The applicant proposes to construct, own, and operate the Project and would secure CUPs from both Kern County and California City along with permits from other relevant agencies as required by law.

1.2.1 Project Site Information

The Project is comprised of 79 assessor's parcels (Project area) totaling approximately 2,136 gross acres (Table 1). The permanent disturbance acreage associated with development of the solar facility and associated infrastructure (Project site) within the Project area would be less than the gross acreage of the Project area. The Project area is adjacent to the approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 Solar Farms, and southeast of the Los Angeles Department of Water and Power (LADWP) Beacon Solar facility. The topography of the Project area is relatively flat.

1.2.2 Location

The Project area is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. The majority of the Project is bisected by Washburn Boulevard (which is also the California City boundary) and Neuralia Road (Figure 1).

Table 1: Kudu Parcels

No.	APN	Acres
California City		
1	302-020-08	40.17
2	302-020-09	80.09
3	302-020-11	163.68
4	302-020-14	40.99
5	302-020-15	10.52
6	302-020-16	10.15

No.	APN	Acres
7	302-020-17	9.59
8	302-020-18	9.98
9	302-290-03	83.58
10	302-305-15	43.54
11	302-321-01	160.93
12	302-322-01	10.10
13	302-322-02	10.09
14	302-322-04	10.24
15	302-322-05	10.28
16	302-322-06	40.04
17	302-322-08	10.33
18	302-322-09	40.50
19	302-322-10	10.27
20	302-322-11	10.29
21	302-325-49	9.74
22	302-330-33	20.21
23	302-330-37	20.38
24	302-341-29	168.79
25	302-342-01	40.23
26	302-342-11	2.67
27	302-342-12	2.66
28	302-342-19	29.69
29	302-342-25	40.77
30	302-342-26	39.89
31	302-342-27	40.29
32	302-342-28	40.68
33	302-470-14	20.20
	California City Total	**1,281.51**
Unincorporated Kern County		
34	469-170-10	10.02
35	469-170-18	39.49
36	470-020-08	2.31
37	470-020-19	4.38
38	470-030-01	79.22
39	470-080-15	20.27
40	470-080-16	10.07
41	470-080-17	10.10

No.	APN	Acres
42	470-080-32	10.07
43	470-100-08	64.83
44	470-100-09	81.11
45	470-151-09	19.62
46	470-151-15	20.23
47	470-151-16	20.40
48	470-151-17	19.98
49	470-152-01	39.32
50	470-152-18	10.32
51	470-152-19	4.93
52	470-302-24	2.59
53	470-302-25	2.62
54	470-302-26	2.52
55	470-322-13	2.39
56	470-322-15	9.96
57	470-322-39	2.37
58	470-330-01	5.06
59	470-330-02	4.77
60	470-330-03	19.86
61	470-330-04	20.15
62	470-330-06	9.95
63	470-330-07	10.02
64	470-330-14	4.89
65	470-330-15	5.23
66	470-350-04	18.65
67	470-350-05	18.91
68	470-350-06	18.89
69	470-350-07	18.57
70	470-350-08	19.93
71	470-360-01	18.43
72	470-360-02	17.85
73	470-360-05	21.15
74	470-360-06	32.23
75	470-380-01	19.92
76	470-380-04	21.35
77	470-380-05	17.34
78	470-380-06	19.88

No.	APN	Acres
79	470-380-07	21.95
	Unincorporated Kern County Total	**854.10**
	Total	**2,135.61**

Note:
APN = Assessor Parcel Number

1.3 DESCRIPTION OF PROPOSED PROJECT

The applicant proposes to develop a photovoltaic (PV) energy facility and energy storage system (ESS) that is capable of producing up to 500 MW of AC power, and 600 MW hours (MWh) of storage capacity. Power generated by the Project would be collected using up to 230 kilovolt (kV) collector lines which run underground and/or overhead to a dedicated Project substation, or to the Eland 1 Substation. The Project may also share the Eland 1 generation tie- (gen-tie) line facilities, or gen-tie rights-of-way. The Eland 1 substation and gen-tie line have gone through environmental analysis and subsequent approval by Kern County and are not part of the Project.

Additionally, the Project may share an operations & maintenance (O&M) building, ESS, and/or transmission facilities, as necessary, with one or more nearby solar Projects, and/or may be remotely operated. Any unused O&M building, substation, and/or transmission facility areas onsite may be covered by solar panels under such scenarios.

The applicant has considered the following in its selection of the Project site for detailed evaluation:

- Land availability (approximately 2,136 gross acres)
- Land use zoning: primarily agriculture located away from high-density residential developments
- Proximity to interconnecting substation (approximately 7 miles away) and ability to share facilities with other solar Projects

Up to 20 full-time employees would operate the Project. Typically, most staff would work during the day shift (sunrise to sunset), and the remainder would work during the night shifts and weekends. If the Project shared O&M, substation, and/or transmission facilities with one or more nearby solar Projects, and/or became remotely, the Project's onsite staff could be reduced.

After the useful life of the Project, the panels would be disassembled from the mounting frames, and the Project site would be restored to its pre-development condition.

1.3.1 PV Module Configuration

The Project would use PV panels or modules[1] on mounting frameworks to convert sunlight into electricity. Individual panels would be installed on either fixed-tilt or tracker mount systems (single- or dual- axis, using galvanized steel or aluminum). If the panels are configured for fixed tilt, they would be oriented toward the south. For tracking systems, the panels would rotate to follow the sun over the course of the day. Although the panels could stand up to 20 feet

[1] Including but not limited to bi-facial or concentrated photovoltaic (CPV) technology

high, depending on the mounting system used and county building codes, panels are expected to remain between 6 and 8 feet high.

The foundations for the mounting structures can extend up to 10 feet below ground, depending on the mounting structure, soil conditions, and wind loads, and may be encased in concrete or use small concrete footings. Final solar panel layout and spacing would be optimized for site characteristics and the desired energy production profile.

1.3.2 Inverter Stations

Direct Current (DC) energy is delivered from the panels via cables to inverter stations, generally located near the center of each block. Inverter stations convert the DC energy to AC energy, which can be dispatched to the transmission system. Inverter stations are typically comprised of one or more inverter modules with a rated power of up to 2 MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear are housed in steel enclosures, while the inverter module(s) are housed in cabinets. Depending on the supplier selected, the inverter station may lie within an enclosed or canopied metal structure, typically on a skid or concrete mounted pad.

1.3.3 Energy Storage System

The Project may include one or more ESS, located at or near a substation/switchyard (onsite or shared) and/or at the inverter stations, or elsewhere onsite. Such large-scale ESSs would be up to 600 MW AC in capacity and occupy up to 25 acres in total area. ESSs consist of modular and scalable battery packs and battery control systems that conform to U.S. national safety standards. The ESS modules, which could include commercially available lithium or flow batteries, typically consist of International Organization of Standardization (ISO) standard containers (40 feet long by 8 feet wide by 8 feet high) housed in pad- or post-mounted, stackable metal structures, but may also be housed in a dedicated building(s) in compliance with applicable regulations. The maximum height of the structure is not expected to exceed 25 feet. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, and configuration chosen, as well as on offtaker/power purchase agreement requirements and on county building standards. The Project may share an ESS with one or more nearby solar Projects or may operate one or more standalone ESS facilities within the Project site.

1.3.4 Substation

Output from the inverter stations would be transferred via electrical conduits and electrical conductor wires to one or more Project substations or switchyards (collectively referred to as substations herein), or the Eland 1 Substation. The Project and any associated ESS would have their own dedicated substation equipment located either within the Project site, or within the Eland 1 Substation footprint. Dedicated equipment may incorporate several components, including auxiliary power transformers, distribution cabinets, revenue metering systems, a microwave transmission tower, and voltage switch gear. Each substation would occupy an area of up to approximately 5 acres, secured separately by a chain-link fence. The final location(s) of each component would be determined before the issuance of building permits.

Substations typically include a small control building (roughly 500 square feet) standing 10 feet tall. The building would either be prefabricated concrete or steel housing, with rooms for the voltage switch gear and metering

equipment, a room for the station supply transformer, and a separate control technology room within which the main computer, intrusion detection system, and main distribution equipment are housed. Components of this building (e.g., control technology room and intrusion detection system) may instead be located at an O&M building below.

1.3.5 Generation-tie Line

Power generated by the Project would be transmitted to the Los Angeles Department of Water and Power (LADWP) Barren Ridge Substation via a 230kV overhead and/or underground generation-tie (gen-tie). The Project intends to share the Eland 1 gen-tie line and right-of-way, which may require stringing additional line on the Eland 1 transmission structures or increasing the capacity of the Eland 1 gen-tie by reconductoring the line with thicker cable. If the Project cannot share these facilities, a new gen-tie line would be developed within one of the routes previously analyzed in the Eland 1 Environmental Impact Report.

1.3.6 Water Usage

Water demand for panel washing and O&M use is not expected to exceed 50 acre-feet per year (afy). Water usage during construction, primarily for dust-suppression purposes, is not expected to exceed 400 acre-feet (af). It is anticipated that water would be obtained from existing onsite wells. Alternatively, water may be obtained from one or more offsite source(s) and delivered to the Project area via truck. If offsite water is used, it would likely be obtained from one of the nearby Springbok Projects, the Eland 1 Project, or from a commercial source. If the applicant determines that offsite water would be used, the applicant would submit a Will Serve Letter from the proposed offsite water purveyor(s). A small water treatment system may be installed to provide deionized water for panel washing.

1.3.7 Water Storage Tank(s)

One or more aboveground water storage tanks with a total capacity of up to 50,000 gallons may be placed onsite near the O&M building. The storage tank(s) near the O&M building would have the appropriate fire department connections to be used for fire suppression.

1.3.8 Operations and Maintenance Building

The Project may include an O&M building approximately 40 feet long by 80 feet wide, with associated onsite parking. The O&M building would be steel framed, with metal siding and roof panels. The O&M building may include the following:

1. Office
2. Repair building/parts storage
3. Control room
4. Restroom
5. Septic tank and leach field

Roads, driveways, and parking lot entrances would be constructed in accordance with Kern County and California City improvement standards. Parking spaces and walkways would be constructed in conformance with all California accessibility regulations.

.

1.3.9 Project Site Security and Fencing

The Project site would be enclosed within a chain link fence with barbed wire measuring up to 8 feet above finished grade. An intrusion alarm system would be integrated into the perimeter fence, with intrusion detection cabinets placed every 1,500 feet along the perimeter fence. An intrusions control unit or similar technology may include additional security measures including but not limited to barbed wire, low voltage fencing with warning reflective signage, controlled access points, security alarms, security camera systems, and security guard vehicle patrols to deter trespassing and/or unauthorized activities.

Gates would be maintained at the main entrances to the Project site to restrict access. Project site access would be provided to offsite emergency responders in the event of an after-hours emergency. Enclosure gates would be manually operated with a key provided in an identified key box location.

1.3.10 Project Lighting

Project lighting would be directed away from public rights-of-way and would be minimal. Site lighting may include motion sensor lights for added security purposes. Lighting would be of the lowest intensity, in compliance with any applicable regulations, measured at the property line after dark.

1.4 CONSTRUCTION ACTIVITIES

Site preparation through construction, testing, and commercial operation, is expected to commence as early as Q4 2021 and would extend for 12 to 18 months.

Construction would include the following:

- site preparation
- grading and earthwork
- concrete foundations
- structural steel work
- electrical/instrumentation work
- collector line installation
- architecture and landscaping

No roads would be affected by the Project, except during construction. Construction traffic would access the site from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 Project site. Up to 1,000 workers per day (during peak construction periods) would be required during the construction of the Project.

Heavy construction would occur between 6:00 AM and 5:00 PM, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Low-level noise activities may occur between 10:00 PM and 7:00 AM. Nighttime activities could include but are not limited to refueling equipment, staging materials, quality assurance and control, and commissioning.

Truck deliveries would normally occur during daylight. However, there would be offloading and/or transporting to the Project area on weekends and during evenings.

Earth moving is expected to be limited to the construction of the access roads, O&M building, substation, ESS(s), and any stormwater protection or storage (detention) facilities. Final grading may include revegetation with low growing or applying earth-binding materials to disturbed areas.

1.5 WORK FORCE

Once the Project is constructed, maintenance would generally be limited to the following:

1. Cleaning of PV panels
2. Monitoring electricity generation
3. Providing site security
4. Facility maintenance: replacing or repairing inverters, wiring, and PV modules

The project would require up to 20 full-time O&M employees. If the project uses shared O&M, substation, ESS, and/or transmission facilities with any future projects share personnel would reduce O&M staff.

The facility would operate seven days a week, 24 hours a day, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

1.6 PROJECT FEATURES AND BEST MANAGEMENT PRACTICES

The following sections describe standard Project features and best management practices that would be applied during construction and long-term operation of the Project to maintain safety and minimize or avoid environmental impact.

1.6.1 Waste and Hazardous Materials Management

The Project would have minimal levels of materials onsite that have been defined as hazardous under 40 Code of Federal Regulations (CFR), Part 261. The following materials are expected to be used during the construction, operation, and long-term maintenance of the Project:

- Insulating oil: used for electrical equipment
- Lubricating oil: used for maintenance vehicles
- Various solvents and detergents: equipment cleaning
- Gasoline: used for maintenance vehicles

Hazardous materials and wastes would be managed, used, handled, stored, and transported in accordance with applicable local and state regulations. All hazardous wastes would be maintained at quantities below the threshold requiring a Hazardous Material Management Program (HMMP): one 55-gallon drum. Though not expected, should any onsite storage of hazardous materials exceed one 55-gallon drum, an HMMP would be prepared and implemented.

1.6.2 Spill Prevention and Containment

Less than 55 gallons of hazardous materials would be stored onsite. Spill prevention and containment for construction and operation of the Project would adhere to the Environmental Protection Agency's guidance on Spill Prevention Control and Countermeasures.

1.6.3 Wastewater/Septic System

A standard onsite septic tank and leach field may be used at the O&M building to dispose sanitary wastewater and would be designed to meet O&M guidelines required by Kern County laws, ordinances, regulations, and standards.

1.6.4 Inert Solids

Inert solid wastes resulting from construction activities may include recyclable items such as paper, cardboard, solid concrete and block, metals, wire, glass, type 1-4 plastics, drywall, wood, and lubricating oils. Non-recyclable items include insulation, other plastics, food waste, vinyl flooring and base, carpeting, paint containers, packing materials, and other construction wastes. A construction waste management plan would be prepared for review by the county and California City. Consistent with local regulations and the California Green Building Code, the plan would provide for diversion of a minimum of 50 percent of construction waste from landfill.

Chemical storage tanks (if any) would be designed and installed to meet applicable local and state regulations. Any wastes classified as hazardous, such as solvents, degreasing agents, concrete curing compounds, paints, adhesives, chemicals, or chemical containers, would be stored in an approved storage facility/shed/structure and disposed of as required by local and state regulations. Material quantities of hazardous wastes are not expected.

1.6.5 Health and Safety

Safety precautions and emergency systems would be implemented as part of the design and construction of the Project to ensure safe and reliable operation. Administrative controls would include classroom and hands-on training in O&M procedures, general safety items, and a planned maintenance program. These would work with the system design and monitoring features to enhance safety and reliability.

The Project would have an emergency response plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies to provide aid in the event of an emergency.

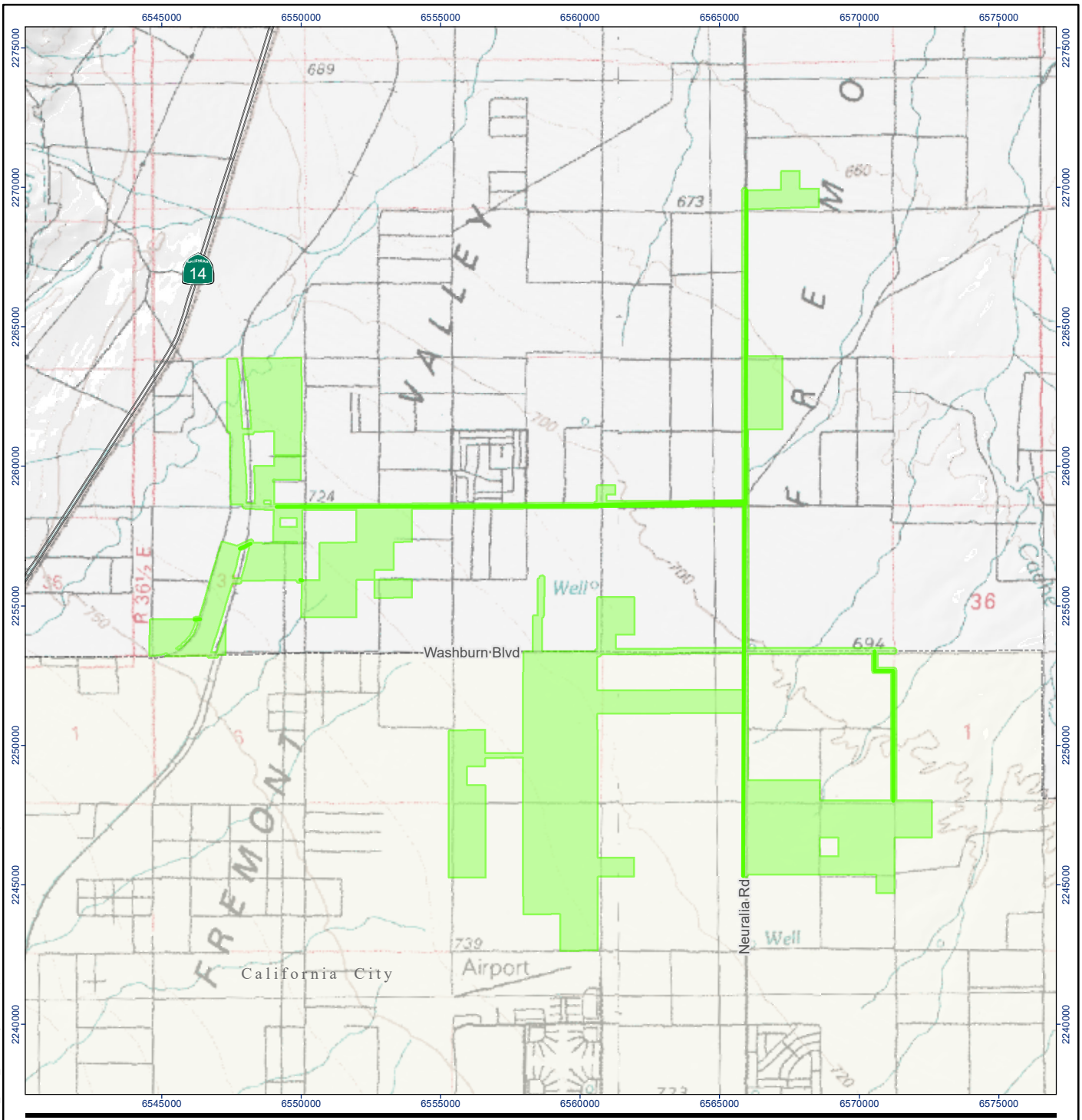
2.0 STUDY METHODS

2.1 PURPOSE AND SCOPE OF WORK

- Review available subsurface information for the sites,
- excavate and sample 19 test pits to a depth of 10 feet,
- perform soil mechanics laboratory testing on select soil samples,
- evaluate geotechnical properties of soils pertinent to the CEQA Guidelines, and
- summarize findings, conclusions, and recommendations in this study.

2.2 PRE-FIELD ACTIVITIES

Test pit locations were selected based on review of conceptual development plans and confirmed in the field at the time of field sampling. In addition, a site-specific Health and Safety Plan was developed in accordance with California Occupational Safety and Health Administration requirements to guide field activities.



Kudu Collector Lines

Kudu Survey Area

0 0.5 1 Miles

(At original document size of 8.5x11)
1:63,360

N

Stantec

8MINUTE SOLAR ENERGY

Project Location
North of California City
Kern County, CA

Prepared by SET on 2019-10-10
TR by
IR by EH 2019-10-14

Client/Project
185704635_0017
8 Minute Solar Energy
Kudu Solar Project

Figure No.
1

Title
Site Location Map

Notes
1. Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
2. Project Data Sources: 8 Minute Solar Energy and Stantec
3. Basemap USGS Topographic 1:100,000 scale mapsheets Tehachapi (1977), and Cuddeback Lake (1973).

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2.4 FIELD EXPLORATION ACTIVITIES

Nineteen shallow test pits (KTP1 through KTP15 and KTP17 through KTP20) were advanced at selected locations throughout the site to a depth of 10 feet (Figures 2 and 3). Relatively undisturbed samples were obtained using a modified California (CAL) sampler, which is a ring-lined split tube sampler with a 3-inch outer diameter and 2.5-inch inner diameter. CAL sampling followed ASTM International (ASTM) D3550 (Standard Practice for Ring-Lined Barrel Sampling of Soils) procedures. Disturbed bulk samples were excavated at locations where CAL sampling could not be completed. The CAL sampler was advanced with a backhoe bucket.

Samples were classified in the field using the United Soil Classification System (USCS), in accordance with ASTM D2488 (Standard Practice for Description and Identification of Soils [Visual-Manual Method]) procedures. The laboratory testing confirmed or modified field classifications as necessary for presentation on the boring logs. Soil samples were removed from the samplers, placed in appropriate containers, and transported in accordance with ASTM D4220 (Standard Practice for Preserving and Transporting Soil Samples).

The test pit logs are located in Appendix A. Soils are classified in accordance with the USCS, which is explained in "Symbols and Terms Used on Borehole and Test Pit Records" in Appendix A. The approximate test pit locations are shown on Figures 2 and 3.

2.5 LABORATORY SOIL TESTING

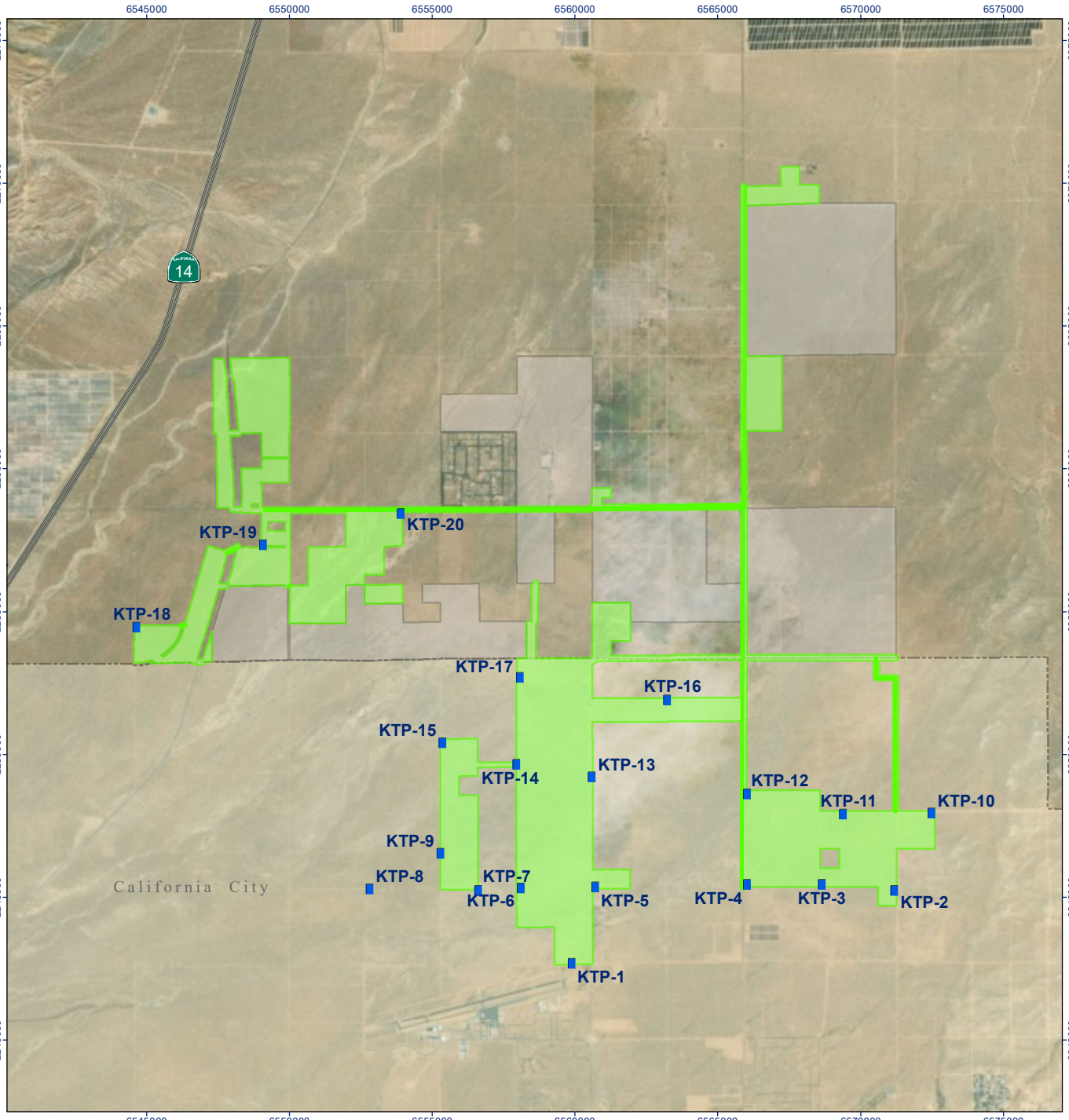
The following laboratory tests were performed on samples collected at the Site either in general accordance with the ASTM or contemporary practices of the soil engineering profession (Table 2):

Table 2. Summary of Laboratory Tests

Type of Test	ASTM Designation	Number Performed
Sieve Analysis	ASTM D422 and ASTM C136	18
Materials Finer than 75 μm (No. 200) Sieve	ASTM D1140	1
Atterberg Limits	ASTM D4318	1
Chemical Tests for Corrosion Potential	Caltrans test methods	3

Notes:
ASTM = ASTM International
Caltrans = California Department of Transportation

The results of the laboratory tests are presented in Appendix B.



Test Pit Location
Kudu Collector Route
Kudu Survey Area
Eland 1 Solar Project

0 0.5 1 Miles

(At original document size of 8.5x11)
1:63,360

N

Stantec

8MINUTE SOLAR ENERGY

Notes

1. Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
2. Project Data Sources: DOGGR, July 2019. 8 Minute Solar Energy, 2019. Stantec, 2019
3. Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Project Location
North of California City
Kern County, CA

Prepared by SET on 2019-10-10
TR by
IR by EH on 2019-10-14

Client/Project
185704635_0018
8 Minute Solar Energy
Kudu Solar Project

Figure No.
2

Title
Subsurface Exploration Map

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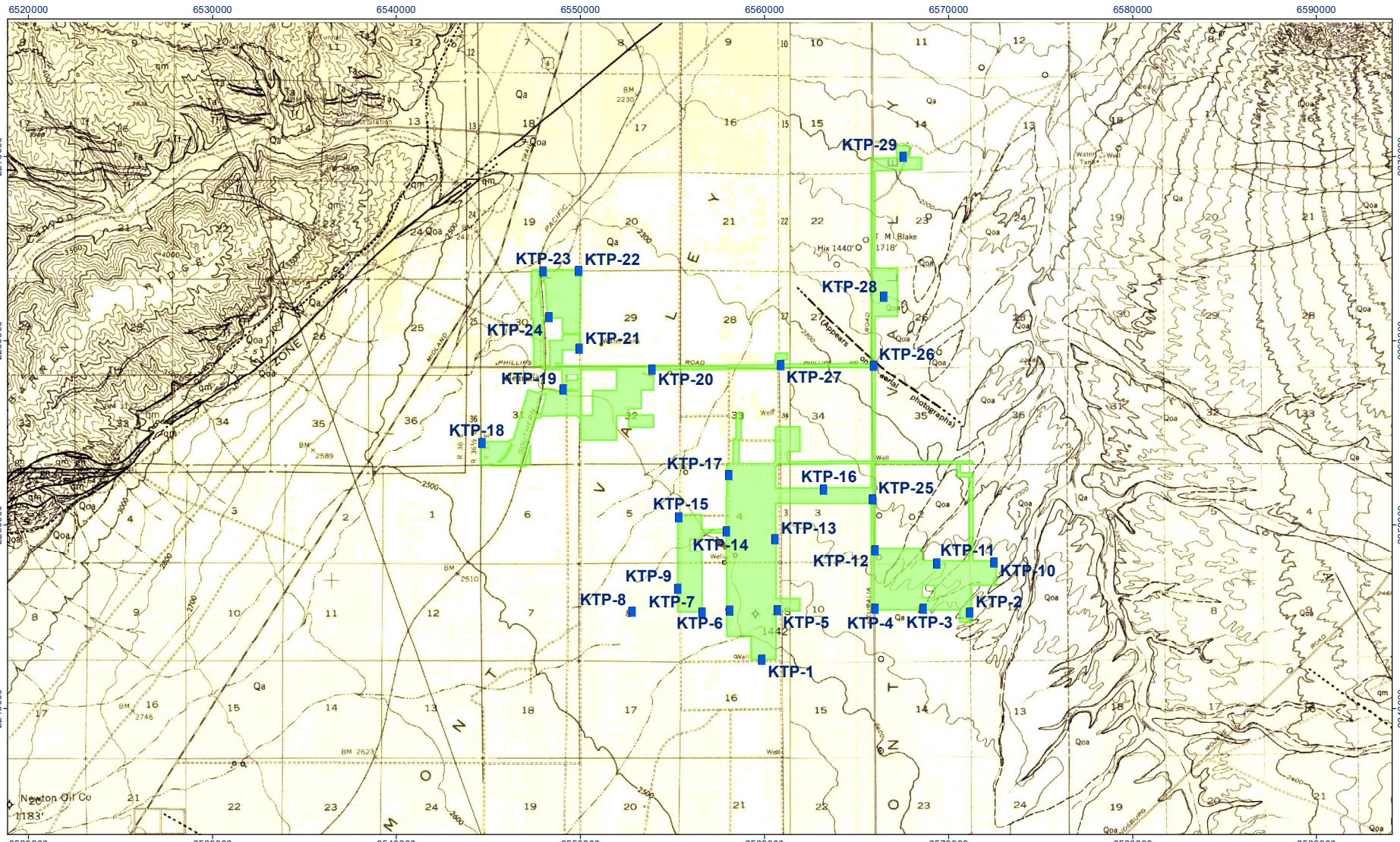

Test Pit Location

Kudu Survey Area

Geologic Units In Survey Area

Qa - Alluvium

Qoa - Older Alluvium

N

0 0.75 1.5 Miles

(At original document size of 8.5x11)

1:95,040

Notes

1. Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet

2. Data Sources: Oil and Gas wells from DOGGR, July 2019. Other data from 8 Minute Solar Energy and Stantec, 2019.

3. Base geologic maps: Castle Butte Quadrangle, Dibblee, 1958. Mojave Quadrangle, Dibblee, 1959.

Project Location
SW of California City
Kern County, CA

Prepared by SET on 2019-10-10
TR by
IR by

Client/Project
8 Minute Solar Energy
Bellefield Solar Farm

185704635_0020

Figure No.
3

Title
Geologic Map

Stantec

8MINUTE SOLAR ENERGY

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3.0 RESULTS

3.1 REGIONAL GEOLOGY

The site is located in the western portion of the Mojave Desert Geomorphic Province in the southern part of California. The surface topography within the province is controlled by two sets of faults—a prominent northwest to southeast trending set and a secondary set trending east to west.

According to the California Geological Survey (CGS) website, the Mojave Desert Geomorphic Province is a broad interior region of isolated mountains separated by desert plains with an enclosed drainage system. The Mojave Desert Geomorphic Province is wedged in a sharp angle between the San Andreas and Garlock faults (CGS 2008). Displacement along both faults is predominantly strike slip (right-lateral in the case of the San Andreas Fault; left lateral in the case of the Garlock Fault).

Geologic mapping presented in the United States Geological Survey (USGS) Geologic Map of the Mojave Quadrangle (USGS, 1959) indicates the Site is underlain by Quaternary Alluvium and Quaternary Older Alluvium deposits. Literature from the CGS indicates the alluvium and older alluvium deposits include unconsolidated and undissected valley fill derived from adjacent highlands consisting of cobbles, gravel, sand, and silt.

3.2 SUBSURFACE CONDITIONS IN TEST PIT EXPLORATIONS

The near surface (approximately 10 feet deep) soils encountered in the test pits performed are composed of sand (SP, SW, SW-SM, and SM USCS soil type), silt (ML USCS soil type), and gravel (GP and GP-GM USCS soil type). Near surface sandy soil with variable amounts of silt, gravel, and cobbles were encountered in most of the test pits. The near surface low plasticity silts were dry and were encountered in test pit KTP-2, KTP-4, KTP-11, and KTP-19 between approximately 2.5 and 10 feet. The near surface gravels were dry and encountered in test pit KTP17 through KTP19 between the ground surface and the maximum depth of exploration. Slight to moderately cemented soils were encountered at depths between approximately 7 feet and 10 feet in KTP-2, KTP-4, KTP-17, KTP-18, and KTP-20, respectively. Cobbles were encountered in KTP-7, KTP-8, KTP-15, and KTP-17 through KTP-20.

The subsurface soils were not difficult to penetrate, and the test pit excavations did not cave to the maximum depth of exploration during the course of the field investigation program. Groundwater was not encountered during this investigation.

3.3 REGIONAL GROUNDWATER

Fremont Valley Groundwater Basin underlies the western portion of the Mojave Desert and is part of the South Lahontan Hydrologic Region. The basin is bounded on the northwest by the Garlock Fault Zone, on the east by crystalline rocks of the Summit Range, Red Mountain, Lava Mountains, Rand Mountains, Castle Butte, Bissel Hills, and Rosamond Hills, and on the southwest and southeast by the Antelope Valley Groundwater Basin (DWR 2004).

Static groundwater was not encountered in the test performed for this investigation. Groundwater data from a production well on the eastern end of the Project indicates that the depth to groundwater is approximately 255 feet

below the ground surface (DWR 2010). Groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage.

3.4 REGIONAL SEISMICITY

The Project site is located within a highly active seismic zone. A regional faulting and seismicity map is presented in Figure 4. This fault map also provides information regarding recent earthquakes in the Project area. Several of the more recent earthquakes in the Project area include the 1992 Johnson earthquake, the 1992 Big Bear earthquake, the 1994 Northridge earthquake, and the 1999 Hector Mine earthquake (CGS 1999).

The estimated distance of the site to the nearest expected surface expression of an active fault is presented in Table 3. The distance measurement was taken from a location in the middle of the site as the site lies between the Garlock (Center) and Garlock (West) faults; the closest active faults relative to the site. The location from which measurements were obtained has a latitude of 35.179540°, and a longitude of -118.011887°.

Table 3. Faults within 30 Miles of the Project Area

Fault	Distance (miles) [1]	Maximum Moment Magnitude [1]
Garlock (West)	4.2	7.5
Garlock (Center)	7.2	7.7
South Sierra Nevada	7.9	7.5
Lenwood-Lockhart-Old Woman Springs	13.5	7.5
Helendale – South Lockhart	24.0	7.4
South San Andreas	29.6	8.1

Note:

1. Measured from 2008 National Seismic Hazard Maps—Source Parameters Website—USGS (USGS 2008).

3.4.1 Fault Rupture Hazard

The site is not located within a currently mapped Alquist-Priolo Special Studies Fault Zone (CDMG 2002). As noted above, the nearest active faults area the Garlock (West) and Garlock (Center) fault, located approximately 4 miles northwest and 7 miles northeast of the Site, respectively. The Garlock (Center) fault trace is shown in Figure 4 relative to the project site. As shown on Figure 4, the Garlock (Center) fault trace trends in a northeast – southwest direction. The fault trace does project toward a portion of the site. Based on proximity, the Garlock (Center) fault is considered to be the fault most likely to cause surface rupture at the project site. There is potential for surface rupture of the Garlock (Center). Based on the fault's distance from the project site and since the fault does project towards the project in the southeast portion of the site, it is our opinion that the potential for surface fault rupture to occur on the project site is moderate.

3.4.2 Strong Ground Shaking

Strong ground shaking can be expected at the site during moderate to severe earthquakes in the general region. This is common to most areas in southern California.

Information published by USGS indicates the peak ground acceleration with a 2 percent probability of being exceeded at the site in 50 years is 0.56g (USGS 2008), where g is the acceleration due to gravity determined in accordance with the U.S. Seismic Design Maps web site. Mitigation of strong ground shaking is typically provided by designing structures in accordance with the latest addition of the California Building Code.

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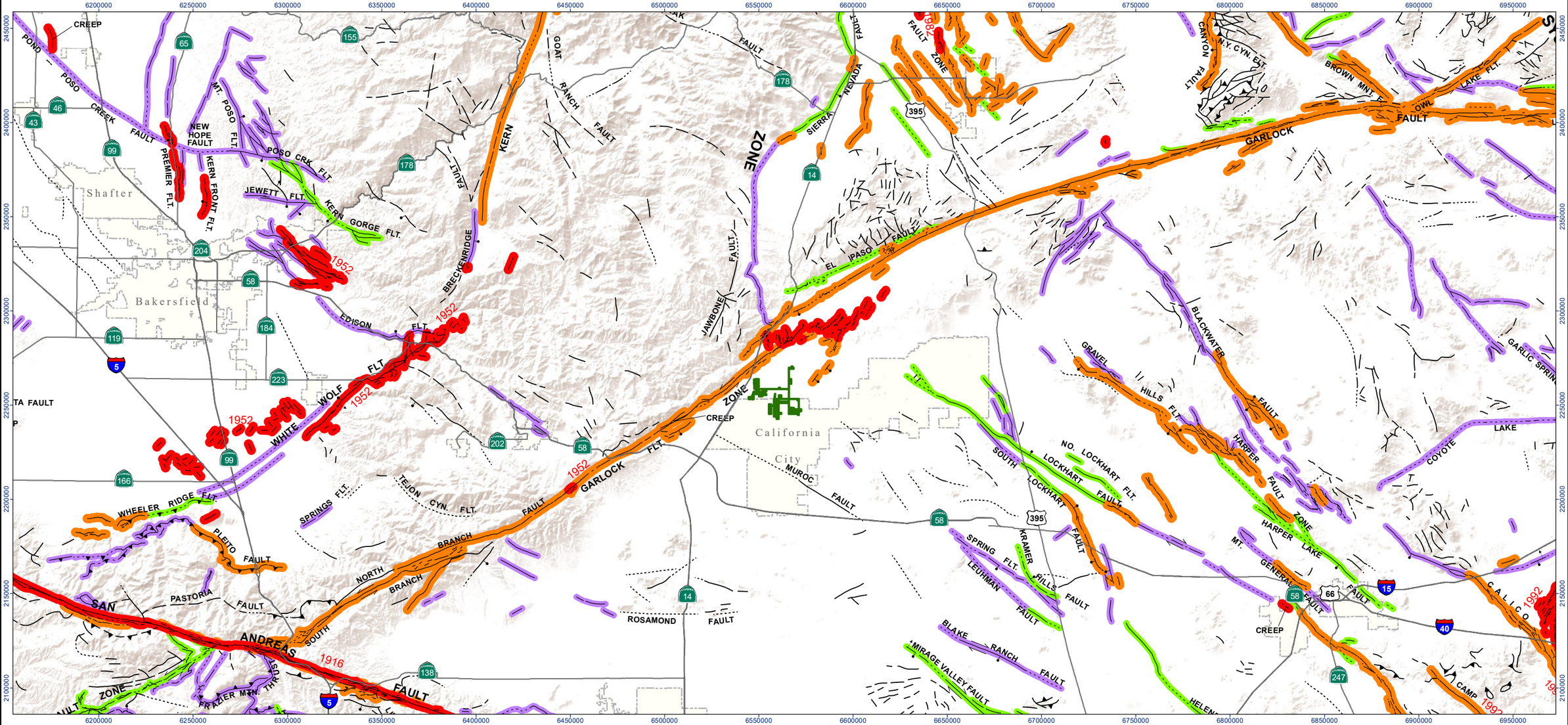

Notes
1. Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
2. Data Sources: Fault Activity Map from California Geological Survey, 2015. Seismicity from USGS, 2012. Project Data from 8 Minute Solar Energy and Stantec
3. Basemap Sources: Esri, USGS, NOAA data service, Statewide Geologic Map, 2010.

1916 Surface Rupture Point Labeled By Year
fault, approx. located
fault, certain
fault, concealed
thrust fault, certain
thrust fault, approx. located
thrust fault, concealed
dextral fault, certain
dextral fault, concealed
sinistral fault, certain
thrust fault, certain (2)
fault, certain (ball and bar)
fault, approx. located (ball and bar)
fault, concealed (ball and bar)
dextral fault, certain (ball and bar)
reverse fault, certain
reverse fault, approx. located

Recency of Movement
Historic
Holocene
Late Quaternary
Quaternary

Kudu Survey Area

0 5 10 Miles
(At original document size of 11x17)
1:633,600

N

Stantec

8MINUTE SOLAR ENERGY

Project Location
SW of California City
Kern County, CA

Prepared by SET on 2019-10-10
TR by
IR by

Client/Project
185704635_0019
8 Minute Solar Energy
Kudu Solar Project

Figure No.
4

Title
Regional Faulting and Seismicity

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3.4.3 Liquefaction

Liquefaction of saturated sandy soils is generally caused by the sudden decrease in soil shear strength due to vibration. During cyclic shaking typically caused by an earthquake, the soil mass is distorted, and inter-particle stresses are transferred from the soil particles to the pore water. As pore pressure increases, the bearing capacity decreases, and the soil may behave temporarily as a viscous fluid (liquefaction), and consequently loses its capacity to support the structures founded thereon.

Engineering research of soil liquefaction potential (Seed, et al. 1985, Seed and Idris 1982) indicates that generally, the following three basic factors must exist concurrently for liquefaction to occur:

- A source of ground shaking such as an earthquake capable of generating soil mass distortions.
- A relatively loose sandy soil fabric exhibiting a potential for volume reduction.
- A relative shallow groundwater table (within approximately 50 feet below ground surface) or completely saturated soil conditions that would allow positive pore pressure generation.

The site is not located within a current, mapped California Liquefaction Hazard Zone. In addition, groundwater in the Project area is expected to be approximately 133 feet below the ground surface (DWR 2010). Based on the near surface soil conditions and depth to groundwater, it is our opinion that the potential for liquefaction-related ground failure, including liquefaction, is low.

3.4.4 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or “free” face such as an open body of water, channel, or excavation. This movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally toward the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free.

Due to the low potential for liquefaction, the depth of groundwater, and the fact that the site is not located near free faces or bodies of water, the potential for lateral spreading is considered low.

3.5 SUBSIDENCE

Groundwater levels in the Antelope Valley adjacent to the east of the Fremont Valley where the site is located have declined more than 270 feet since the 1970s (USGS 2017) in some parts of the groundwater basin, especially near the City of Lancaster. These groundwater-level declines have caused the aquifer system to compact, resulting in land subsidence. Land subsidence within the Antelope Valley has been most recently evaluated by the USGS through the use of Interferometric Synthetic Aperture Radar between 1992 and 2009 (USGS 2000). Based on these recent studies, the site is not within an area that has sustained measurable subsidence due to groundwater draw down. Due to the depth of groundwater and the fact that the site is not located in a mapped subsidence area, the potential for subsidence is considered low.

3.6 EXPANSIVE SOIL POTENTIAL

Expansion and contraction of volume can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). Since near-surface soils encountered during the recent geotechnical investigation are mostly sandy soils whose expansion potential is considered low, special design for expansive soils would likely not be necessary for the proposed development.

3.7 SLOPES

The site is relatively flat, with a topographic gradient less than 2 percent. Permanent slopes steeper than 5:1 (horizontal to vertical) or higher than 5 feet are not anticipated to be constructed or built upon for the Project. Due to the existing topography and the proposed grading, landslides are not considered a potential hazard for the Project. The stability of slopes, if any, should be verified when design-grading information becomes available.

3.8 EROSION

The predominantly coarse-grained soils underlying the site are potentially susceptible to erosion or the loss of topsoil due to surface water flows.

Mitigation of soil erosion may include selective grading, establishment of anchoring vegetation, design of runoff control features such as drainage ditches, and construction of erosion control features such as pavements and surface mats. These mitigation options should be addressed in the design-level evaluations for the Project.

4.0 CONCLUSIONS

Based on the currently planned development, it is our opinion that the soils would require additional assessment to determine mitigation measures for strong ground shaking and erosion.

Mitigation options for these hazards are provided in the preceding sections. Impacts should be mitigated through the application of standard conditions of development, which require preparation of a design-level geotechnical study as a condition of grading permit issuance.

Based on the findings of this CEQA Level Geotechnical Study, a completed CEQA questionnaire for the Geology and Soils Section has been included as Appendix C. As recommended above, items checked as “Less than Significant with Mitigation” should be addressed in the scope of a future design-level geotechnical investigation.

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5.0 REFERENCES

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Appendix A TEST PIT LOGS

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-01** PAGE 1 OF 1
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 17.824"** LONGITUDE: **-118° 0' 21.528"**
GROUND ELEV (ft): **2394** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)		KTP1-Bulk	CORR			
		SM	**SILTY SAND** ; SM; reddish brown; 80% fine to coarse grained sand; 20% fines; dry; medium dense; no PHCO or staining		KTP1-2.0'				
5			4% fine gravel; 81% fine to coarse grained sand; 14% fines below 5 feet		KTP1-5.0'	SA			5
10					KTP1-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-02

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 9' 44.51"**
LONGITUDE: **-117° 58' 5.948"**
GROUND ELEV (ft): **2337**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY OLDER ALLUVIUM (Qoa)						
		SM	**SILTY SAND** ; SM; light gray; 1% fine gravel; 72% fine to coarse grained sand; 27% fines; dry; medium dense; no PHCO or staining		KTP2-2.0'	SA			
5					KTP2-5.0'				5
		ML	**SANDY SILT WITH GRAVEL** ; ML; light brown; 5% fine gravel; 35% fine to coarse grained sand; 60% fines; dry; very stiff; occasional carbonatic cement; no PHCO or staining		KTP2-10.0'				
10			Hole terminated at 10 feet.						10
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-03** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 45.155"** LONGITUDE: **-117° 58' 35.933"**
GROUND ELEV (ft): **2335** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 10% fine gravel; 73% fine to coarse grained sand; 17% fines; dry; medium dense; no PHCO or staining		KTP3-2.0'	SA			
5					KTP3-5.0'				5
10					KTP3-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-04** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 45.166"** LONGITUDE: **-117° 59' 7.426"**
GROUND ELEV (ft): **2345** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; light gray; 1% fine gravel; 61% fine to coarse grained sand; 38% fines; dry; medium dense; no PHCO or staining		KTP4-2.0'	SA			
		ML	**SANDY SILT** ; ML; white; 5% fine gravel; 30% fine to coarse grained sand; 65% fines; dry; stiff to very stiff; no PHCO or staining						
5					KTP4-5.0'				5
		SM	**SILTY SAND WITH GRAVEL** ; SM; reddish brown; 5% fine gravel; 35% fine to coarse grained sand; 60% fines; dry; very stiff; occasional carbonatic cement; no PHCO or staining		KTP4-10.0'				
10			Hole terminated at 10 feet.						10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-05** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 44.456"** LONGITUDE: **-118° 0' 13.5"**
GROUND ELEV (ft): **2379** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**WELL GRADED SAND WITH GRAVEL** ; SM; light gray; 8% fine gravel; 81% fine to coarse grained sand; 11% fines; dry; medium dense; no PHCO or staining		KTP5-2.0'	SA			
5		SP	**POORLY GRADED SAND** ; SP; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; medium dense; no PHCO or staining		KTP5-5.0'				5
					KTP5-10.0'				
10			Hole terminated at 10 feet.						10
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-06

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 9' 44.01"**
LONGITUDE: **-118° 0' 42.66"**
GROUND ELEV (ft): **2403**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 3% fine gravel; 78% fine to coarse grained sand; 19% fines; dry; loose to medium dense; no PHCO or staining		KTP6-2.0'	SA			
5			5% fine gravel; 80% fine to coarse grained sand; 15% fines below 5 feet		KTP6-5.0'				5
					KTP6-10.0'				
10			Hole terminated at 10 feet.						10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:
KTP-07
PAGE 1 OF 1

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 43.369"** LONGITUDE: **-118° 1' 3.439"**
GROUND ELEV (ft): **2412** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 1% fine gravel; 59% fine to coarse grained sand; 40% fines; dry; loose; no PHCO or staining		KTP7-2.0'	SA			
5			5% fine gravel; 80% fine to coarse grained sand; 15% fines below 5 feet		KTP7-5.0'				5
			Occasional cobbles up to 5 inches in diameter below 7 feet						
10					KTP7-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-08

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 12' 46.519"** LONGITUDE: **-118° 2' 33.27"**
GROUND ELEV (ft): **2335** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **11.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 7% fine gravel; 84% fine to coarse grained sand; 9% fines; dry; loose to medium dense; no PHCO or staining		KTP8-2.0'	SA			
5		SP	**POORLY GRADED SAND WITH GRAVEL** ; SP; light brown; 5% fine gravel; 90% fine to coarse grained sand; 5% fines below 5 feet; cobbles up to 6 inches in diameter		KTP8-5.0'				5
10					KTP8-10.0'				10
			Hole terminated at 11 feet.						
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:
KTP-09 PAGE 1 OF 1
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 9' 59.188"** LONGITUDE: **-118° 1' 16.014"**
GROUND ELEV (ft): **2423** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND WITH GRAVEL** ; SM; light brown; 35% fine gravel; 52% fine to coarse grained sand; 13% fines; dry; loose; no PHCO or staining		KTP9-2.0'	SA			
5					KTP9-5.0'				5
10					KTP9-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-10

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 10' 9.131"**
LONGITUDE: **-117° 57' 49.759"**
GROUND ELEV (ft): **2318**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY OLDER ALLUVIUM (Qoa)		KTP10-Bulk	CORR			
		SM	**SILTY SAND** ; SM; reddish brown; 1% fine gravel; 69% fine to coarse grained sand; 30% fines; dry; loose; no PHCO or staining		KTP10-2.0'	SA			
		SP	**POORLY GRADED SAND** ; SP; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; no PHCO or staining						
5					KTP10-5.0'				5
10					KTP10-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-11

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 10' 8.976"**
LONGITUDE: **-117° 58' 26.249"**
GROUND ELEV (ft): **2323**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 69% fine to coarse grained sand; 31% fines; dry; medium dense; no PHCO or staining		KTP11-2.0'	#200, AL			
5		ML	**SANDY SILT** ; ML; white; 5% fine gravel; 30% fine to coarse grained sand; 65% fines; dry; very stiff; no PHCO or staining		KTP11-5.0'				5
			Hard below 9 feet						
10					KTP11-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-12** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 10' 9.329"** LONGITUDE: **-117° 59' 6.914"**
GROUND ELEV (ft): **2335** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; light brown; 1% fine gravel; 69% fine to coarse grained sand; 30% fines; dry; medium dense; no PHCO or staining		KTP12-2.0'	SA			
5			Loose to medium dense below 5 feet		KTP12-5.0'				5
10					KTP12-10.0'				10
			Hole terminated at 10 feet.						
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/28/19** COMPLETED: **8/28/19**
INSTALLATION: STARTED **8/28/19** COMPLETED: **8/28/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:
KTP-13 PAGE 1 OF 1
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 10' 11.096"** LONGITUDE: **-118° 0' 12.744"**
GROUND ELEV (ft): **2372** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 1% fine gravel; 74% fine to coarse grained sand; 25% fines; dry; medium dense; no PHCO or staining		KTP13-2.0'	SA			
5		SW	**WELL GRADED SAND** ; SW; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; no PHCO or staining		KTP13-5.0'				5
10			Hole terminated at 10 feet.		KTP13-10.0'				10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-14

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 10' 20.244"**
LONGITUDE: **-118° 0' 43.646"**
GROUND ELEV (ft): **2390**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **11.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 5% fine gravel; 73% fine to coarse grained sand; 22% fines; dry; loose to medium dense; no PHCO or staining		KTP14-2.0'	SA			
		SP	**POORLY GRADED SAND** ; SP; light brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; no PHCO or staining		KTP14-5.0'				
5									5
		SM	**SILTY SAND** ; SM; light brown; 5% fine gravel; 80% fine to coarse grained sand; 15% fines; dry; medium dense; no PHCO or staining		KTP14-10.0'				
10			Hole terminated at 11 feet.						10
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-15** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 10' 34.266"** LONGITUDE: **-118° 1' 16.036"**
GROUND ELEV (ft): **2402** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SM	**SILTY SAND** ; SM; reddish brown; 8% fine gravel; 76% fine to coarse grained sand; 16% fines; dry; loose to medium dense; no PHCO or staining		KTP15-2.0'	SA			
5		SW	**WELL GRADED SAND** ; SW; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; occassional cobbles up to 6 inches in diameter; no PHCO or staining		KTP15-5.0'				5
10			Hole terminated at 10 feet.		KTP15-10.0'				10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-17** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 10' 46.344"** LONGITUDE: **-118° 0' 42.793"**
GROUND ELEV (ft): **2376** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		GP-GM	**POORLY GRADED GRAVEL WITH SILT AND SAND** ; GP-GM; tan; 54% fine gravel; 39% fine to coarse grained sand; 7% fines; dry; medium dense; some cobbles up to 5 inches in diameter; no PHCO or staining		KTP17-2.0'	SA			
5		SW	**WELL GRADED SAND WITH GRAVEL** ; SW; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; no PHCO or staining		KTP17-5.0'				5
			Dense with carbonatic cement below 7 feet						
			Cobbles up to 4 inches in diameter below 9 feet						
10			Hole terminated at 10 feet.		KTP17-10.0'				10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-18** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 11' 9.992"** LONGITUDE: **-118° 3' 24.448"**
GROUND ELEV (ft): **2459** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		SW-SM	**WELL GRADED SAND WITH SILT** ; SW-SM; light brown; 8% fine gravel; 81% fine to coarse grained sand; 11% fines; dry; medium dense; no PHCO or staining		KTP18-2.0'	SA			
5		SW	**WELL GRADED SAND** ; SW; reddish brown; 10% fine gravel; 85% fine to coarse grained sand; 5% fines; dry; loose; some cobbles up to 4 inches in diameter; no PHCO or staining Dense with carbonatic cement below 7 feet		KTP18-5.0'				5
10		GP	**POORLY GRADED GRAVEL** ; GP; white; black; tan; 55% fine gravel; 40% fine to coarse grained sand; 5% fines; dry; loose to medium dense; some cobbles up to 7 inches in diameter; no PHCO or staining Hole terminated at 10 feet.		KTP18-10.0'				10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO: **KTP-19** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 11' 41.161"** LONGITUDE: **-118° 2' 29.8"**
GROUND ELEV (ft): **2398** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **11.0**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB** CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)						
		ML	**SANDY SILT** ; ML; light brown; 1% fine to coarse gravel; 48% fine to coarse grained sand; 51% fines; dry; very stiff; no PHCO or staining		KTP19-2.0'	SA			
5		SM	**SILTY SAND** ; SM; 5% fine gravel; 60% fine to coarse grained sand; 35% fines; dry; loose; some cobbles up to 4 inches in diameter; no PHCO or staining		KTP19-5.0'				5
		GP	**POORLY GRADED GRAVEL WITH SAND** ; GP; light brown; 55% fine gravel; 40% fine to coarse grained sand; 5% fines; dry; loose; occassional cobbles up to 6 inches in diameter; no PHCO or staining		KTP19-10.0'				
10			Hole terminated at 11 feet.						10
15									15
20									20

PROJECT: **8minutenergy - Kudu**
LOCATION: **Northwest of California City, Kern County, CA**
PROJECT NUMBER: **185704635**
DRILLING: STARTED **8/27/19** COMPLETED: **8/27/19**
INSTALLATION: STARTED **8/27/19** COMPLETED: **8/27/19**
DRILLING COMPANY: **4Granite**
DRILLING EQUIPMENT: **Backhoe**
DRILLING METHOD: **Backhoe trenching**
SAMPLING EQUIPMENT: **Bulk/Bag Sample**

WELL / TEST PIT / BOREHOLE NO:

KTP-20

Stantec

NORTHING (ft):
EASTING (ft):
LATITUDE: **35° 11' 41.161"**
LONGITUDE: **-118° 2' 29.8"**
GROUND ELEV (ft): **2358**
TOC ELEV (ft):
INITIAL DTW (ft): **NE**
BOREHOLE DEPTH (ft): **10.0**
STATIC DTW (ft): **NE**
WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---**
BOREHOLE DIAMETER (in): **36**
LOGGED BY: **GB**
CHECKED BY: **JF**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			QUATERNARY ALLUVIUM (Qa)		KTP20-Bulk	CORR			
		SP	**POORLY GRADED SAND WITH GRAVEL** ; SP; light brown; 31% fine gravel; 68% fine to coarse grained sand; 1% fines; dry; loose; few organics; no PHCO or staining		KTP20-2.0'	SA			
5		SM	**SILTY SAND** ; SM; reddish brown; 10% fine gravel; 65% fine to coarse grained sand; 25% fines; dry; loose; no PHCO or staining Dense with carbonatic cement below 7 feet		KTP20-5.0'				5
		SP	**POORLY GRADED SAND** ; SP; light brown; 30% fine gravel; 65% fine to coarse grained sand; 5% fines; dry; loose to medium dense; occassional cobbles up to 6 inches in diameter; no PHCO or staining		KTP20-10.0'				
10			Hole terminated at 10 feet.						10
15									15
20									20

GEO FORM 304 BORING_LOGS.GPJ SECOR INTL.GDT 10/11/19

Appendix B LABORATORY TEST RESULTS

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP1-5'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	442.70	Analysis based on total sample.	
Moisture Content (%)	3.3		

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	3.30	0.7	99.3
No. 4	15.40	3.5	95.8
No. 8	36.70	8.3	87.5
No. 16	59.20	13.4	74.1
No. 30	69.70	15.7	58.4
No. 50	97.20	22.0	36.4
No. 100	62.90	14.2	22.2
No. 200	34.54	7.8	14.4
Pan	63.76	14.4	---

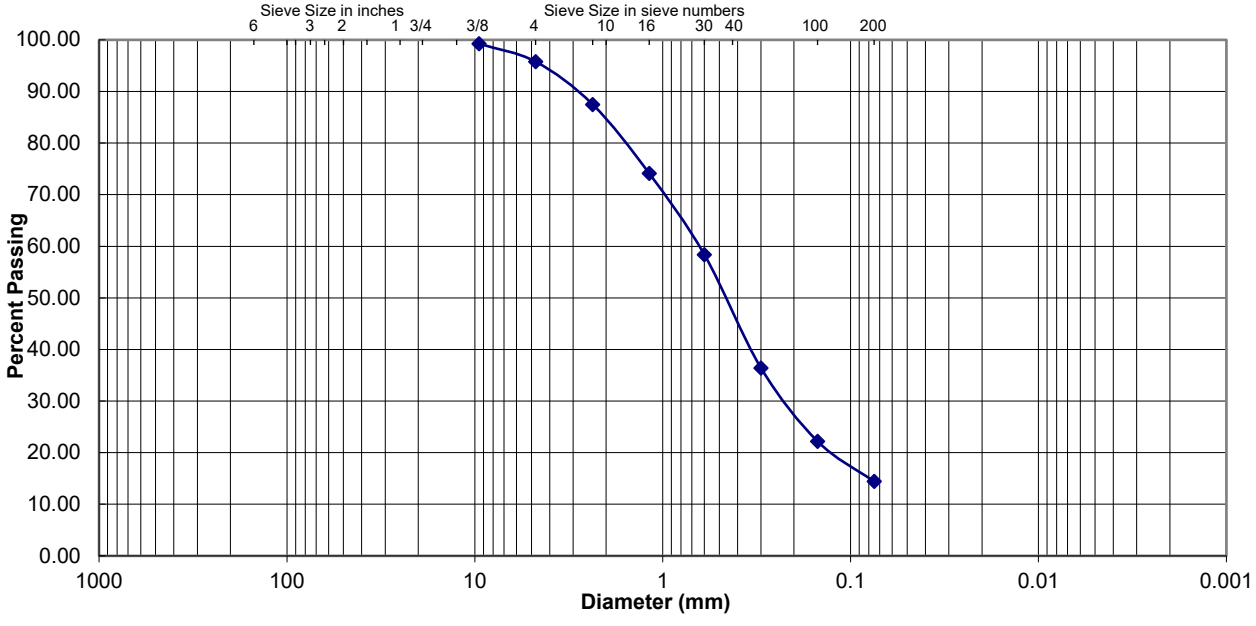
% Gravel	4.2
% Sand	81.4
% Fines	14.4
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP2-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	394.40	Analysis based on total sample.	
Moisture Content (%)	8.0		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	3.30	0.8	99.2
No. 8	16.20	4.1	95.1
No. 16	26.80	6.8	88.3
No. 30	40.00	10.1	78.1
No. 50	80.10	20.3	57.8
No. 100	77.30	19.6	38.2
No. 200	42.30	10.7	27.5
Pan	108.40	27.5	---

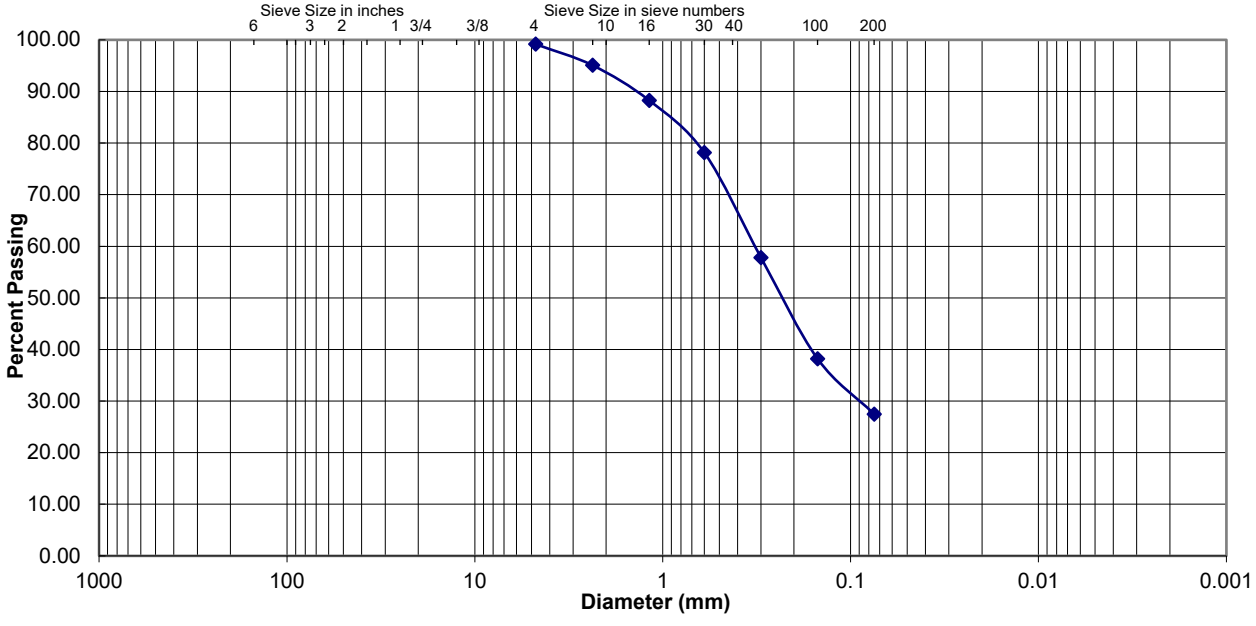
% Gravel	0.8
% Sand	71.7
% Fines	27.5
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP3-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	442.80		
Moisture Content (%)	3.2		

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
3/4"	28.90	6.5	93.5
1/2"	0.00	0.0	93.5
3/8"	5.60	1.3	92.2
No. 4	8.80	2.0	90.2
No. 8	22.30	5.0	85.2
No. 16	41.00	9.3	75.9
No. 30	59.60	13.5	62.5
No. 50	80.40	18.2	44.3
No. 100	73.70	16.6	27.7
No. 200	47.70	10.8	16.9
Pan	74.80	16.9	---

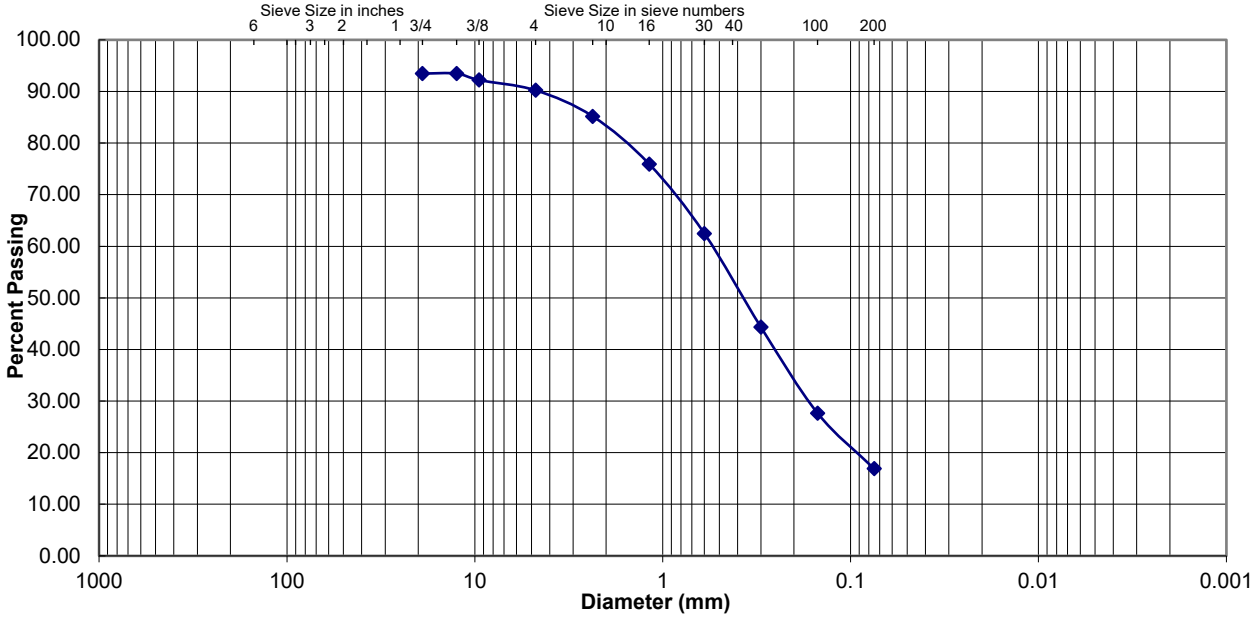
% Gravel	9.8
% Sand	73.3
% Fines	16.9
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP4-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	402.70		
Moisture Content (%)	5.6		

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	2.00	0.5	99.5
No. 8	7.60	1.9	97.6
No. 16	16.20	4.0	93.6
No. 30	28.50	7.1	86.5
No. 50	57.70	14.3	72.2
No. 100	78.80	19.6	52.6
No. 200	57.70	14.3	38.3
Pan	154.20	38.3	---

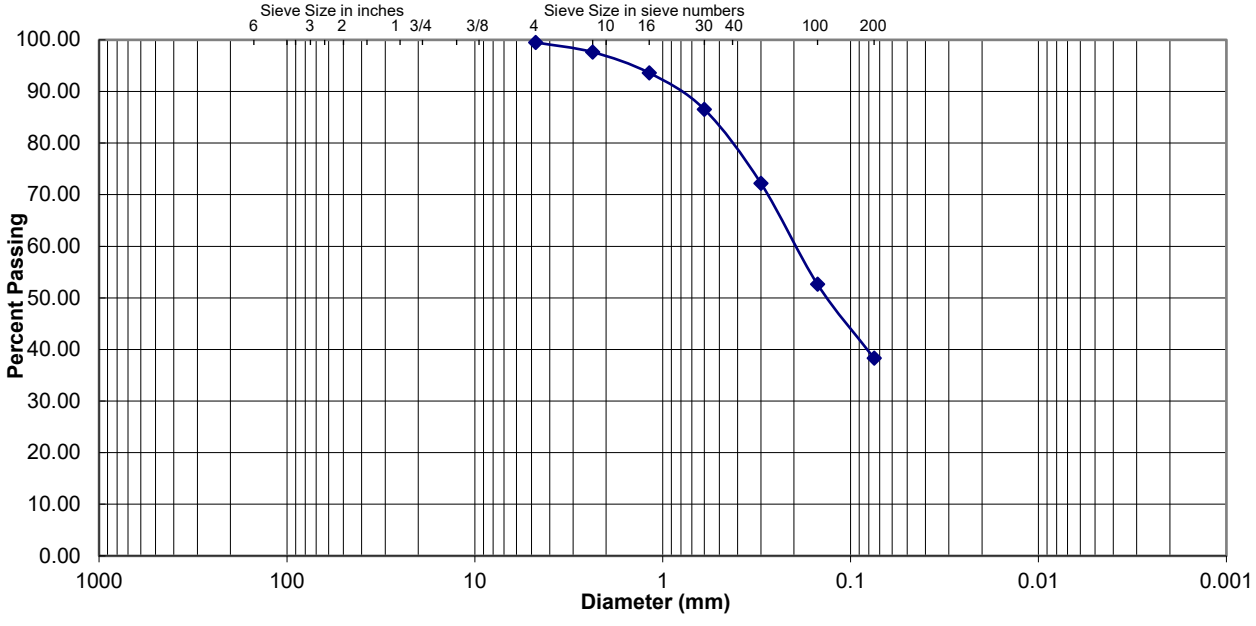
% Gravel	0.5
% Sand	61.2
% Fines	38.3
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP5-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	359.00	Analysis based on total sample.	
Moisture Content (%)	3.4		

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	9.50	2.6	97.4
No. 4	19.50	5.4	91.9
No. 8	30.30	8.4	83.5
No. 16	47.60	13.3	70.2
No. 30	59.10	16.5	53.8
No. 50	71.30	19.9	33.9
No. 100	55.40	15.4	18.5
No. 200	25.70	7.2	11.3
Pan	40.60	11.3	---

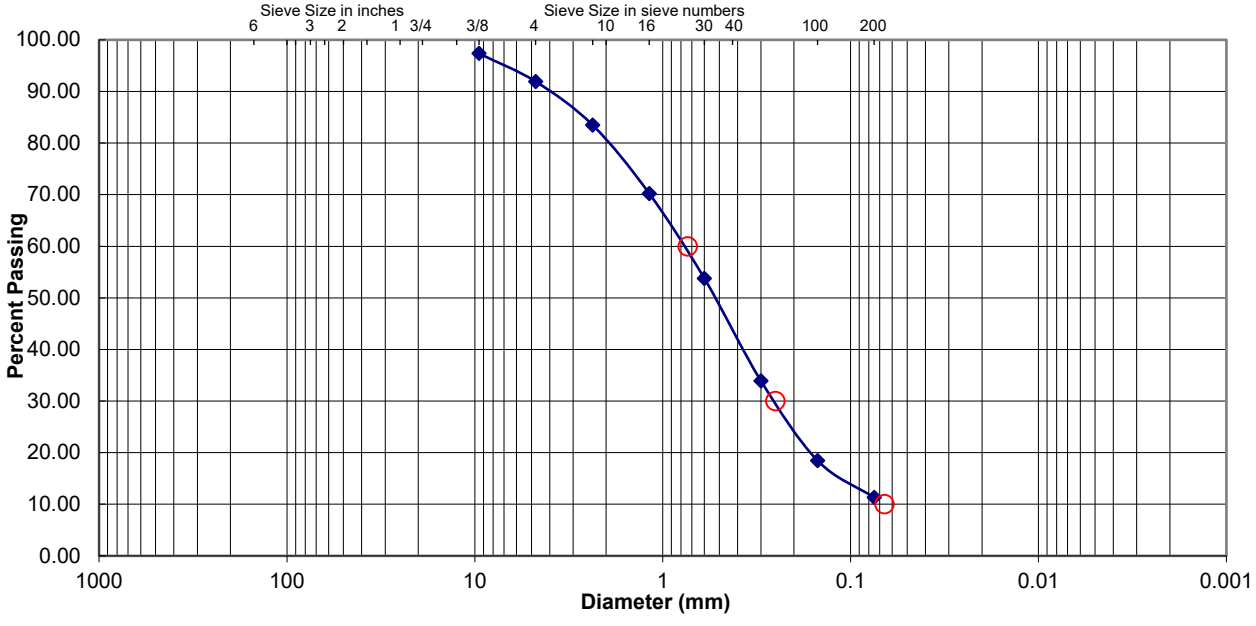
% Gravel	8.1
% Sand	80.6
% Fines	11.3
Fines Classification	ML
D_{10} (mm)	0.0661
D_{30} (mm)	0.2518
D_{60} (mm)	0.7353
Cu	11.13
Cc	1.31

Classification

Well Graded Sand (SW-SM) with Silt

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP6-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	357.40	Analysis based on total sample.	
Moisture Content (%)	2.8		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	9.80	2.7	97.3
No. 8	21.90	6.1	91.1
No. 16	46.30	13.0	78.2
No. 30	54.50	15.2	62.9
No. 50	66.80	18.7	44.2
No. 100	55.20	15.4	28.8
No. 200	35.40	9.9	18.9
Pan	67.50	18.9	---

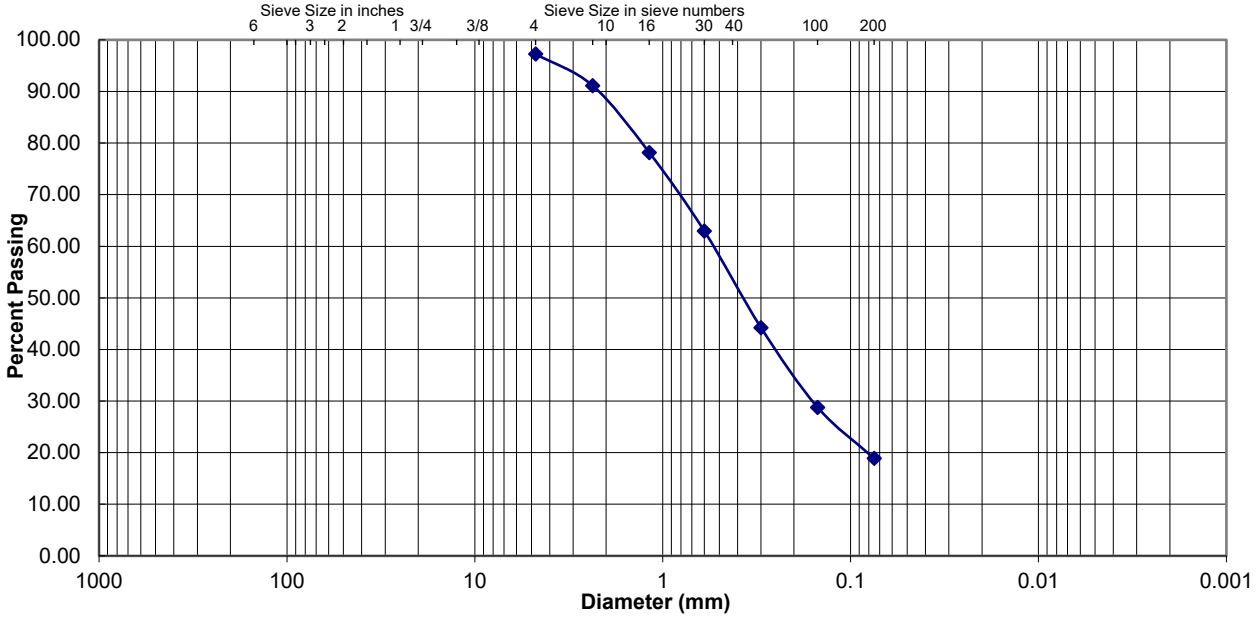
% Gravel	2.7
% Sand	78.4
% Fines	18.9
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP7-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	324.60	Analysis based on total sample.	
Moisture Content (%)	3.5		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	4.70	1.4	98.6
No. 8	9.00	2.8	95.8
No. 16	15.20	4.7	91.1
No. 30	21.40	6.6	84.5
No. 50	32.80	10.1	74.4
No. 100	54.80	16.9	57.5
No. 200	57.70	17.8	39.7
Pan	129.00	39.7	---

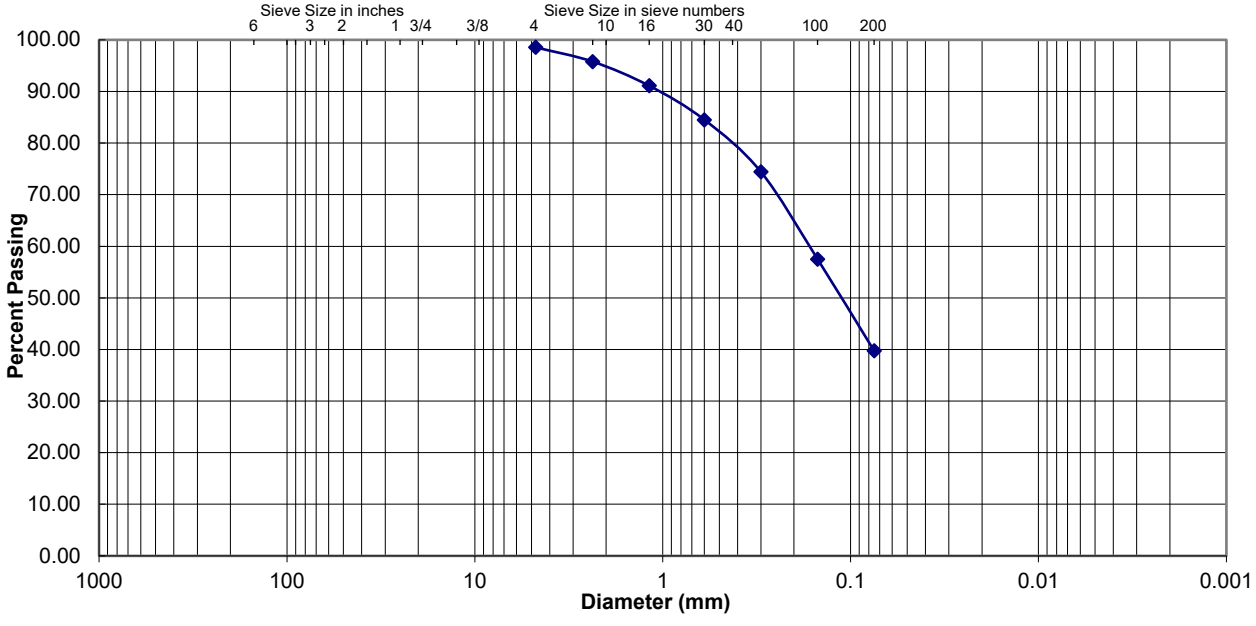
% Gravel	1.4
% Sand	58.8
% Fines	39.7
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP8-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-21-2019
Particle Shape		Test Date	09-22-2019
Particle Hardness			
Sample Dry Mass (g)	431.80	Analysis based on total sample.	
Moisture Content (%)	1.4		

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	11.50	2.7	97.3
No. 4	17.00	3.9	93.4
No. 8	28.50	6.6	86.8
No. 16	58.80	13.6	73.2
No. 30	70.90	16.4	56.8
No. 50	88.20	20.4	36.3
No. 100	76.80	17.8	18.6
No. 200	40.70	9.4	9.1
Pan	39.40	9.1	---

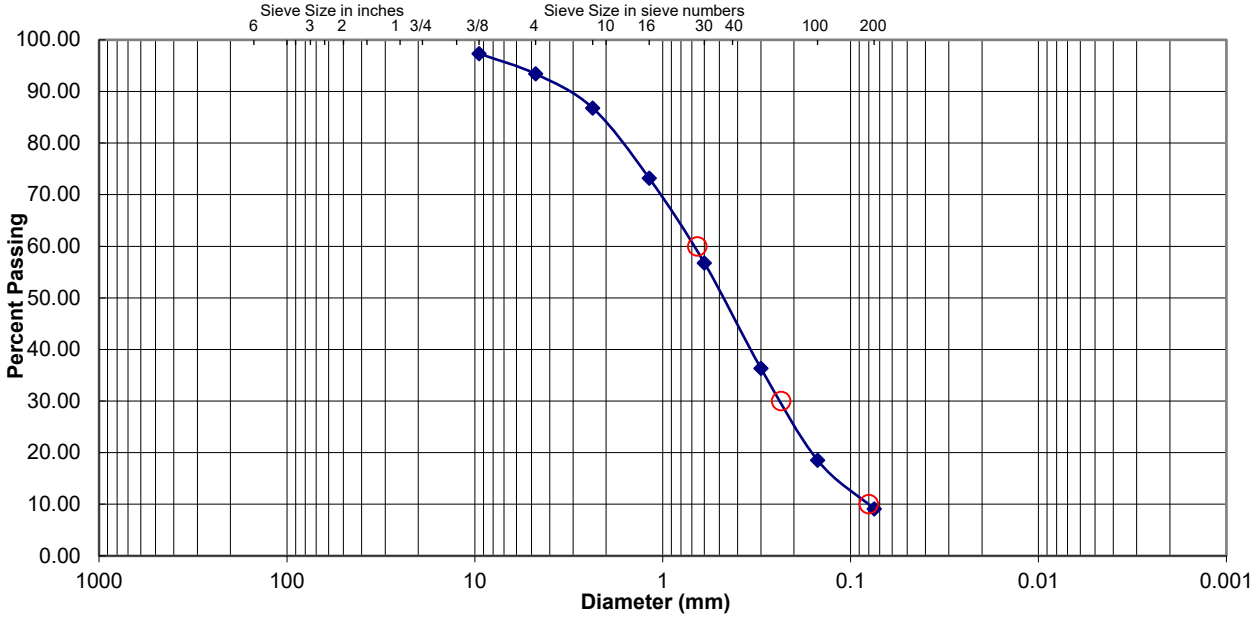
% Gravel	6.6
% Sand	84.3
% Fines	9.1
Fines Classification	ML
D_{10} (mm)	0.0800
D_{30} (mm)	0.2344
D_{60} (mm)	0.6556
Cu	8.20
Cc	1.05

Classification

Well Graded Sand (SW-SM) with Silt

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP9-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	498.60	Analysis based on total sample.	
Moisture Content (%)	1.5		

Sieve Size	Grams Retained	% Retained	% Passing
1"	70.50	14.1	85.9
3/4"	42.00	8.4	77.4
1/2"	33.50	6.7	70.7
3/8"	15.60	3.1	67.6
No. 4	15.50	3.1	64.5
No. 8	26.60	5.3	59.1
No. 16	38.40	7.7	51.4
No. 30	40.10	8.0	43.4
No. 50	49.90	10.0	33.4
No. 100	59.90	12.0	21.4
No. 200	43.00	8.6	12.8
Pan	63.60	12.8	---

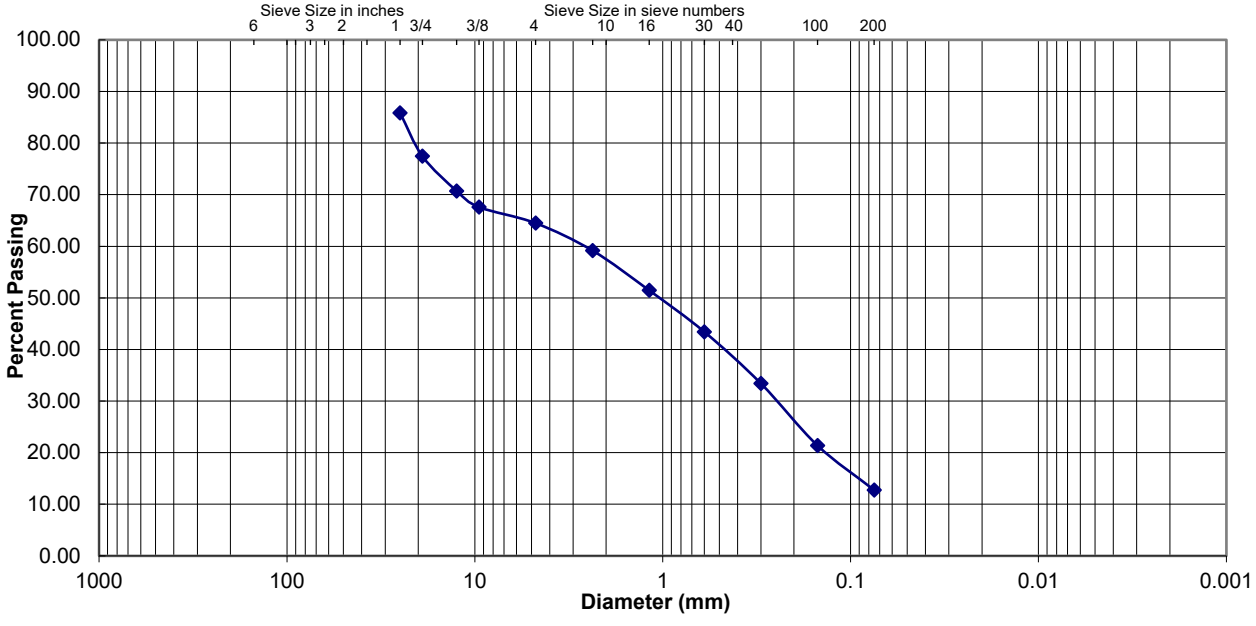
% Gravel	35.5
% Sand	51.7
% Fines	12.8
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM) with Gravel

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP10-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	448.10	Analysis based on total sample.	
Moisture Content (%)	9.1		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	2.30	0.5	99.5
No. 8	13.00	2.9	96.6
No. 16	33.60	7.5	89.1
No. 30	52.20	11.6	77.4
No. 50	98.40	22.0	55.5
No. 100	75.20	16.8	38.7
No. 200	35.90	8.0	30.7
Pan	137.50	30.7	---

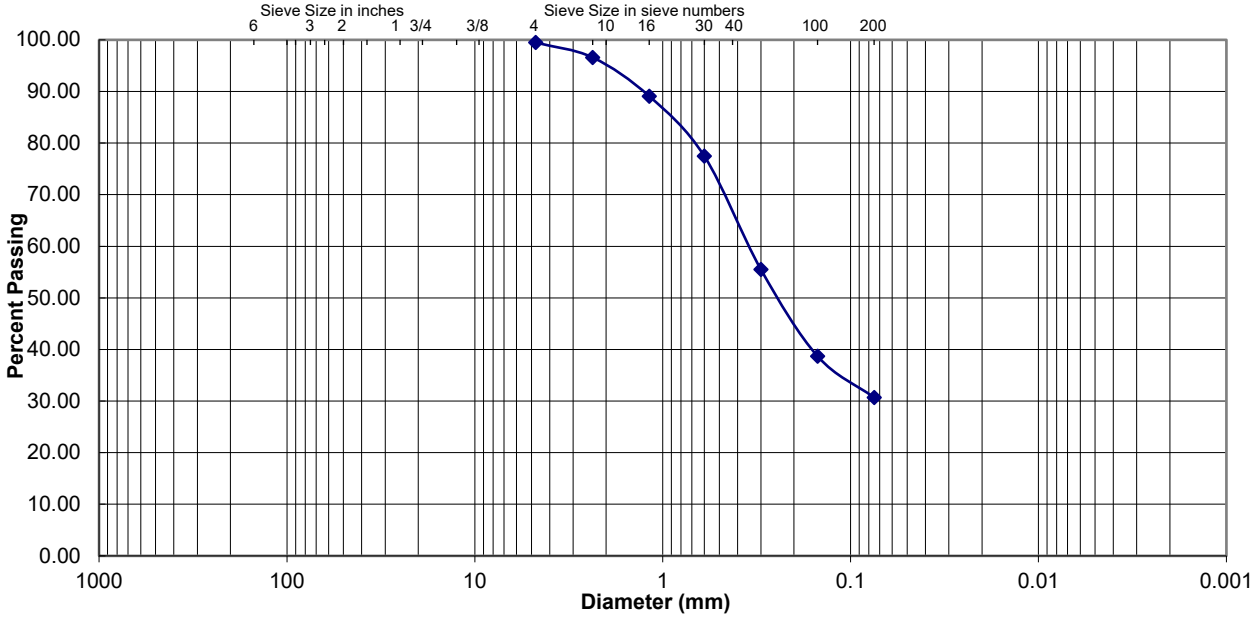
% Gravel	0.5
% Sand	68.8
% Fines	30.7
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Materials Finer Than 75µm (No. 200) Sieve

ASTM D 1140

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP11-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Test Date	09-22-2019

Initial Sample Wet Mass (g)	283.00	Moisture Content (%)	3.9
Initial Oven Dry Sample Mass (g)	272.40		
Final Oven Dry Sample Mass (g)	189.20		
Materials Finer Than 75µm (No. 200) Sieve (g)	83.20		
Percent Finer Than 75µm (No. 200) Sieve (%)	30.5		

Comments

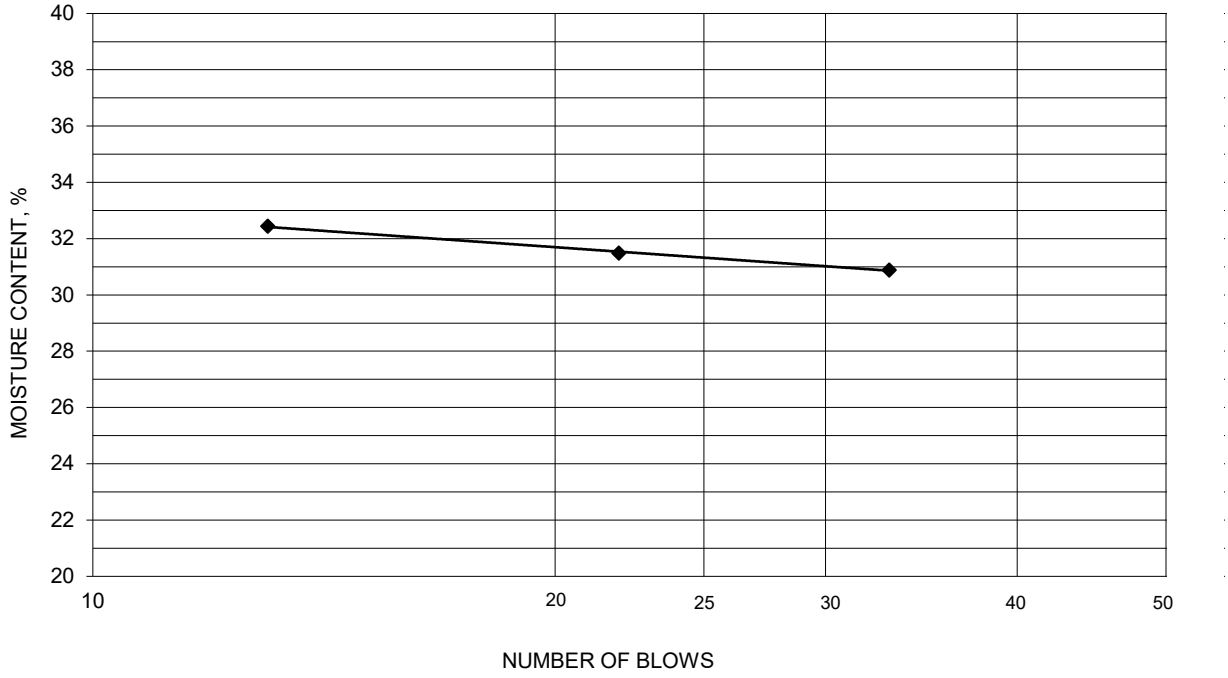
Reviewed By

ATTERBERG LIMITS

Project	8me Kudu			Project No.	185704635
Source	Grab			Lab ID	KTP11-2'
Tested By	M.P.	Test Method	ASTM D 4318	% + No. 40	30
Test Date	Need! Input	Prepared	Dry	Date Received	09-12-2019

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.51	18.12	13.62	33	30.9	
20.56	18.91	13.67	22	31.5	
21.67	19.74	13.79	13	32.4	31

Liquid Limit



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
23.72	21.96	13.54	20.9	21	10

Remarks: _____

Reviewed By _____

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP12-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	362.10		
Moisture Content (%)	1.0		

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	3.70	1.0	99.0
No. 8	16.00	4.4	94.6
No. 16	30.70	8.5	86.1
No. 30	43.20	11.9	74.2
No. 50	55.30	15.3	58.9
No. 100	56.90	15.7	43.2
No. 200	48.10	13.3	29.9
Pan	108.20	29.9	---

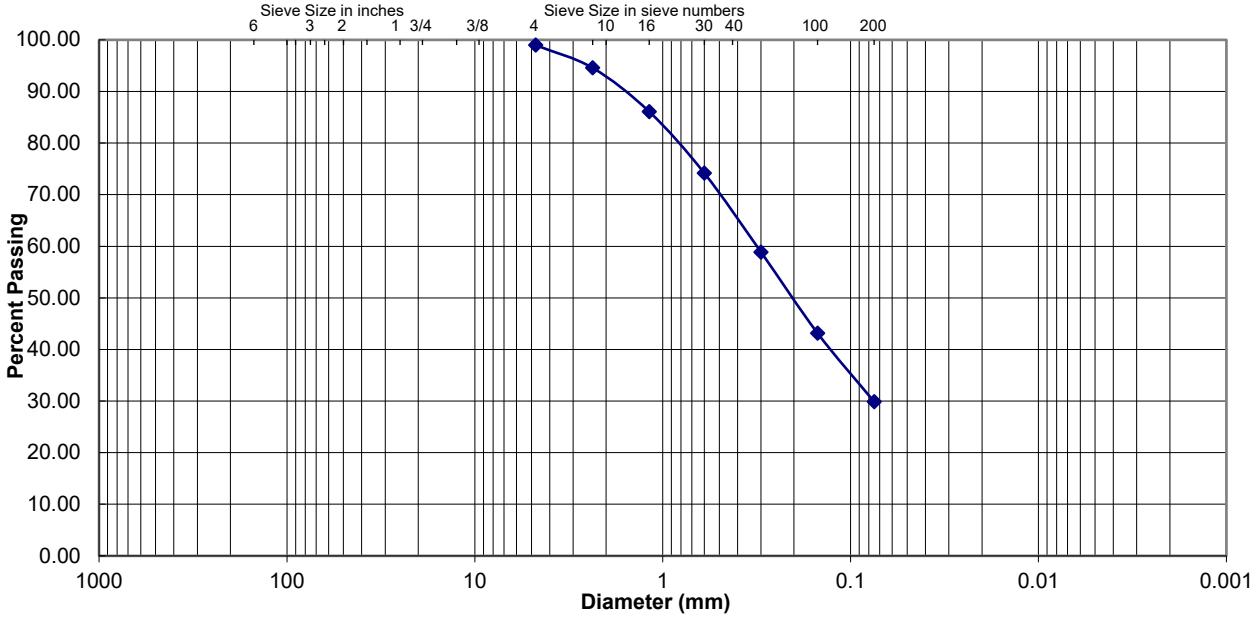
% Gravel	1.0
% Sand	69.1
% Fines	29.9
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP13-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	330.10	Analysis based on total sample.	
Moisture Content (%)	3.1		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	4.70	1.4	98.6
No. 8	15.10	4.6	94.0
No. 16	33.20	10.1	83.9
No. 30	42.00	12.7	71.2
No. 50	52.00	15.8	55.5
No. 100	57.30	17.4	38.1
No. 200	43.20	13.1	25.0
Pan	82.60	25.0	---

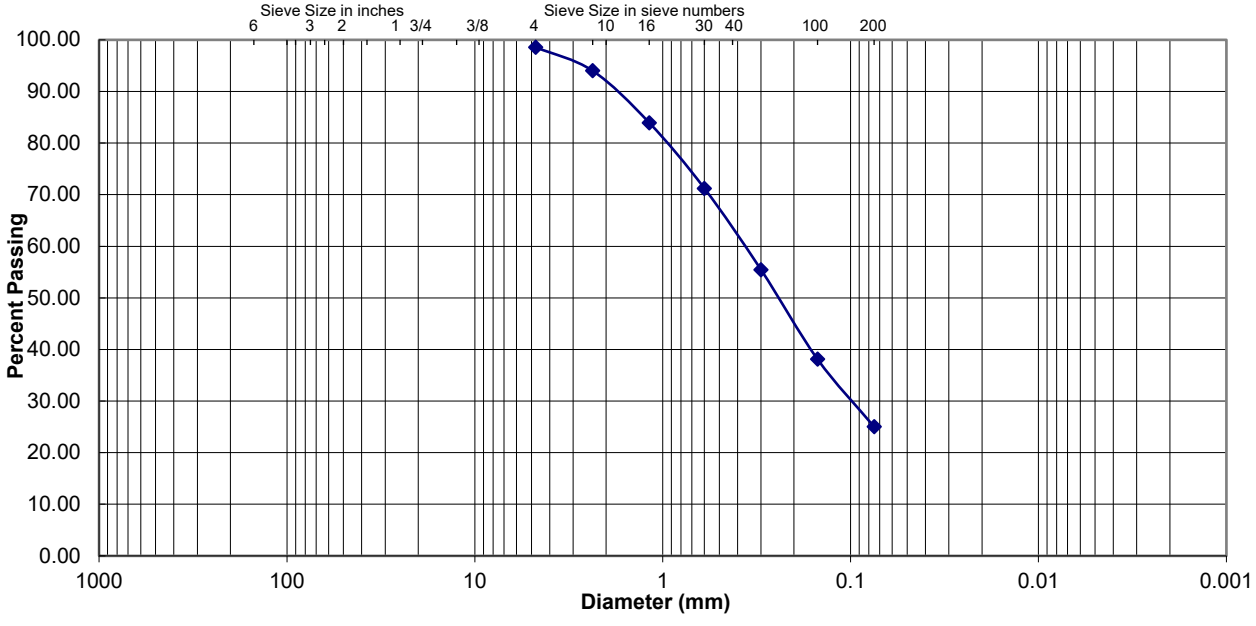
% Gravel	1.4
% Sand	73.6
% Fines	25.0
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name 8me Kudu
Source Grab

Project Number 185704635
Lab ID KTP14-2'
Date Received 09-12-2019
Preparation Date 09-22-2019
Test Date 09-23-2019

Preparation Method ASTM D 1140 Method A
Particle Shape
Particle Hardness
Sample Dry Mass (g) 379.30
Moisture Content (%) 2.5

Analysis based on total sample.

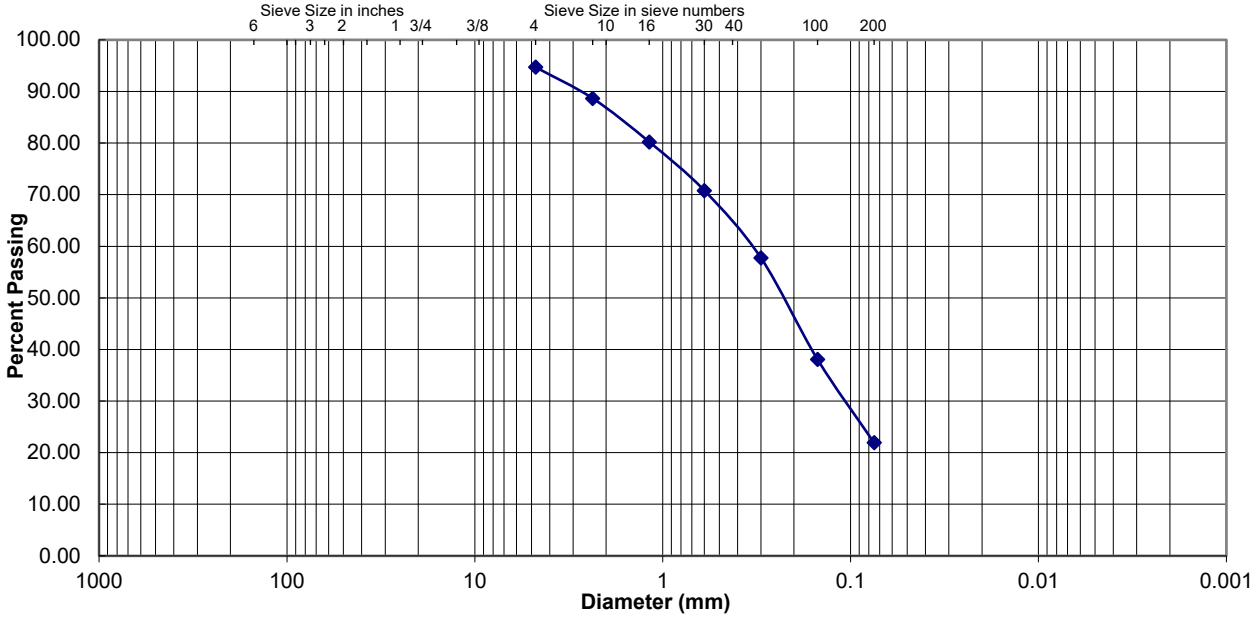
Sieve Size	Grams Retained	% Retained	% Passing
No. 4	20.10	5.3	94.7
No. 8	22.90	6.0	88.7
No. 16	32.00	8.4	80.2
No. 30	35.80	9.4	70.8
No. 50	49.50	13.1	57.7
No. 100	74.60	19.7	38.1
No. 200	61.30	16.2	21.9
Pan	83.10	21.9	---

% Gravel	5.3
% Sand	72.8
% Fines	21.9
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification
Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Stantec

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP15-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	332.60	Analysis based on total sample.	
Moisture Content (%)	3.1		

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	25.30	7.6	92.4
No. 8	34.50	10.4	82.0
No. 16	47.20	14.2	67.8
No. 30	49.20	14.8	53.0
No. 50	52.40	15.8	37.3
No. 100	43.30	13.0	24.3
No. 200	27.50	8.3	16.0
Pan	53.20	16.0	---

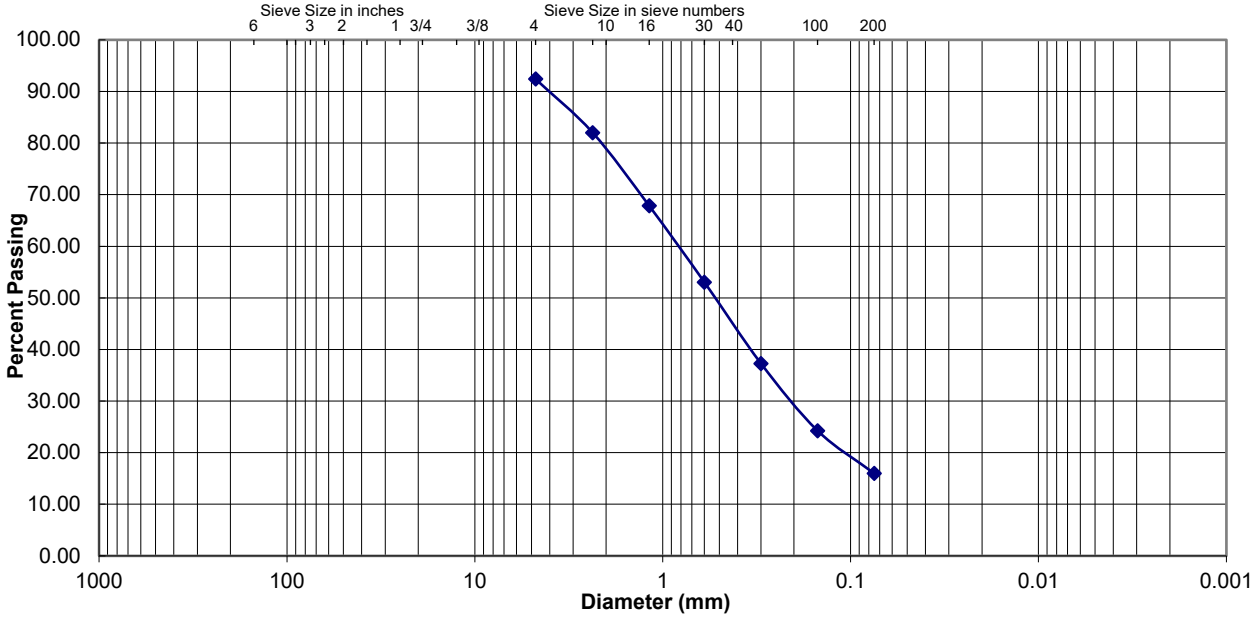
% Gravel	7.6
% Sand	76.4
% Fines	16.0
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP17-2'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	671.50	Analysis based on total sample.	
Moisture Content (%)	1.4		

Sieve Size	Grams Retained	% Retained	% Passing
1 1/2"	122.30	18.2	81.8
1"	56.60	8.4	73.4
3/4"	39.40	5.9	67.5
1/2"	33.10	4.9	62.6
3/8"	34.10	5.1	57.5
No. 4	74.70	11.1	46.4
No. 8	44.40	6.6	39.7
No. 16	54.00	8.0	31.7
No. 30	53.10	7.9	23.8
No. 50	50.80	7.6	16.2
No. 100	37.50	5.6	10.6
No. 200	21.70	3.2	7.4
Pan	49.80	7.4	---

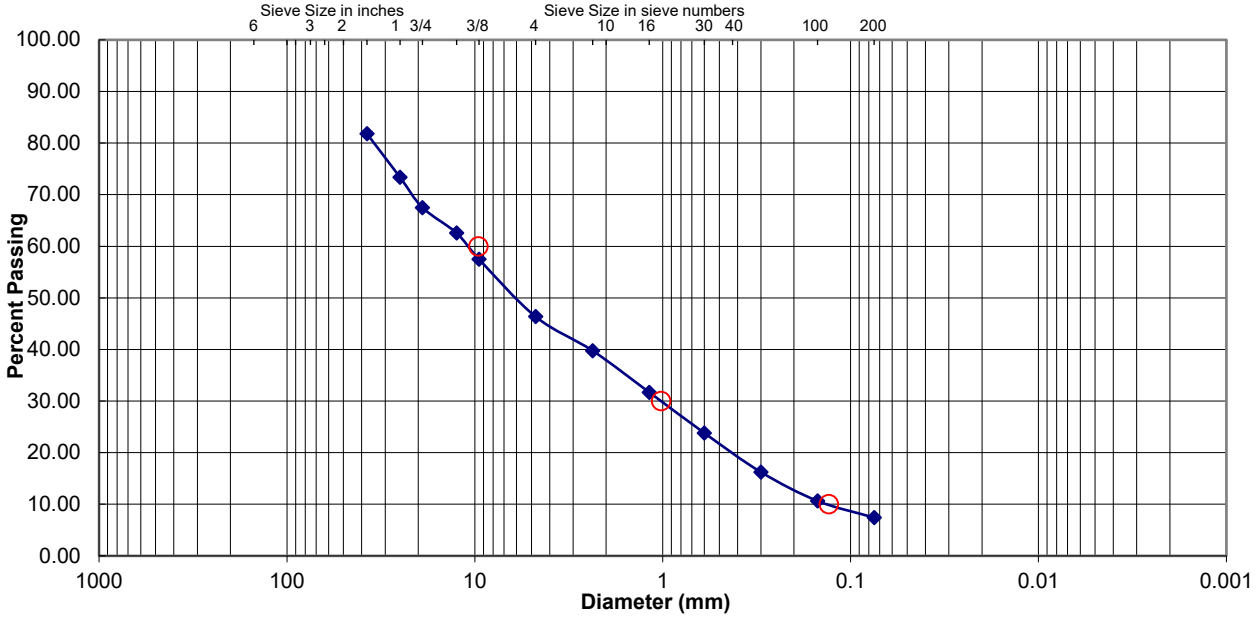
% Gravel	53.6
% Sand	38.9
% Fines	7.4
Fines Classification	ML
D_{10} (mm)	0.1305
D_{30} (mm)	1.0199
D_{60} (mm)	9.5841
Cu	73.42
Cc	0.83

Classification

Poorly Graded Gravel (GP-GM) with Silt and Sand

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name 8me Kudu
Source Grab

Project Number 185704635
Lab ID KTP18-2'
Date Received 09-12-2019
Preparation Date 09-22-2019
Test Date 09-23-2019

Preparation Method ASTM D 1140 Method A
Particle Shape
Particle Hardness
Sample Dry Mass (g) 442.90
Moisture Content (%) 1.7

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	16.10	3.6	96.4
No. 4	20.00	4.5	91.8
No. 8	27.70	6.3	85.6
No. 16	51.40	11.6	74.0
No. 30	57.80	13.1	60.9
No. 50	83.80	18.9	42.0
No. 100	83.60	18.9	23.1
No. 200	53.90	12.2	11.0
Pan	48.60	11.0	---

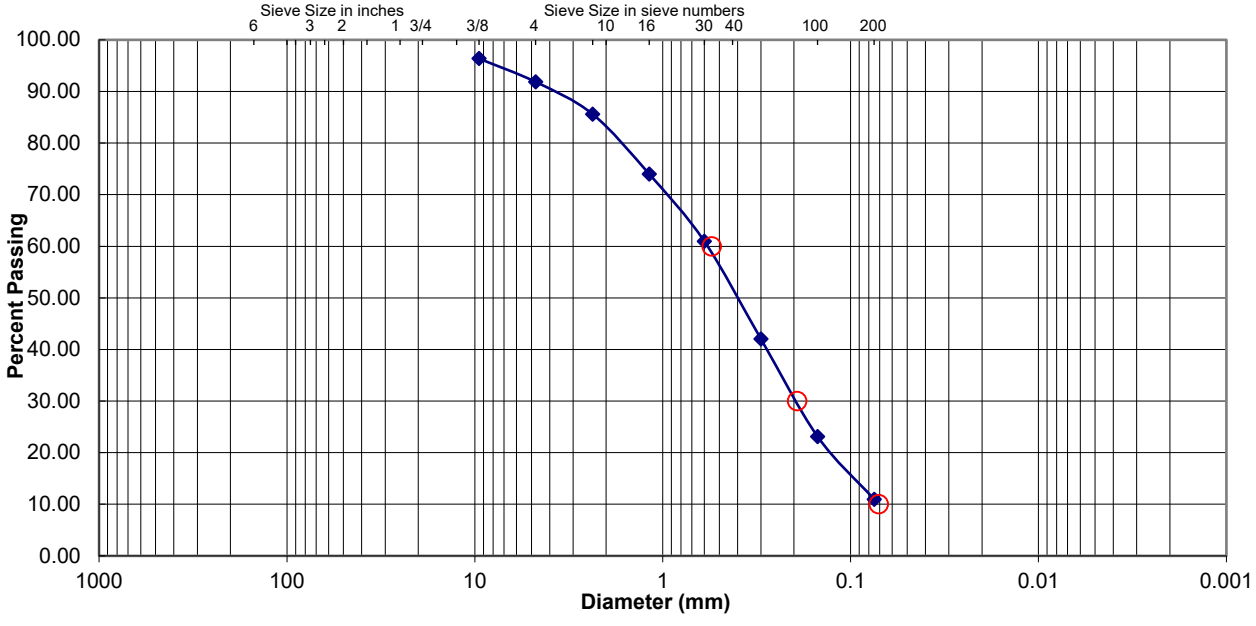
% Gravel	8.2
% Sand	80.9
% Fines	11.0
Fines Classification	ML
D_{10} (mm)	0.0710
D_{30} (mm)	0.1930
D_{60} (mm)	0.5497
Cu	7.75
Cc	0.95

Classification

Well Graded Sand (SW-SM) with Silt

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

Stantec

Gradation Analysis
ASTM D 422

Project Name 8me Kudu
Source Grab

Project Number 185704635
Lab ID KTP19-2'
Date Received 09-12-2019
Preparation Date 09-22-2019
Test Date 09-23-2019

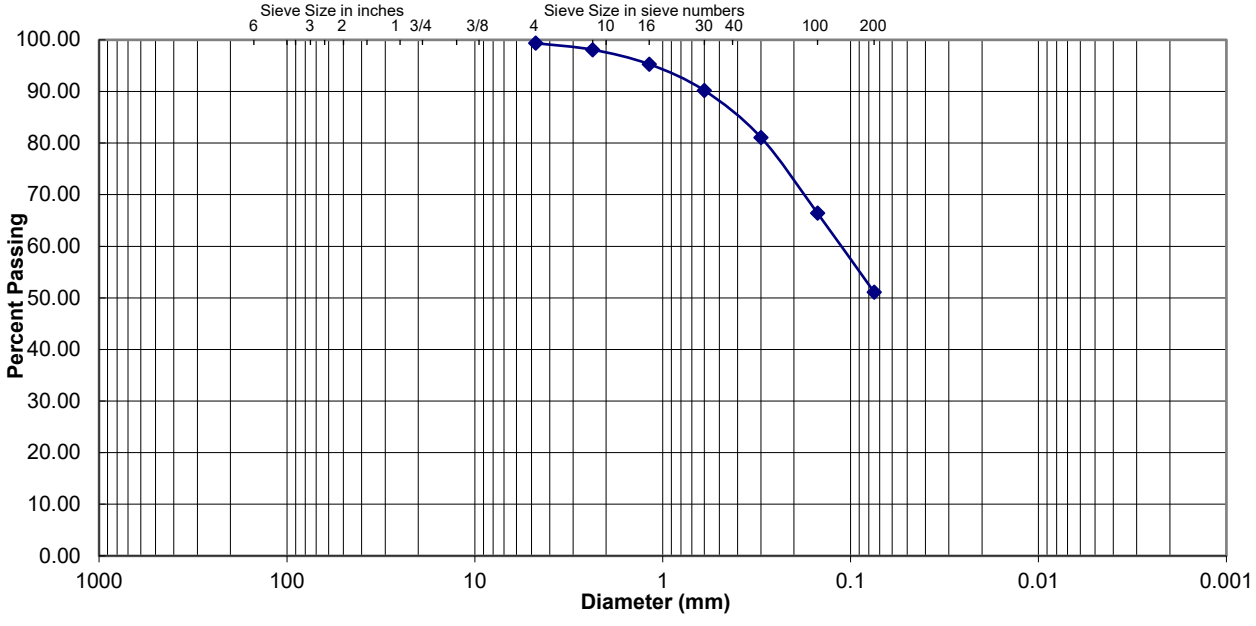
Preparation Method ASTM D 1140 Method A
Particle Shape
Particle Hardness
Sample Dry Mass (g) 313.40
Moisture Content (%) 2.9

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
No. 4	2.00	0.6	99.4
No. 8	4.00	1.3	98.1
No. 16	8.80	2.8	95.3
No. 30	16.00	5.1	90.2
No. 50	28.50	9.1	81.1
No. 100	46.00	14.7	66.4
No. 200	47.90	15.3	51.1
Pan	160.20	51.1	---

% Gravel	0.6
% Sand	48.2
% Fines	51.1
Fines Classification	ML
D_{10} (mm)	N/A
D_{30} (mm)	N/A
D_{60} (mm)	N/A
Cu	N/A
Cc	N/A

Particle Size Distribution



Comments

Reviewed By

Gradation Analysis
ASTM D 422

Project Name	8me Kudu	Project Number	185704635
Source	Grab	Lab ID	KTP20-5'
		Date Received	09-12-2019
Preparation Method	ASTM D 1140 Method A	Preparation Date	09-22-2019
Particle Shape		Test Date	09-23-2019
Particle Hardness			
Sample Dry Mass (g)	446.40	Analysis based on total sample.	
Moisture Content (%)	0.9		

Sieve Size	Grams Retained	% Retained	% Passing
1"	18.40	4.1	95.9
3/4"	38.40	8.6	87.3
1/2"	27.50	6.2	81.1
3/8"	15.90	3.6	77.6
No. 4	38.60	8.6	68.9
No. 8	59.20	13.3	55.6
No. 16	70.60	15.8	39.8
No. 30	62.50	14.0	25.8
No. 50	63.90	14.3	11.5
No. 100	39.40	8.8	2.7
No. 200	8.50	1.9	0.8
Pan	3.50	0.8	---

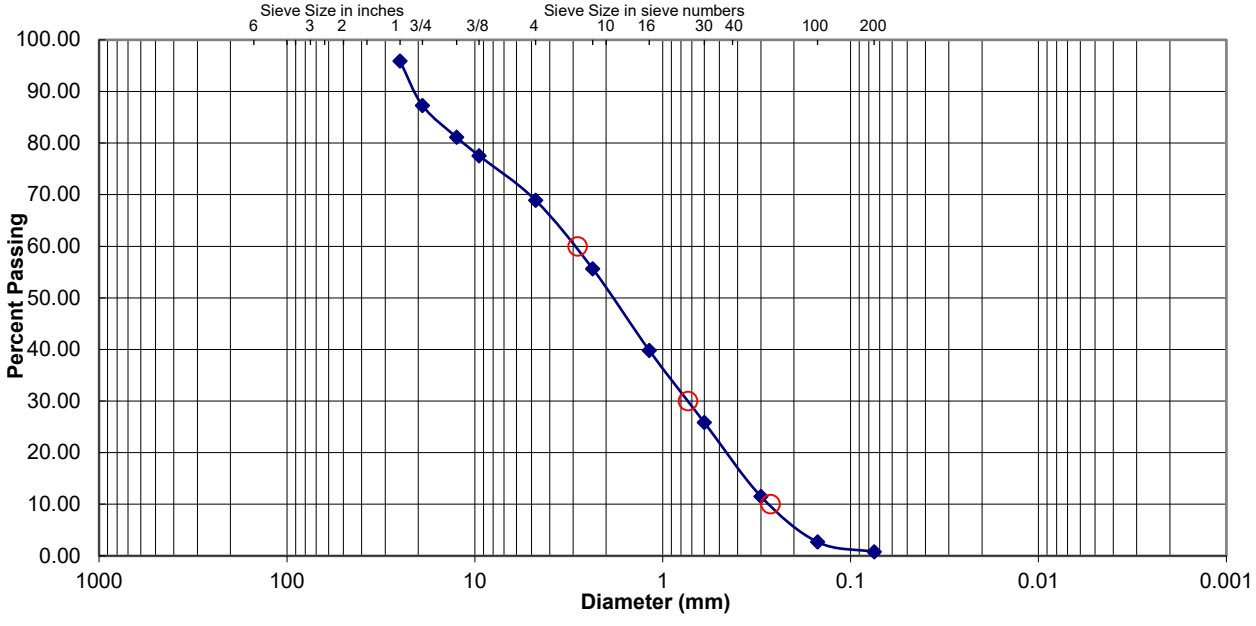
% Gravel	31.1
% Sand	68.1
% Fines	0.8
Fines Classification	ML
D_{10} (mm)	0.2664
D_{30} (mm)	0.7339
D_{60} (mm)	2.8394
Cu	10.66
Cc	0.71

Classification

Poorly Graded Sand (SP) with Gravel

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution



Comments

Reviewed By

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

CORROSION TEST RESULTS

Client Name: Stantec
Project Name: 8me Kudu
Project No.: 185704635

AP Job No.: 19-0916
Date: 09/16/19

Boring No.	Sample Type	Depth (feet)	Soil Type	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
TP1	Grab	2	SC	4253	8.8	35	37
TP10	Grab	5	SW-SM	7245	9.7	38	38
TP20	Grab	2	SC	5291	8.9	36	33

NOTES: Resistivity Test and pH: California Test Method 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

Appendix C CEQA GUIDELINES FORM – GEOLOGY AND SOILS

Appendix C CEQA Guidelines form – Geology and Soils

GEOLOGY AND SOILS	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to CDMG Special Publication 42)?			X		
ii) Strong Seismic ground shaking?		X			
iii) Seismic-related ground failure, including liquefaction?			X		
iv) Landslides?			X		
b) Result in substantial soil erosion or the loss of topsoil?		X			
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?			X		
d) Be located on expansive soil, as identified in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X		
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for disposal of waste water?			X		

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Appendix G-2

Paleontological Inventory Report

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PALEONTOLOGICAL INVENTORY REPORT

Kudu Solar Project

69SV 8me LLC

Prepared for: **Stantec**
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Courtney Richards, M.S. – Principal Investigator
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PSI Report: CA19KernSTA01R

February 4, 2020

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1.0 EXECUTIVE SUMMARY

This report presents the results of the paleontological technical study conducted by Paleo Solutions, Inc. (Paleo Solutions) in support of the 69SV 8me LLC Kudu Solar Project (Project) located in Kern County, California (see Figures 1 and 2). Paleo Solutions was contracted by Stantec to conduct an analysis of existing paleontological data and to provide recommendations for mitigation based on the geological and paleontological data. All paleontological work was completed in compliance with the California Environmental Quality Act (CEQA), local regulations, and best practices in mitigation paleontology (Murphey et al., 2019). See Table 1 for a Project summary.

69SV 8me LLC is developing a photovoltaic (PV) energy facility (up to 500 megawatt alternating current [MWac]) within the approximately 1,955-acre Project area. The Project area includes private parcels in both unincorporated Kern County and California City. The Project is located in the Mojave Desert Geomorphic Province, a region characterized by vast, arid expanses of barren mountain ranges, broad alluvial-filled flatlands, desiccated riverbeds and washes, extensive mesas, sand dunes, playas, volcanic cinder cones, and basaltic lava flows (Norris and Webb, 1990; Sylvester and O'Black Gans, 2016). The Project is specifically located on the United States Geological Survey (USGS) California City North (2018) and Mojave Northeast (2018) 7.5' topographic quadrangles in Townships 31 and 32 South, Range 37 East (see Appendix B).

The paleontological potential of the Project area was evaluated based on an analysis of existing paleontological data. The three components of the analysis of existing data included a geologic map review, a literature search, and an institutional record search. Geologic mapping indicates that the Project area is primarily underlain by Holocene-age younger alluvial gravel, sand, and silt of undissected valley fills derived from adjacent higher ground (Holocene-age younger alluvium; Qa) with a small amount of Pleistocene-age fanglomerate, gravel, sand, and silt of dissected older valley fills and alluvial fans, derived from adjacent highlands (Pleistocene-age older alluvium; Qoa) within the southeastern portion of the Project area (Dibblee and Minch, 2008; see Figure 3). Additionally, Pleistocene-age older alluvium (Qoa) often occurs at depth beneath Holocene-age younger alluvium or occurs as a mixture of undifferentiated alluvium with these younger deposits within the Mojave Desert Geomorphic Province (Dibblee and Minch, 2008; Reynolds, 1989).

According to the record search and the literature search, there are no previously recorded fossil localities within the Project area; however, the Natural History Museum of Los Angeles County (LACM) reported that there are three vertebrate fossil localities recorded in the Project vicinity from sedimentary deposits similar to those that occur in the Project area (McLeod, 2019). Furthermore, literature and database reviews also identified numerous vertebrate fossils recovered from Pleistocene-age older alluvium (Qoa) and other Pleistocene-age sedimentary deposits elsewhere in Kern County and southern California (see Table 3; Cooper and Eisentraut, 2002; Jahns, 1954; Jefferson, 1991; UCMP, 2019).

The Potential Fossil Yield Classification (PFYC) system was applied to the results of the analysis of existing data (see Table 2). Pleistocene-age older alluvium (Qoa) has a moderate paleontological potential (PFYC 3). Holocene-age younger alluvium (Qa) is estimated to be less than 11,000 years old and has a low paleontological potential (PFYC 2), because these deposits are too young to contain *in-situ* fossils. However, these younger deposits often overlie older geologic units with higher paleontological potential, which may be impacted at depth.

Based on the ground disturbance necessary to complete the Project, there is potential for adverse impacts to scientifically significant paleontological resources within Pleistocene-age older alluvium (Qoa) where mapped at the surface and where encountered in the subsurface beneath the Holocene-age younger alluvium (Qa). Therefore, it is recommended that excavations in locations of the Project area mapped as Pleistocene-age

older alluvium (Qoa) (PFYC 3) be initially monitored to determine whether Project excavations will disturb Pleistocene-age sedimentary deposits and scientifically significant fossils that may be preserved within them. Areas mapped as Holocene-age younger alluvium (Qa) should be spot-checked during excavations that exceed depths of 5 feet to check for underlying, paleontologically sensitive Pleistocene-age older alluvium (Qoa). If it is determined that only Holocene-age younger alluvium (Qa) (PFYC 2) is impacted, the monitoring program should be reduced or suspended.

Prior to the start of construction, a paleontological resource monitoring and mitigation plan (PRMMP) should be prepared. The PRMMP should provide detailed recommended monitoring locations including locations with moderate paleontological potential; a description of a worker training program; detailed procedures for monitoring, fossil recovery, laboratory analysis, and museum curation; and notification procedures in the event of a fossil discovery by paleontological monitors or other project personnel. A curation agreement with the LACM or another accredited repository should also be obtained and included as part of the PRMMP. Any subsurface bones or potential fossils that are unearthed during construction should be evaluated by a Qualified Paleontologist.

2.0 INTRODUCTION

This report presents the results of the paleontological technical study conducted by Paleo Solutions in support of the 69SV 8me LLC Kudu Solar Project located in Kern County, California (Figures 1 and 2). Paleo Solutions was contracted by Stantec to conduct an analysis of existing paleontological data and to provide recommendations for mitigation based on the geological and paleontological data. All paleontological work was completed in compliance with CEQA, local regulations, and best practices in mitigation paleontology (Murphey et al., 2019). See Table 1 for a Project summary.

2.1 Project Description

69SV 8me LLC is developing a PV energy facility (up to 500 MWac) within the approximately 1, 955-acre Project area. The Project area includes private parcels in both unincorporated Kern County and California City. Power generated by Kudu Solar will be delivered from the Project site via up to 230 kilovolt (kV) overhead general transmission lines (gen-tie) originating from the Eland 1 Substation and terminating at the Los Angeles Department of Water and Power (LADWP) Barren Ridge Substation. Upgrades needed to connect Kudu to the Eland 1 Substation will be covered in the Kudu Conditional Use Permits (CUPs), while the gen-tie right-of-way (ROW) has been analyzed in the Eland 1 Environmental Impact Report. The Project may also include a battery energy storage system (BESS) within the Project area, or a connection to the Eland 1 BESS.

2.2 Project Location

The Project is located in the Mojave Desert Geomorphic Province, a region characterized by vast, arid expanses of barren mountain ranges, broad alluvial-filled flatlands, desiccated riverbeds and washes, extensive mesas, sand dunes, playas, volcanic cinder cones, and basaltic lava flows (Norris and Webb, 1990; Sylvester and O'Black Gans, 2016). The Project is located within and to the north of California City and south of the unincorporated community of Cantil on the USGS California City North (2018) and Mojave Northeast (2018) 7.5' topographic quadrangles in Townships 31 and 32 South, Range 37 East (Figures 1 and 2; Appendix B).

Geologic mapping indicates that the Project area is underlain by Holocene-age younger alluvium (Qa) and Pleistocene-age older alluvium (Qoa) (Dibblee and Minch, 2008; Figure 3). Additionally, Pleistocene-age older alluvium (Qoa) often occurs at depth beneath Holocene-age younger alluvium or occurs as a mixture of undifferentiated alluvium with these younger deposits within the Mojave Desert Geomorphic Province (Dibblee and Minch, 2008; Reynolds, 1989).

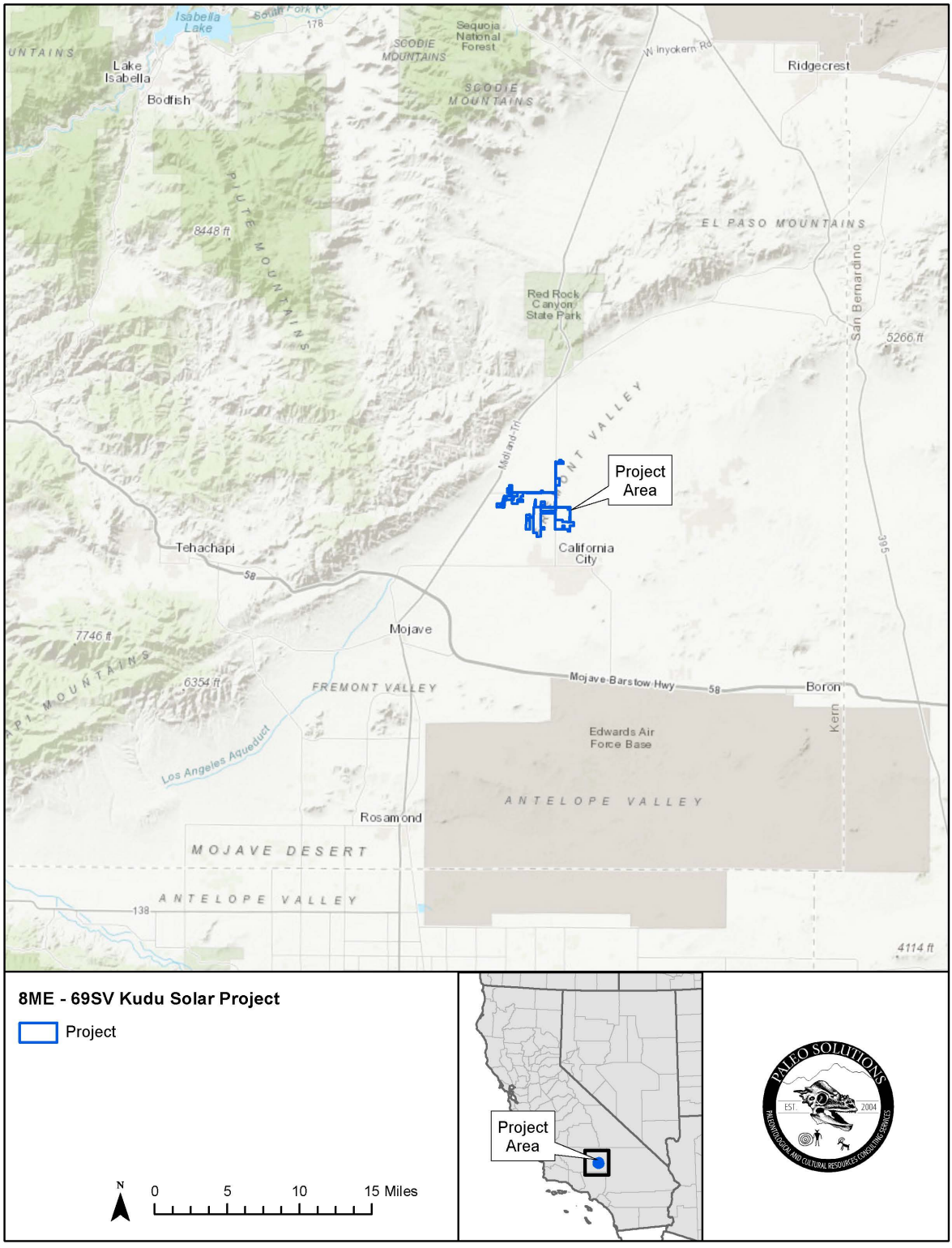

Figure 1. Project Location Map.

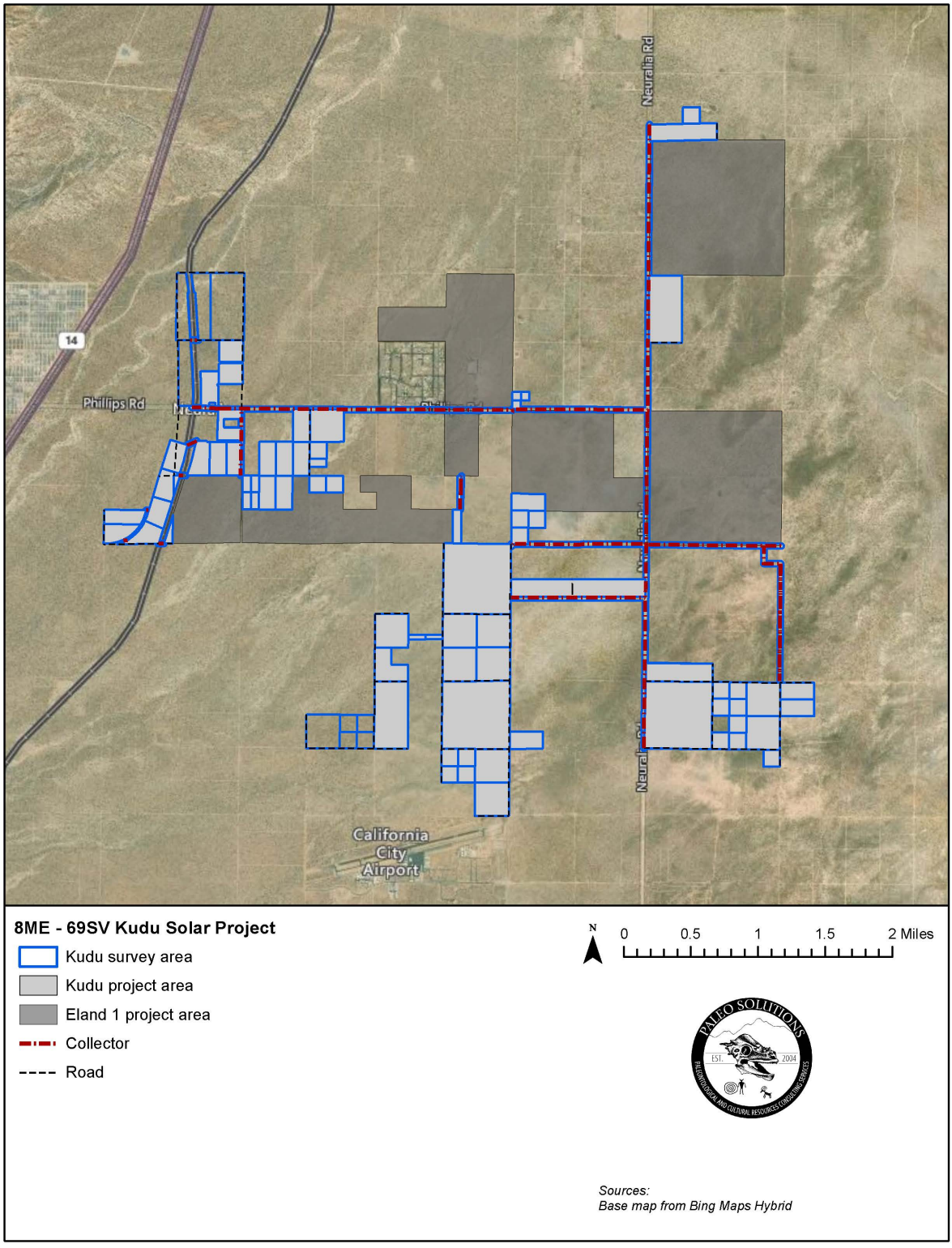

Figure 2. Project Overview Map.

Table 1. Kudu Solar Project Summary

Project Name	Kudu Solar Project			
Project Description	69SV 8me LLC is developing a PV energy facility (up to 500 MWac) within the approximately 1,955-acre Project area. Power generated by Kudu Solar will be delivered from the Project site via up to 230 kV overhead gen-tie originating from the Eland 1 Substation and terminating at the LADWP Barren Ridge Substation. The Project may also include a BESS within the Project area, or a connection to the Eland 1 BESS.			
Project Area	The Project is located in the Mojave Desert Geomorphic Province, and is specifically located within and to the north of California City and south of the unincorporated community of Cantil in Kern County, California.			
Total Acreage	1, 9551 acres			
Location (PLSS)	**Quarter-Quarter**	**Section**	**Township**	**Range**
	See Appendix B			
Land Ownership	Private			
Topographic Map(s)	USGS California City North (2018) and Mojave Northeast (2018) 7.5' Quadrangles			
Geologic Map(s)	Geologic Map of the Mojave and Castle Butte 15' Quadrangles, Kern County, California (Dibblee and Minch 2008).			
Mapped Geologic Units(s) and Age(s)	**Geologic Unit and Map Symbol**	**Age**	**Paleontological Potential (PFYC)**	
	Younger alluvium (Qa)	Holocene	2 (Low)	
	Older alluvium (Qoa)	Pleistocene	3 (Moderate)	
Permits	No permits were required for the paleontological work conducted.			
Previously Documented Fossil Localities within the Project Area	The LACM reported that there are no vertebrate fossil localities recorded from within the Project area. However, there are several localities recorded from within the Project vicinity and other areas of California from sediments similar to those mapped within the Project area (see Section 5.2).			
Recommendations	Based on the ground disturbance necessary to complete the Project, there is potential for adverse impacts to scientifically significant paleontological resources within Pleistocene-age older alluvium (Qoa) where mapped at the surface and where encountered in the subsurface beneath the Holocene-age younger alluvium (Qa). Therefore, it is recommended that excavations in locations of the Project area mapped as Pleistocene-age older alluvium (Qoa) (PFYC 3) be initially monitored to determine whether Project excavations will disturb Pleistocene-age sedimentary deposits and scientifically significant fossils that may be preserved within them. Areas mapped as Holocene-age younger alluvium (Qa) should be spot-checked during excavations that exceed depths of 5 feet to check for underlying, paleontologically sensitive Pleistocene-age older alluvium (Qoa). If it is determined that only Holocene-age younger alluvium (Qa) (PFYC 2) is impacted, the monitoring program should be reduced or suspended. Prior to the start of construction, a PRMMP should be prepared. The PRMMP should provide detailed recommended monitoring locations including locations with moderate paleontological potential; a description of a worker training program; detailed procedures for monitoring, fossil recovery, laboratory analysis, and museum curation; and notification procedures in the event of a fossil discovery by paleontological monitors or other project personnel. A curation agreement with the LACM or another accredited repository should also be obtained and included as part of the PRMMP. Any subsurface bones or potential fossils that are unearthed during construction should be evaluated by a Qualified Paleontologist.			

3.0 DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

As defined by Murphey and Daitch (2007): "Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Paleontological resources include not only fossils themselves, but also the associated rocks or organic matter and the physical characteristics of the fossils' associated sedimentary matrix.

The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered non-renewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced. Fossils are important scientific and educational resources because they are used to:

- Study the phylogenetic relationships amongst extinct organisms, as well as their relationships to modern groups;
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including the biases inherent in the fossil record;
- Reconstruct ancient environments, climate change, and paleoecological relationships;
- Provide a measure of relative geologic dating that forms the basis for biochronology and biostratigraphy, and which is an independent and corroborating line of evidence for isotopic dating;
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time;
- Study patterns and processes of evolution, extinction, and speciation; and
- Identify past and potential future human-caused effects to global environments and climates."

Fossil resources vary widely in their relative abundance and distribution and not all are regarded as significant. According to the Bureau of Land Management (BLM) Instructional Memorandum (IM) 2009-011, a "Significant Paleontological Resource" is defined as:

> "Any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be of scientific interest if it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has an identified educational or recreational value. Paleontological resources that may be considered not to have scientific significance include those that lack provenience or context, lack physical integrity due to decay or natural erosion, or that are overly redundant or are otherwise not useful for research. Vertebrate fossil remains and traces include bone, scales, scutes, skin impressions, burrows, tracks, tail drag marks, vertebrate coprolites (feces), gastroliths (stomach stones), or other physical evidence of past vertebrate life or activities" (BLM, 2008).

Vertebrate fossils, whether preserved remains or track ways, are classified as significant by most state and federal agencies and professional groups (and are specifically protected under the California Public Resources Code). In some cases, fossils of plants or invertebrate animals are also considered significant and can provide important information about ancient local environments.

The full significance of fossil specimens or fossil assemblages cannot be accurately predicted before they are collected, and in many cases, before they are prepared in the laboratory and compared with previously collected fossils. Pre-construction assessment of significance associated with an area or formation must be made based on previous finds, characteristics of the sediments, and other methods that can be used to determine paleoenvironmental and taphonomic conditions.

4.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This section of the report presents the regulatory requirements pertaining to paleontological resources that apply to this Project.

4.1 State Regulatory Setting

4.1.1 California Environmental Quality Act (CEQA)

The procedures, types of activities, persons, and public agencies required to comply with the California Environmental Quality Act (CEQA) are defined in the Guidelines for Implementation of CEQA (State CEQA Guidelines), as amended on March 18, 2010 (Title 14, Section 15000 et seq. of the California Code of Regulations) and further amended January 4, 2013 and December 28, 2018. One of the questions listed in the CEQA Environmental Checklist is: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (State CEQA Guidelines Appendix G, Section VII, Part F).

4.1.2 State of California Public Resources Code

The State of California Public Resources Code (Chapter 1.7), Sections 5097 and 30244, includes additional state level requirements for the assessment and management of paleontological resources. These statutes require reasonable mitigation of adverse impacts to paleontological resources resulting from development on state lands, and define the excavation, destruction, or removal of paleontological "sites" or "features" from public lands without the express permission of the jurisdictional agency as a misdemeanor. As used in Section 5097, "state lands" refers to lands owned by, or under the jurisdiction of, the state or any state agency. "Public lands" is defined as lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

4.2 Local Regulatory Setting

4.2.1 Kern County

Paleontological resources are briefly mentioned in the Land Use, Open Space and Conservation element of the Kern County General Plan (Kern County, 2009) in Section 1.10.3, "Archaeological, Paleontological, Cultural, and Historical Preservation." Policy 25 states that the County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors. Implementation measure M is the only measure which directly or indirectly addresses paleontological resources, and it states that in areas of known paleontological resources, the County should address the preservation of these resources where feasible.

5.0 METHODS

The paleontological analysis of existing data included a geologic map review, literature review, and an institutional record search. The goal of this report is to evaluate the paleontological potential of the Project area and make recommendations for the mitigation of adverse impacts on paleontological resources that may occur as a result of the Project. Paleontological sensitivity assignments were determined using the PFYC system (BLM, 2016) and best practices in mitigation paleontology (Murphey et al., 2019). Joey Raum, B.S. (Field Director), performed the background research and co-authored this report with Courtney Richards, M.S. (Principal Investigator). Courtney Richards performed the technical review of this report. GIS maps were prepared by Barbara Webster, M.S.

Copies of this report will be submitted to 69SV 8me LLC, Stantec, and Kern County. Paleo Solutions will retain archival copy of all project information including maps and other data.

5.1 Analysis of Existing Data

Paleo Solutions reviewed geologic mapping of the Project site and half-mile buffer by T.W. Dibblee and J.A. Minch (2008). The literature reviewed included published and unpublished scientific papers. A paleontological museum record search was conducted at the LACM. Samuel McLeod, Ph.D., conducted the search (dated September 9, 2019), which is included as Appendix A. Additional record searches of online databases were completed by Paleo Solutions staff.

5.2 Criteria for Evaluating Paleontological Potential

The PFYC system was developed by the BLM (BLM, 2016). Because of its demonstrated usefulness as a resource management tool, the PFYC has been utilized for many years for projects across the country, regardless of land ownership. It is a predictive resource management tool that classifies geologic units on their likelihood to contain paleontological resources on a scale of 1 (very low potential) to 5 (very high potential). This system is intended to aid in predicting, assessing, and mitigating paleontological resources. The PFYC ranking system is summarized in Table 2.

Table 2. Potential Fossil Yield Classification (BLM, 2016).

BLM PFYC Designation	Assignment Criteria Guidelines and Management Summary (PFYC System)
1 = Very Low Potential	Geologic units are not likely to contain recognizable paleontological resources.
	Units are igneous or metamorphic, excluding air-fall and reworked volcanic ash units.
	Units are Precambrian in age.
	Management concern is usually negligible, and impact mitigation is unnecessary except in rare or isolated circumstances.
2 = Low Potential	Geologic units are not likely to contain paleontological resources.
	Field surveys have verified that significant paleontological resources are not present or are very rare.
	Units are generally younger than 10,000 years before present.
	Recent eolian deposits.
	Sediments exhibit significant physical and chemical changes (i.e., diagenetic alteration) that make fossil preservation unlikely.
	Management concern is generally low, and impact mitigation is usually unnecessary except in occasional or isolated circumstances.
3 = Moderate Potential	Sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence.
	Marine in origin with sporadic known occurrences of paleontological resources.

BLM PFYC Designation	Assignment Criteria Guidelines and Management Summary (PFYC System)
	Paleontological resources may occur intermittently, but these occurrences are widely scattered.
	The potential for authorized land use to impact a significant paleontological resource is known to be low-to-moderate.
	Management concerns are moderate. Management options could include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Opportunities may exist for hobby collecting. Surface-disturbing activities may require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action and whether the action could affect the paleontological resources.
4 = High Potential	Geologic units that are known to contain a high occurrence of paleontological resources.
	Significant paleontological resources have been documented but may vary in occurrence and predictability.
	Surface-disturbing activities may adversely affect paleontological resources.
	Rare or uncommon fossils, including nonvertebrate (such as soft body preservation) or unusual plant fossils, may be present.
	Illegal collecting activities may impact some areas.
	Management concern is moderate to high depending on the proposed action. A field survey by a qualified paleontologist is often needed to assess local conditions. On-site monitoring or spot-checking may be necessary during land disturbing activities. Avoidance of known paleontological resources may be necessary.
5 = Very High Potential	Highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources.
	Significant paleontological resources have been documented and occur consistently.
	Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities.
	Unit is frequently the focus of illegal collecting activities.
	Management concern is high to very high. A field survey by a qualified paleontologist is almost always needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.
U = Unknown Potential	Geologic units that cannot receive an informed PFYC assignment.
	Geological units may exhibit features or preservational conditions that suggest significant paleontological resources could be present, but little information about the actual paleontological resources of the unit or area is known.
	Geologic units represented on a map are based on lithologic character or basis of origin but have not been studied in detail.
	Scientific literature does not exist or does not reveal the nature of paleontological resources.
	Reports of paleontological resources are anecdotal or have not been verified.
	Area or geologic unit is poorly or under-studied.
	BLM staff has not yet been able to assess the nature of the geologic unit.
	Until a provisional assignment is made, geologic units with unknown potential have medium to high management concerns. Field surveys are normally necessary, especially prior to authorizing a ground-disturbing activity.

6.0 ANALYSIS OF EXISTING DATA

The Project area is located within the Mojave Desert Geomorphic Province. A geomorphic province is a geographical area of distinct landscape character, with related geophysical features, including relief, landforms, orientations of valleys and mountains, type of vegetation, and other geomorphic attributes (Harden, 2004). Attributes of the Mojave Desert Geomorphic Province consist of vast, arid expanses of barren mountain ranges, broad alluvial-filled flatlands, desiccated riverbeds and washes, extensive mesas, sand dunes, playas, volcanic cinder cones, and basaltic lava flows (Norris and Webb, 1990; Sylvester and O'Black Gans, 2016). Within California, the Mojave Desert Geomorphic Province occupies approximately 25,000 square miles of southeastern California and is bounded on the west by the Western Transverse Ranges, the San Gabriel Mountains, and the San Andreas Fault; on the north and northeast by the Garlock Fault, the Tehachapi Mountains, and the Basin and Range Geomorphic Province; on the east by the Nevada State Line and the Colorado River; and on the south by the Eastern Transverse Ranges, the San Andreas Fault, the Salton Trough, and the Colorado Desert, which generally coincide with the San Bernardino-Riverside counties boundary (Norris and Webb, 1990; Harden, 2004; Hall, 2007). Topographically, the Mojave Desert has a more subdued landform than the Basin and Range Geomorphic Province of California despite their related geologic histories, with the Mojave Desert containing relatively shorter and lower ranges and broader valleys than the Basin and Range (Harden, 2004). Additionally, the southeastern Mojave Desert lacks the north-south-trending mountain ranges and basins typical of the Basin and Range (Sylvester and O'Black Gans, 2016). Despite its more subdued topography, the Mojave Desert Geomorphic Province has elevations typically above 2,000 feet above sea level, unlike the southern and adjacent Colorado Desert, which has some areas with elevations below sea level.

The geologic history of the Mojave Desert is related to the complex development of the Basin and Range of the southwestern United States and spans from the Proterozoic Eon to the Holocene Epoch (Norris and Webb, 1990; Harden, 2004; Hall, 2007; Sylvester and O'Black Gans, 2016; Prothero, 2017). Little is known about the geologic environment of southeastern California before the development of the passive continental margin, with the oldest rocks being of latest Proterozoic age (Harden, 2004). According to Norris and Webb (1990), between 2.5 and 1.7 billion years ago, the principal rocks in the region consisted of plutonic and extrusive igneous rocks and sedimentary rocks, which were subsequently metamorphosed to gneissic and highly schistose rocks and are exposed today in the Ord Mountains, the Old Woman Mountains, and the Marble Mountains of the Mojave Desert (Hall, 2007; Sylvester and O'Black Gans, 2016). Also around 2.5 and 1.7 billion years ago, magmatism and plutonic processes resulted in the deposition of Proterozoic-age granites and other igneous rocks in the region, followed by a brief geologic period of erosion and nondeposition (Norris and Webb, 1990; Harden, 2004). By the latest Neoproterozoic Era, the continental shelf edge subsided and supercontinents in the region broke apart, resulting in continental rifting and the formation of the passive continental margin (Norris and Webb, 1990; Harden, 2004; Hall, 2007). Due to continental divergence during the latest Neoproterozoic and the Cambrian Period, sandstone and calcareous mudstones were deposited (Norris and Webb, 1990).

Unlike the Basin and Range Geomorphic Province, the Mojave Desert Geomorphic Province yields only partial Paleozoic-age sections, which are mainly present within its eastern ranges and are relatively thinner than those exposed in the Basin and Range. For example, the lower Paleozoic sections of the Mojave Desert are represented by less than 5,000 feet of cumulative rock, with no continuous sections greater than 2,500 to 3,000 feet thick throughout most of the province; however, the thickest marine Paleozoic section within the Mojave Desert is exposed in the Providence Mountains, totaling approximately 10,000 feet, and upper Paleozoic strata are recognized in the Ord Mountains and near Victorville (Norris and Webb, 1990; Hall, 2007). Throughout most of the Paleozoic Era, shallow seas dominated the Mojave Desert region, with the deposition of limestone and dolomite representing deposition on a relatively stable continental platform (Norris and Webb, 1990; Hall, 2007).

During the Mesozoic Era, metamorphosed sedimentary rocks in the Mojave Desert were intruded by plutonic rocks (Norris and Webb, 1990). During the Triassic and early Jurassic periods, the region consisted of lowlands and regions of shallow seas, while the Mojave Desert region west of Barstow was rifted away and the typical north-south coastline of California was established (Hall, 2007). Marine early Triassic rocks are present in the Providence Mountains and represent a vast shallow sea that experienced episodic transgressions and regressions along the shoreline, which was located somewhere northwest of the eastern Mojave Desert during that time (Norris and Webb, 1990). However, by the early Jurassic, shallow seas had completely regressed to the northwest due to the Nevadan Orogeny uplifting the Mojave Desert block, causing arid conditions throughout most of the southwestern United States. These conditions are made evident by the deep red, oxidized eolian deposits and other nonmarine deposits (Norris and Webb, 1990). Throughout the middle Jurassic and the early Cretaceous, erosion and nondeposition occurred within the Mojave Desert region until the middle to late Cretaceous, when several pulses of magmatism resulted in plutonic rock intrusions into older rocks, resulting in local contact metamorphism of older geologic units (Hall, 2007). Mesozoic-age granitic rocks are abundant in the Mojave Desert region due to a large system of batholiths that formed along the subduction zone on the western edge of North America (Sylvester and O'Black Gans, 2016). According to Hall (2007), during the Cretaceous magmatism, tectonic forces resulted in the thrusting of older strata onto younger strata, and following the Cretaceous magmatism, extensional, normal, and detachment faults developed, offsetting Cretaceous-age plutonic rocks.

The oldest Cenozoic-age rocks in the Mojave Desert are of Oligocene age. Between the late Cretaceous and the Oligocene, widespread erosion or nondeposition were present within the Mojave Desert due to the degradation of the Nevadan Orogeny, which resulted in the reduction of the Mojave Desert to an area of relatively low relief by the latest Cretaceous (Hall, 2007). Despite the degradation of the Nevadan Orogeny, the Mojave Desert block had been uplifted approximately 10,000 to 15,000 feet by the beginning of the Miocene (Norris and Webb, 1990). During the middle and late Miocene, the Mojave Desert and Basin and Range regions experienced tectonic extension, with normal faults and related detachment faults characteristic of both provinces.

6.1 Geologic Map and Literature Review

Geologic mapping by Dibblee and Minch (2008) indicates that the Project area is primarily underlain by Holocene-age younger alluvium (Qa) with a small amount of Pleistocene-age older alluvium (Qoa) within the southeastern portion of the Project area. Pleistocene-age older alluvium (Qoa) is also known to occur at depth beneath Holocene-age younger alluvium (Qa) as a mixture of undifferentiated alluvium with these younger deposits within the Mojave Desert Province (Reynolds, 1989). The distributions of the geologic units in the Project area and vicinity, as mapped by Dibblee and Minch (2008), are provided in Figure 3.

6.1.1 Younger Alluvium (Qa) (Holocene)

Holocene-age younger alluvium (Qa) consists of clay, silt, sand, and gravel that comprise valleys and alluvial fans. These sediments are generally poorly consolidated and represent sedimentation associated with current or former river and stream systems. Gravel is composed of igneous and metamorphic rocks that range from granule to cobble-sized and which generally vary between subangular to subrounded depending on the source proximity. Holocene-age younger alluvium (Qa) is mapped at the surface of the majority of the Project area (Dibblee and Minch, 2008; Figure 3). Fossils are generally unknown from Holocene-age younger alluvium (Qa), due to its young age. Reworked paleontological material from older deposits may be present but would lack critical stratigraphic contextual data. Holocene-age younger alluvium (Qa) is therefore considered to have a low paleontological potential (PFYC 2) using BLM (2016) guidelines. However, these sediments may overlie older, paleontologically sensitive deposits at depth.

6.1.2 Older Alluvium (Qoa) (Pleistocene)

Pleistocene-age older alluvium (Qoa) comprise fluvial sediments deposited on broad canyon floors by ancient river and stream systems. Sediments consist of medium- to coarse-grained sand and gravel from alluvial fans derived from the uplift of adjacent mountains, particularly the Rand Mountains located to the northeast of the Project area. These deposits are generally characterized by their low-moderate to moderate relief and dissected surfaces. They are relatively elevated and contrast the lower lying Holocene-age younger alluvium (Qa). Pleistocene-age older alluvium (Qoa) is mapped within the southeastern portion of the Project area, as well as in areas adjacent to the eastern portion of the Project area within the Project vicinity (Dibblee and Minch, 2008; Figure 3). Furthermore, these sediments likely occur at depth beneath younger Holocene-age younger alluvium (Qa) within the Project area (Reynolds, 1989).

Ice Age taxa have been recovered from Pleistocene-age deposits of Kern County, including specimens of extinct horse (*Equus occidentalis*), rabbit (Leporinae), camel (*Procamelus*), dog (Canidae), rodent (*Thomomys*, *Microtus*, *Dipodomys*, *Neotoma*), frog (*Hyla*), and lizard (Lacertilia) (UCMP, 2019; Table 3). Approximately 30,000 fossil specimens have been collected from Pleistocene-age sediments at McKittrick Tar Pits in western Kern County. These specimens include a diversity of species of rodents, rabbits, birds, camels, horses, bison, pronghorn antelope, and mammoths, as well as plants and preserved insects (UCMP, 2019; Table 3). Furthermore, numerous localities have been documented from Pleistocene-age lake deposits in Manix Lake, San Bernardino County, which is located approximately 90 miles northeast of the Project area. Recorded specimens include pond turtle (Emydidae), western pond turtle (*Actinemys marmorata*), stork (*Ciconia maltha*), flamingo (*Phoenicopterus minutus*, *Phoenicopterus copei*), golden eagle (*Aquila chrysaetos*), pelican (*Pelecanus*), American white pelican (*Pelecanus erythrorhynchos*), western grebe (*Aechmophorus occidentalis*), double-crested cormorant (*Phalacrocorax auratus*), great horned owl (*Bubo virginianus*), bony fish (Osteichthyes), chub (*Gila mojavensis*), hare or jackrabbit (*Lepus*), cat (*Felis*), saber-toothed cat (*Smilodon californicus*), short-faced bear (*Arctodus*), mammoth (*Mammuthus*), bison (*Bison antiquus*), horse (*Equus*), oreodont (*Merychyus calaminthus*), miniature camel (*Stenomylus*), camel (Camelidae, *Camelops*, *Camelus*, *Hemiauchenia*, *Tanupolama*, *Tanupolama stevensi*), pronghorn (*Antilocapra*), bighorn sheep (*Ovis canadensis*), coyote (*Canis latrans*), ground sloth (*Nothrotheriops*) (UCMP, 2019; Table 3). While the depositional environments of the McKittrick Tar Pit locality and the Manix Lake localities differ from that of the Project area, there is the potential for similar fauna to be recovered during Project excavations. Additional localities recorded from Pleistocene-age sedimentary deposits throughout southern California have produced specimens including mammoth (*Mammuthus*), mastodon (*Mammut*), camel (Camelidae), horse (Equidae), bison (*Bison*), giant ground sloth (*Megatherium*), peccary (Tayassuidae), cheetah (*Acinonyx*), lion (*Panthera*), saber-toothed cat (*Smilodon*), capybara (*Hydrochoerus*), dire wolf (*Canis dirus*), and numerous taxa of smaller mammals (Rodentia) (Cooper and Eisentraut, 2002; Jahns, 1954; Jefferson, 1991; Table 3). Pleistocene older alluvium is considered to have moderate paleontological potential (PFYC 3) using BLM (2016) guidelines.

6.2 Paleontological Record Search Results

Paleo Solutions requested a paleontological search of records maintained by the Natural History Museum of Los Angeles County. The museum responded on September 9, 2019 that there were no localities within the Project area (McLeod, 2019; Appendix A). However, there are fossil localities recorded in the Project vicinity from similar sedimentary deposits as those that likely occur at depth in the Project area (Table 3). Locality LACM 3721, located northeast of the Project area in Goler Gulch, is recorded from Pleistocene-age older alluvium (Qoa) at depth beneath Holocene-age younger alluvium (Qa) and produced fossil horse (*Equus conversidens*) (McLeod, 2019; Table 3). Locality 3722, located west-southwest of the Project area, is recorded from Pleistocene-age older alluvium (Qoa) at depth beneath Holocene-age younger alluvium (Qa) and produced fossil horse (*Equus*) (McLeod, 2019; Table 3). Locality 7891, located southwest of the Project area, is recorded from Pleistocene-age older alluvium (Qoa) and produced fossil camel (*Hemiauchenia*) (McLeod, 2019; Table 3).

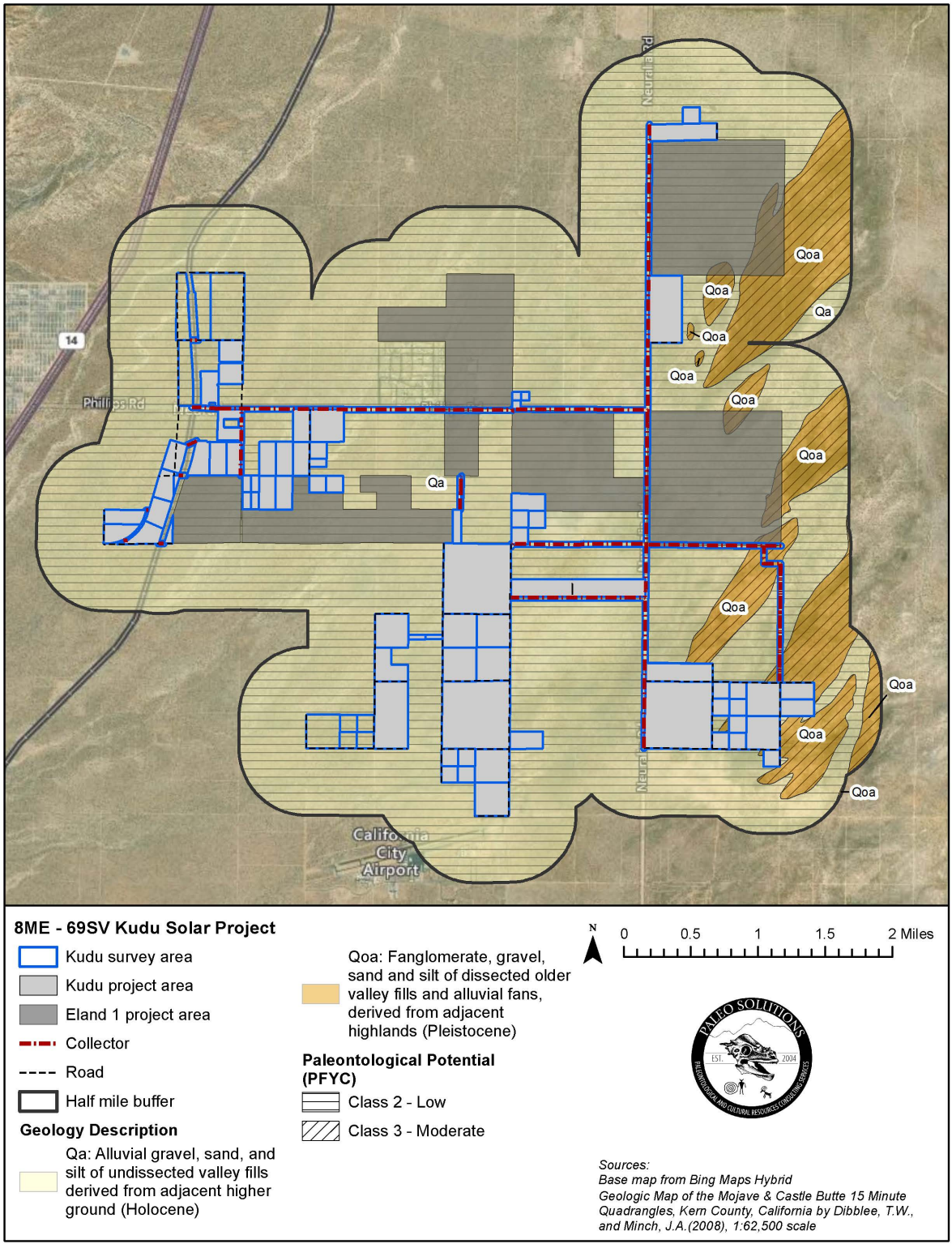

Figure 3. Project Geology Map.

Table 3. Paleontological Literature and Record Search Results

Institutional Locality Number/Name	Geologic Unit	Taxon	Common Name	Location	Source
LACM 3721	Pleistocene-age older alluvium (Qoa)	*Equus conversidens*	horse	Goler Gulch, northeast of Project area	McLeod, 2019
LACM 3722	Pleistocene-age older alluvium (Qoa)	*Equus*	horse	City of Tehachapi, west-southwest of Project area	McLeod, 2019
LACM 7891	Pleistocene-age older alluvium (Qoa)	*Hemiauchenia*	camel	Between Tehachapi Mountains and Rosamond Hills, southwest of Project area	McLeod, 2019
Not Reported	Pleistocene-age older alluvium (Qoa)	Lacertilia *Hyla* *Thomomys* *Microtus* *Dipodomys* *Neotoma* Leporinae Canidae *Equus occidentalis* *Procamelus*	lizard frog rodent rodent rodent rodent rabbit dog horse camel	Kern County	UCMP, 2019
McKittrick Tar Pits	Pleistocene-age asphaltic seep deposit	- - - - - - - - - - -	plant insect bird rodent rabbit camel horse bison pronghorn antelope mammoth	McKittrick Tar Pits (Kern County)	UCMP, 2019
UCMP RV6735, UCMP RV6736, UCMP RV6738, UCMP RV6746, UCMP RV6751, UCMP RV6752, UCMP RV6758, UCMP RV6767, UCMP RV7021, UCMP RV7051, UCMP RV7053, UCMP RV7054, UCMP RV7057,	Pleistocene-age Manix Lake Formation	Emydidae *Actinemys marmorata* *Ciconia maltha* *Phoenicopterus minutus* *Phoenicopterus copei* *Aquila chrysaetos* *Pelecanus* *Pelecanus erythrorhynchos* *Aechmophorus occidentalis* *Phalacrocorax auratus* *Bubo virginianus* Osteichthyes *Gila mojavensis*	pond turtle western pond turtle stork flamingo flamingo golden eagle pelican American white pelican western grebe double-crested cormorant great horned owl bony fish chub	Manix Lake, San Bernardino County	UCMP, 2019

Institutional Locality Number/Name	Geologic Unit	Taxon	Common Name	Location	Source
UCMP RV7063, UCMP RV7109, UCMP RV7131, UCMP RV7139, UCMP RV7140, UCMP RV6925, UCMP V92103		*Lepus* *Felis* *Smilodon californicus* *Arctodus* *Mammuthus* *Bison antiquus* *Equus* *Merychyus calaminthus* *Stenomylus* Camelidae *Camelops* *Camelus* *Hemiauchenia* *Tanupolama* *Tanupolama stevensi* *Antilocapra* *Ovis canadensis* *Canis latrans* *Nothrotheriops*	hare or jackrabbit cat saber-toothed cat short-faced bear mammoth bison horse oreodont miniature camel camel camel camel camel camel camel pronghorn bighorn sheep coyote ground sloth		
Not Reported	Pleistocene-age sedimentary deposits	*Mammuthus* *Mammut* Camelidae Equidae *Bison* *Megatherium* Tayassuidae *Acinonyx* *Panthera* *Smilodon* *Hydrochoerus* *Canis dirus* Rodentia	mammoth mastodon camel horse bison giant ground sloth peccary cheetah lion saber-toothed cat capybara dire wolf rodent	Southern California	Cooper and Eisentraut, 2002; Jahns, 1954; Jefferson, 1991

7.0 IMPACTS TO PALEONTOLOGICAL RESOURCES

Impacts on paleontological resources can generally be classified as either direct, indirect, or cumulative. Direct adverse impacts on surface or subsurface paleontological resources are the result of destruction by breakage and crushing as the result of surface disturbing actions including construction excavations. In areas that contain paleontologically sensitive geologic units, ground disturbance has the potential to adversely impact surface and subsurface paleontological resources of scientific importance. Without mitigation, these fossils and the paleontological data they could provide if properly recovered and documented, could be adversely impacted (damaged or destroyed), rendering them permanently unavailable to science and society.

Indirect impacts typically include those effects which result from the continuing implementation of management decisions and resulting activities, including normal ongoing operations of facilities constructed within a given project area. They also occur as the result of the construction of new roads and trails in areas that were previously less accessible. This increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting. Human activities that increase erosion also cause indirect impacts to surface and subsurface fossils as the result of exposure, transport, weathering, and reburial.

Cumulative impacts can result from incrementally minor but collectively significant actions taking place over a period of time. The incremental loss of paleontological resources over time as a result of construction-related surface disturbance or vandalism and unlawful collection would represent a significant cumulative adverse impact because it would result in the destruction of non-renewable paleontological resources and the associated irretrievable loss of scientific information.

Excavations within the Project area that impact Pleistocene-age older alluvium (Qoa), either at the surface or at depth beneath Holocene-age younger alluvium (Qa), may well result in an adverse direct impact on scientifically important paleontological resources. Surface grading or shallow excavations entirely within Holocene-age younger alluvium (Qa) in the Project area are unlikely to uncover significant fossil vertebrate remains, since any recovered resources will lack stratigraphic context. However, these deposits may shallowly overlie older *in situ* sedimentary deposits. Therefore, grading and other earthmoving activities may potentially result in significant adverse direct impacts to paleontological resources throughout the entirety of the Project area.

No direct or cumulative impacts are anticipated from any of the planned Project activities.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the ground disturbance necessary to complete the Project, there is potential for adverse impacts to scientifically significant paleontological resources within Pleistocene-age older alluvium (Qoa) where mapped at the surface and where encountered in the subsurface beneath the Holocene-age younger alluvium (Qa). Therefore, it is recommended that excavations in locations of the Project area mapped as Pleistocene-age older alluvium (Qoa) (PFYC 3) be initially monitored to determine whether Project excavations will disturb Pleistocene-age sedimentary deposits and scientifically significant fossils that may be preserved within them. Areas mapped as Holocene-age younger alluvium (Qa) should be spot-checked during excavations that exceed depths of 5 feet to check for underlying, paleontologically sensitive Pleistocene-age older alluvium (Qoa). If it is determined that only Holocene-age younger alluvium (Qa) (PFYC 2) is impacted, the monitoring program should be reduced or suspended.

Prior to the start of construction, a PRMMP should be prepared. The PRMMP should provide detailed recommended monitoring locations including locations with moderate paleontological potential; a description of a worker training program; detailed procedures for monitoring, fossil recovery, laboratory analysis, and museum curation; and notification procedures in the event of a fossil discovery by paleontological monitors or other project personnel. A curation agreement with the LACM or another accredited repository should also be obtained and included as part of the PRMMP. Any subsurface bones or potential fossils that are unearthed during construction should be evaluated by a Qualified Paleontologist.

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APPENDIX A

Natural History Museum of Los Angeles County Paleontological Record Search

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007
tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

9 September 2019

Paleo Solutions, Inc.
911 South Primrose Avenue, Unit N
Monrovia, CA 91016

Attn: Barbara Webster, GIS Specialist & Archaeologist

re: Paleontological resources for the proposed Kudu Solar Project, near California City, Kern County, project area

Dear Barbara:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Kudu Solar Project, near California City, Kern County, project area as outlined on the portions of the Mojave NE and California City North USGS topographic quadrangle maps that you sent to me via e-mail on 26 August 2019. We do not have any vertebrate fossil localities that lie directly within the proposed project area boundaries, but we do have localities somewhat nearby from the same or similar sedimentary deposits as occur in the proposed project area, either at the surface or at depth.

In the slightly elevated terrain on the eastern margin of the proposed project area there are surface deposits that consist of relatively coarse older Quaternary Alluvium, derived as alluvial fan deposits from the Rand Mountains to the east and northeast. Otherwise the proposed project area has surface deposits of younger Quaternary Alluvium, derived as alluvial fan deposits from the Piute Mountains to the west and from the Rand Mountains to the east. These Quaternary deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers. Our closest vertebrate fossil locality from these deposits is LACM 3722, west-southwest of the proposed project area and found during excavation for a sewer line within the city of Tehachapi, that produced a specimen of fossil horse, *Equus*. Our next closest vertebrate fossil locality from these deposits is probably LACM 3721, northeast of the proposed project area in Goler Gulch

northeast of Garlock, that produced a fossil specimen of horse, *Equus conversidens*. Further to the southwest of the proposed project area, near the California Aqueduct between the Tehachapi Mountains and the Rosamond Hills north of Willow Springs, our older Quaternary locality LACM 7891 produced a fossil specimen of camel, *Hemiauchenia*, at a depth of 21 feet below the surface.

Shallow excavations in the uppermost few feet of the older and younger Quaternary alluvial fan deposits in the proposed project area probably will not uncover significant fossil vertebrate remains. Deeper excavations in the proposed project area that extend down into older and perhaps finer-grained Quaternary deposits, however, may well encounter significant vertebrate fossils. Any substantial excavations in the proposed project area, therefore, should be closely monitored to quickly and professionally collect any specimens without impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

APPENDIX B

Public Land Survey System

Quarter-Quarter	Section	Township	Range
SWSW, NWSW, SWNW, NWNW	Sec.01	T32S	R37E
SWSW, SESW, SWSE, SESE, NWSW, NESE, SWNW, SENE, NWNW, NENW, NWNE, NENE	Sec.02		
SWSW, SESE, NWSW, NESE, SWNW, SENW, SWNE, SENE, NWNW, NENW, NWNE, NENE	Sec.03		
SWSW, SESW, SWSE, SESE, NWSW, NESW, NWSE, NESE, SWNW, SWNE, SENE, NWNE, NENE	Sec.04		
NENW	Sec.06		
NWSE, NESE, SWNE, SENE	Sec.08		
SWSE, SESE, NWSW, NWSE, NESE, SWNW, SWNE, SENE, NWNW, NENW, NWNE, NENE	Sec.09		
NWSW, NESE, SWNW, SENE, NWNW, NENE	Sec.10		
NWSW, NWSE, NESE, SWNW, SENW, SWNE, SENE, NWNW, NENW, NWNE, NENE	Sec.11		
SWNW, SENW, NWNW, NENW	Sec.12		
SWSW, SESW	Sec.14	T31S	
SESE	Sec.15		
SESW, SWSE, SESE	Sec.19		
SWSW	Sec.20		
SESE, NESE, SENE, NENE	Sec.22		
SWSW, NWSW, SWNW, NWNW, NENW	Sec.23		
SWSW, NWSW, NESW, SWNW, SENW, NWNW, NENW	Sec.26		
SWSW, SESW, SWSE, SESE, NESE, SENE, NENE	Sec.27		
SWSW, SESW, SWSE, SESE	Sec.28		
SWSW, SESW, SWSE, SESE, SWNW, NWNW	Sec.29		
SWSE, SESE, NWSE, NESE, NENW, NWNE, NENE, SENW, SWNE, SENE	Sec.30		
SWSW, SESW, NWSW, NESW, NWSE, NESE, SENW, SWNE, SENE, NENW, NWNE, NENE	Sec.31		
NWSW, NESW, NWSE, NESE, SWNW, SENW, SWNE, SENE, NWNW, NENW, NWNE, NENE	Sec.32		
SWSE, SESE, NWSE, NESE, SWNE, NWNW, NENW, NWNE, NENE	Sec.33		
NWNW, NENW, NWNE, NENE, SWSW, SESW, SWSE, SESE, NWSW, NESW, NESE, SENE	Sec.34		
NWNW, NWSW, SWNW, SWSW, SESW, SWSE, SESE	Sec.35		
SWSW	Sec.36		

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Appendix H

Phase I Environmental
Site Assessment

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Kudu Solar Farm
Phase I Environmental Site Assessment

December 4, 2019

Prepared for:

69SV 8me LLC
Eland 2 Solar CEI Parent, LLC
250 Sutter Street, Suite 600
San Francisco, CA 94108

Prepared by:

Stantec Consulting Services Inc.
100 California Street, Suite 1000
San Francisco, CA 94111

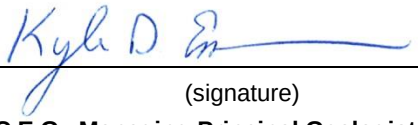
This document entitled Phase I Environmental Site Assessment was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of 69SV 8me LLC and Eland 2 Solar CEI Parent, LLC (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

All information, conclusions, and recommendations provided by Stantec in this document regarding the Phase I ESA have been prepared under the supervision of and reviewed by the professionals whose signatures appear below.

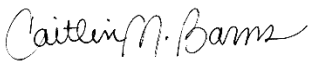
I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared by  (signature)

Dion Monge, Senior Scientist

Reviewed by  (signature)

Kyle Emerson, C.E.G., Managing Principal Geologist

Approved by  (signature)

Caitlin Barns, Senior Biologist

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Abbreviations

AAI	All Appropriate Inquiry
ACM	asbestos-containing material
amsl	Above mean sea level
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Client	69SV 8me LLC and Eland 2 Solar CEI Parent, LLC
CREC	controlled recognized environmental conditions
DOGGR	California Division of Oil, Gas, and Geothermal Resources
DTSC	Department of Toxic Substances Control
EP	Environmental Professional
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
gen-tie	generation tie
HREC	historical recognized environmental conditions
LADWP	Los Angeles Department of Water and Power
LBP	lead-based paint
pCi/L	PicoCuries per liter
Project/Property	the proposed Kudu Solar Farm, 72 parcels of land or portions thereof located approximately 1 mile east of the intersection of State Route 14 and Philips Road
REC	recognized environmental conditions
SR	State Route
Stantec	Stantec Consulting Services Inc.
User	69SV 8me LLC and Eland 2 Solar CEI Parent, LLC
USGS	United States Geological Survey
UST	underground storage tank

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1.0 SUMMARY

This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the Property. No further investigation appears to be warranted at this time.

Stantec Consulting Services Inc. (Stantec) has completed a Phase I Environmental Site Assessment (ESA) report for the proposed Kudu Solar Farm (alternatively, the Project), located approximately 1 mile east of the intersection of State Route (SR) 14 and Philips Road (Property), on behalf of 69SV 8me, LLC and Eland 2 Solar CEI Parent, LLC (Client or User). The work was performed according to Stantec's proposal and terms and conditions dated August 5, 2019. 69SV 8me, LLC has been designated as the User of this report.

The Phase I ESA was conducted in conformance with the requirements of American Society for Testing and Materials (ASTM) Designation E 1527-13, and All Appropriate Inquiry (AAI) as defined by the United States Environmental Protection Agency (EPA) in Title 40 of the Code of Federal Regulations (CFR), Part 312, except as may have been modified by the scope of work, and terms and conditions, requested by 8minute Solar Energy. Any exceptions to, or deletions from, the ASTM or AAI practice are described in Section 2.3, Exceptions and Limiting Conditions.

The Property is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. It consists of 72 parcels totaling 1,965.95 acres of predominantly vacant and undeveloped land in unincorporated Kern County and California City. The User has proposed the construction and operation of an up to 500 megawatt-alternating current (MW-AC) utility-scale solar farm with energy storage, known as the Kudu Solar Farm, on the Property.

The Property is adjacent to the approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 Solar Farms, and southeast of the Los Angeles Department of Water and Power (LADWP) Beacon Solar facility. A Property location map is provided as Figure 1. A Property map illustrating the main features of the Property is provided as Figure 2. Photographs taken during the site reconnaissance visit are provided in Appendix A.

We have performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 for the Property. Any exceptions to or deletions from this practice are described in Section 7.2, Data Gaps. This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the Property. No further investigation appears to be warranted at this time.

However, the following items of note were identified during this ESA:

- **Oil Wells.** Based on Stantec's review of the California Division of Oil, Gas, and Geothermal Resources' (DOGGR's) Well Finder online database, and as confirmed by measurements provided in the individual well records, there are two oil wells on the Property. The wells are identified as National Security Oil Co. "1" (API: 0402932491) and Childs-Wall "1" (API: 0402932490). According to the records, National Security Oil Co. "1" was drilled in the early 1920s to 111 feet below ground surface (bgs) and deemed a dry hole. The handwritten location in the record is not clearly written so there are two potential locations for the well, but both would fall in the northern portion of APN: 302-32-101, as shown on Figure 2.

The Childs-Wall "1" well was drilled in 1945 to a depth of 2,232 feet bgs and found to be a dry hole. The records indicate that there is no casing in the hole and that it is a square wood conductor box that was cemented in place. The well was "closed" with a board nailed to the conductor box so the property owner could potentially convert it to a water well at a later date. According to the locational information provided in the well record, this well is located in the northwest portion of APN: 302-020-14.

Based on a review of available well records, the wells do not have any casing and therefore would not be able to be located using geophysical survey methods. Given that the wells were determined to be "dry holes" and because of the proposed use of the Property as a solar farm, the wells are not considered a REC, but they may be encountered during development. If these wells are encountered during grading or development, Stantec recommends that work be stopped in the area and DOGGR be contacted for evaluation and determination for any further requirements.

- **Adjacent Railroad Easement.** A railroad easement crosses through the Property, but a buffer of undeveloped land that is approximately 75 feet or more is present between the boundary and the railroad tracks. The one exception to this is in areas where the proposed generation tie (gen-tie) lines would cross the railroad tracks.

  Given the distance from the Property boundary to the railroad tracks, no further assessment is recommended. However, if subsurface work is proposed for the installation of gen-tie lines or poles in areas that are within 20 feet of the railroad tracks, Stantec would recommend evaluation of soil samples to determine whether metals concentrations in soil are above California hazardous waste levels or regulatory thresholds that may pose a risk to future onsite construction workers.

- **Potential Water Wells.** Suspect water wells were observed during the field reconnaissance near the Property boundaries. Stantec recommends that all known and unknown (those encountered during proposed development activities) water wells be abandoned in accordance with applicable regulations unless the wells would be used for the Project.

The preceding summary is intended for informational purposes only. Reading of the full body of this report is recommended.

2.0 INTRODUCTION

The objective of this Phase I ESA was to perform AAI into the past ownership and uses of the Property consistent with good commercial or customary practice as outlined by the ASTM in "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process", Designation E1527-13. AAI is the process for evaluating a property's environmental conditions for the purpose of qualifying for landowner liability protections under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). following final rule of 40 CFR Part 312. The purpose of this Phase I ESA was to identify, to the extent feasible, adverse environmental conditions including RECs of the Property.

The ASTM E1527-13 standard indicates that the purpose of the Phase I ESA is to identify RECs, including historical recognized environmental conditions (HRECs), and controlled recognized environmental conditions (CRECs) that may exist at a property. The term "recognized environmental conditions" means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property:

1. due to any release to the environment;
2. under conditions indicative of a release to the environment; or
3. under conditions that pose a material threat of a future release to the environment.

ASTM defines HREC as a REC that has occurred in connection with a property but has been addressed to the satisfaction of the applicable regulatory authority and meets current unrestricted use criteria established by a regulatory authority without subjecting the property to any required controls (e.g., property use restrictions, activity and use limitations, institutional controls, or engineering controls). Before calling the past release a HREC, the environmental professional (EP) must determine whether the past release is a REC when the current Phase I ESA is conducted (e.g., if there has been a change in the regulations). If the EP considers the past release to be a REC at the time the Phase I ESA is conducted, the condition shall be included in the conclusions section of the report as a REC.

ASTM defines CREC as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), but with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, activity and use limitations, institutional controls, or engineering controls).

As defined by ASTM, RECs can include hazardous substances or petroleum products present under conditions in compliance with laws if that presence represents a material threat of future release. The presence of hazardous substances or petroleum products is, however, not a REC if that presence is a *de minimis* condition. *De minimis* conditions are minor occurrences of contamination that generally do not present a material risk to human health and would not likely be subject to enforcement action if brought to the attention of governmental agencies.

This Phase I ESA was conducted in accordance with our proposal to 8minutenergy dated August 5, 2019, and Client's authorization on August 12, 2019. The scope of work conducted during this Phase I ESA consisted of a visual reconnaissance of the Property, interviews with key individuals, and review of reasonably obtainable documents. The

scope of work did not include an assessment for environmental regulatory compliance of any facility ever operated at the Property (past or present), or sampling and analyzing of environmental media. Stantec was not contracted to perform an independent evaluation of the purchase or lease price of the Property and its relationship to current fair market value. The conclusions presented in this Phase I ESA report are professional opinions based on data described herein. The opinions are subject to the limitations described in Section 2.3, Exceptions and Limiting Conditions.

ASTM E1527-13 notes that the availability of record information varies by source. The User or EP is not obligated to identify, obtain, or review every possible source that might exist with respect to a property. Instead, ASTM identifies record information that is reasonably ascertainable from standard sources. “Reasonably ascertainable” is defined as follows:

1. information that is publicly available;
2. information that is obtainable from its source within reasonable time and cost constraints; and
3. information that is practicably reviewable.

2.1 PROPERTY DESCRIPTION

The Property is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. It consists of 72 parcels totaling 1,965.95 acres of predominantly vacant and undeveloped land in unincorporated Kern County and California City. The User has proposed the construction and operation of an up to 500 MW-AC utility-scale solar farm with energy storage, known as the Kudu Solar Farm.

The Property is adjacent to the approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 Solar Farms and southeast of the LADWP Beacon Solar facility. A Property location map is provided as Figure 1. A Property map illustrating the main features of the Property is provided as Figure 2. Photographs taken during the site reconnaissance visit are provided in Appendix A.

The table below provides a summary of the parcel numbers and acreage that are a part of the Property:

APN	Acres	Owner
Kern County Parcels		
469-170-10	10.02	KEREN & ASSCS, LLC
469-170-18	39.49	KEREN & ASSCS, LLC
470-020-19	4.38	JANIEKAY, LLC
470-030-01	79.22	ANDARI, GHAZI N.
470-080-15	20.27	AEK GLOBAL INVESTMENT, LLC
470-080-16	10.07	WOLFE, JEFFREY
470-080-17	10.10	WOLFE, JEFFREY
470-080-32	10.07	MOORE, JOHN T. & DONNA L. FAMILY TRUST
470-151-09	19.62	MAZIN FAMILY TRUST
470-151-15	20.23	ARAGON, GENARO & GUADALUPE
470-151-16	20.40	AHN, HYUNG

APN	Acres	Owner
470-151-17	19.98	CLERICO, ROBERT W. TRUST
470-152-01	39.32	DHUPAR, SURINDER K. ET AL.
470-152-18	10.32	JOHANSING, LOYDELL H. & DAVID A.
470-152-19	4.93	MITCHELL, LORI LYNN
470-322-15	9.96	INLAND MANAGEMENT, LLC
470-330-01	5.06	OAK INVS, LLC
470-330-02	4.77	OAK INVS, LLC
470-330-03	19.86	MEUNIER, PHYLLIS TRUST
470-330-04	20.15	MEUNIER, PHYLLIS TRUST
470-330-06	9.95	KANE, MARY
470-330-07	10.02	AZAM, JAVED & ROOBILA NAZ FAMILY TRUST
470-330-14	4.89	OAK INVS, LLC
470-330-15	5.23	YABLONSKI FAMILY TRUST A
470-350-04	18.65	HILBON, STEVEN
470-350-05	18.91	DISCOUNTLAND, INC.
470-350-06	18.89	KHATIBI, EBRAHIM
470-350-07	18.57	DISCOUNTLAND, INC.
470-350-08	19.93	WESTPALM DEV. CO.
470-380-01	19.92	HILBON, STEVEN
470-380-04	21.35	ROBERTO FAMILY TRUST ET AL.
470-380-05	17.34	SMITH, ALVA E. & BETTY M. REV LIVING TRUST
470-380-06	19.88	HIGGINS, MICHAEL
470-380-07	21.95	CABLE, JAMEY
California City Parcels		
302-020-08	40.17	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-09	80.09	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-11	163.67	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-14	40.99	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-15	10.52	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-16	10.15	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-020-17	9.59	ORTON FAMILY TRUST
302-020-18	9.98	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-290-03	83.58	PEACE, JUDY ET AL.
302-305-15	43.54	WANG, NATHAN & LINDA
302-321-01	160.93	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-322-01	10.10	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-322-02	10.09	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-322-04	10.24	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST

APN	Acres	Owner
302-322-05	10.28	ORTON FAMILY TRUST
302-322-06	40.04	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-322-08	10.33	ORTON FAMILY TRUST
302-322-09	40.49	ORTON FAMILY TRUST
302-322-10	10.27	ORTON, DAVID M. & PATRICIA D. FAMILY TRUST
302-322-11	10.29	ORTON FAMILY TRUST
302-325-49	9.74	STILLIENS, MARVIN E. & CAROLYN M.
302-330-33	20.21	O'LAUGHLIN, JEANIE & RANDALL
302-330-37	20.38	STALKNEGT FAMILY TRUST
302-341-29	168.79	BESSONART, DENIS & JULIE LIVING TRUST
302-342-01	40.22	INLAND MANAGEMENT, LLC
302-342-11	2.67	POLAN, HAROLD E. & AUDREY A.
302-342-12	2.66	O'BRIEN, SUSAN
302-342-19	29.69	KOLLAR, M M TR & MONTONNA WM
302-342-25	40.77	REINELT FAMILY TRUST
302-342-26	39.89	REINELT FAMILY TRUST
302-342-27	40.29	REINELT FAMILY TRUST
302-342-28	40.68	REINELT FAMILY TRUST
302-381-12	40.06	GEPHART, ROSS & JUDITH M.
302-381-13	9.94	GEPHART, ROSS & JUDITH M.
302-381-14	10.07	GEPHART, ROSS & JUDITH M.
302-381-15	10.38	GEPHART, ROSS & JUDITH M.
302-381-16	10.27	GEPHART, ROSS & JUDITH M.
302-470-14	20.20	CAMARA, MARGARET ELDRED TRUST
Total Acreage	**1,965.95**	

2.2 SPECIAL TERMS, CONDITIONS, AND SIGNIFICANT ASSUMPTIONS

There were no special terms, conditions, associated with the Phase I ESA. However, there is an unknown condition, where it is unclear as of this date if certain features (pipeline and wells) are part of the property to be acquired.

2.3 EXCEPTIONS AND LIMITING CONDITIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided and given the schedule and budget constraints established by the Client. No other representations, warranties, or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential and actual liabilities and conditions associated with the Property.

This report provides an evaluation of selected environmental conditions associated with the Property that was assessed at the time that the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the Client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available, and the results of the work. They are not a certification of the Property's environmental condition.

The Client did not provide or contract Stantec to provide recorded title records or search results for environmental liens or activity and use limitations encumbering the Property or in connection with the Property. Stantec did not obtain historical records that document the Property history in 5-year intervals. Although this resulted in data gaps, these data gaps are not considered significant. Based on the information obtained during this ESA and general knowledge of development at and near the Property, the absence of this information did not affect the ability of the EPs to identify RECs, HRECs, CRECs, or *de minimis* conditions.

This report relates solely to the project for which Stantec was retained and the stated purpose for which this report was prepared and shall not be used or relied upon by the Client for any variation or extension of this project, any other project, or any other purpose.

This report has been prepared for the exclusive use of the Client identified herein, and any use of or reliance on this report by any third party is prohibited except as may be consented to in writing by Stantec or as required by law. The provision of any such consent is at Stantec's sole and unfettered discretion and will only be authorized pursuant to the conditions of Stantec's standard form reliance letter. Stantec assumes no responsibility for losses, damages, liabilities, or claims, howsoever arising, from third party use of this report.

Project-specific limiting conditions are provided in Section 2.2, Special Terms, Conditions, and Significant Assumptions.

The locations of any utilities, buildings and structures, and Property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures, are not guaranteed. Before starting site work, the exact location of all such utilities and structures must be confirmed by the Client and the party performing the work, and Stantec assumes no liability resulting from damage to such utilities and structures.

The conclusions are based on the conditions encountered at the Property by Stantec at the time the work was conducted.

As the purpose of this report is to identify Property conditions that may pose an environmental risk; the identification of non-environmental risks to structures or people on the Property is beyond the scope of this assessment.

The findings, observations, and conclusions expressed by Stantec in this report are not an opinion concerning the compliance of any past or present owner or operator of the Property that is the subject of this report with any federal, state, provincial, or local law or regulation.

This report presents professional opinions and findings of a scientific and technical nature. It does not and shall not be construed to offer a legal opinion or representations as to the requirements of or compliance with, environmental laws, rules, regulations or policies of federal, state, provincial, or local governmental agencies. It is recommended that issues raised by the report should be reviewed for the Client by its legal counsel.

Stantec specifically disclaims any responsibility to update the conclusions in this report if new or different information later becomes available or if the conditions or activities on the property subsequently change.

2.4 PERSONNEL QUALIFICATIONS

This Phase I ESA was conducted by or under the supervision of an individual that meets the ASTM definition of an EP. The credentials of the EP and other key Stantec personnel involved in conducting this Phase I ESA are provided in Appendix B.

3.0 USER-PROVIDED INFORMATION

ASTM E1527-13 describes responsibilities of the User to complete certain tasks in connection with the performance of AAI into the Property. The ASTM standard requires that the EP request information from the User on the results of those tasks because that information can assist in the identification of RECs, CRECs, HRECs, or *de minimis* conditions in connection with the Property. Towards that end, Stantec requested that the User provide the following documents and information:

Description of Information	Provided (Yes / No)	Description and/or Key Findings
User Questionnaire and/or Interview	No	A completed user questionnaire was not provided. Given the historical documents available for the Property, the lack of a completed user questionnaire is not considered a significant data gap.
Environmental Liens or Activity Use Limitations	No	Land title records and deeds were not provided by the User, and public records were not searched by Stantec.
Previous Environmental Permits or Reports Provided by User	No	None provided
Purpose of the Phase I ESA	Yes	Due diligence

4.0 RECORDS REVIEW

The objective of consulting historical sources of information is to develop the history of the Property and surrounding area and evaluate if past uses may have resulted in RECs. Physical setting records are evaluated to determine if the physical setting may have contributed to adverse environmental conditions in connection with the Property. During the review of historical records, Stantec attempted to identify uses of the Property from the present to the first developed use of the Property. Stantec's research included the reasonably ascertainable and useful records described in this section.

4.1 PHYSICAL SETTING

A summary of the physical setting of the Property is provided in the table below with additional details in the following subsections:

Topography:	Most of the Property topography slopes to the northeast at elevations range from approximately 2,440 feet above mean sea level (amsl) to approximately 2,280 feet amsl.
Soil/Bedrock Data:	The Property is underlain by Holocene or later Pleistocene sandy alluvium, which in turn overlies older, Plio-Pleistocene clayey Alluvium.
Estimated Depth to Groundwater/ Estimated Direction of Gradient:	Due to the wide range in topography across the Property, the depth to groundwater is expected to vary. The Environmental Data Resources, Inc. (EDR) DataMap™ Well Search records indicated the depth to water in nearby water wells ranges between 190 feet bgs to more than 300 feet bgs (EDR 2019). Location-specific groundwater direction and elevations are not known.

Note: Site-specific groundwater flow direction and depth can be determined only by site-specific testing, which Stantec has not conducted.

4.1.1 Property Topography and Surface Water Flow

There is at least 160 feet of topographic relief at the Property with elevations ranging from 2,440 feet amsl in the southwest to 2,280 feet amsl in the northeast (U.S. Geological Survey [USGS] 2012). Based on the topography, surface water on the Property infiltrates the ground surface or flows overland to the northeast.

4.1.2 Regional and Property Geology

The Property is in the Mojave Desert geomorphic province of California, which spans 25,000 square miles and is landlocked. The Mojave Desert is a wedge-shaped structural block that is enclosed to the southwest by the San Andreas Fault and the Traverse Ranges, while the north and northeast is enclosed by the Garlock Fault, the Tehachapi Mountains, and the Basin and Range. The Colorado River and the Nevada State Line form the eastern boundary of the province, and finally, the San Bernardino-Riverside County line forms the southern boundary. The desert itself is of Cenozoic nature and likely formed from the movements of the San Andreas and Garlock faults. The region is currently dominated by broad alluvial basins that are aggrading surfaces that receive nonmarine continental

deposits from the adjacent upland areas. The western portion of the province is riddled with north-west trending faults (San Andreas Fault being most predominant) and with east-west trending Garlock Fault.

The Property is underlain by Holocene or later Pleistocene sandy alluvium, which in turn overlies older, Plio-Pleistocene clayey alluvium.

4.1.3 Regional and Property Hydrogeology

The Property is located within the Fremont Valley Groundwater Basin, which underlies Fremont Valley in eastern Kern County and northwestern San Bernardino County. The basin is bounded on the northwest by the Garlock fault zone against impermeable crystalline rocks of the El Paso Mountains and the Sierra Nevada. This basin is bounded on the east by crystalline rocks of the Summit Range, Red Mountain, Lava Mountains, Rand Mountains, Castle Butte, Bissel Hills, and Rosamond Hills. The basin is bounded on the southwest by the Antelope Valley Groundwater Basin along a groundwater divide approximated by a line connecting the mouth of Oak Creek through Middle Butte to exposed basement rock near Gem Hill. Both Quaternary alluvium and lacustrine deposits are water-bearing; however, the alluvium is the most important water-bearing material in the basin (California Department of Water Resources 2004).

Due to the wide range in topography across the Property, the depth to groundwater is expected to vary. The EDR DataMap™ Well Search records indicated the depth to water in nearby water wells ranges between 190 feet bgs to more than 300 feet bgs. Location-specific groundwater direction and elevations are not known.

4.2 FEDERAL, STATE AND TRIBAL ENVIRONMENTAL RECORDS

A regulatory agency database search report was obtained from EDR, a third-party environmental database search firm. A complete copy of the database search report, including the date the report was prepared, the date the information was last updated, and the definition of databases searched, is provided in Appendix D.

Stantec evaluated the information listed within the database relative to potential impact to the Property, assessing the potential for impacts based in part on the physical setting. As part of this process, inferences have been made regarding the likely groundwater flow direction at or near the Property. The inferred groundwater flow direction is likely to be to northeast. Observations about the Property and surrounding properties made during the Property reconnaissance are provided in more detail in Section 5, Site Reconnaissance.

4.2.1 Listings for Property

The Property was not identified in the environmental database report.

4.2.2 Listings for Nearby Sites with Potential to Impact Property

Stantec assessed data presented in the environmental agency database search report to evaluate the potential for conditions on adjacent and nearby sites to pose a REC, CREC, or HREC for the Property. The evaluation included an opinion of the potential for contamination by hazardous substances or petroleum products to migrate to the Property from a nearby property, including by vapor migration or encroachment (i.e., potential for a vapor encroachment condition).

Stantec considers the listings in the database search report provided in Appendix C to not constitute a potential REC for the Property.

4.3 LOCAL/REGIONAL ENVIRONMENTAL RECORDS

Stantec checked the following sources to obtain information pertaining to Property use and/or indications of RECs in connection with the Property:

4.3.1 Kern County Department of Environmental Health

Agency Name Contact Information	Finding
Kern County Department of Environmental Health 1800 Mt. Vernon Avenue Bakersfield, CA 93306 (661) 321-3000 September 5, 2019	Stantec submitted a request to the Kern County Department of Environmental Health to research whether any documents were on file for the Property. At the time of this report, Stantec has not been notified by the department with any information pertaining to the Property. If files become available at a later date, Stantec would issue an addendum to this report with a summary of findings. However, based on its review of other sources, Stantec considers it unlikely that any records from this agency would alter the conclusions or recommendations of this report.

4.3.2 Regional Water Quality Control Board (RWQCB)

Agency Name Contact Information	Finding
Regional Water Quality Control Board (RWQCB) Lahontan RWQCB Region 6V 15095 Amargosa Road, Bldg. 2, Ste 210 Victorville, CA 92394 Researched: September 5, 2019	Stantec searched for available files for the Site and nearby properties on the RWQCB Geotracker website (https://geotracker.waterboards.ca.gov). According to the Geotracker website, no documents associated with the Property or adjoining properties are available.

4.3.3 Department of Toxic Substances Control (DTSC)

Agency Name Contact Information	Finding
Department of Toxic Substances Control (DTSC) 8800 Cal Center Drive Sacramento, CA 95826 Online database: https://www.envirostor.dtsc.ca.gov/ researched September 5, 2019	Stantec searched for available files for the Site and nearby properties on the Department of Toxic Substances Control's Envirostor website (https://geotracker.waterboards.ca.gov). According to the Envirostor website, no documents associated with the Site are available.

4.3.4 California City Building Department

Agency Name, Contact Information	Findings
California City Building Department 21000 Hacienda Blvd. California City, CA 93505 (760) 373-7140 September 5, 2019	Stantec contacted the California City Building Department to research whether any documents were on file for the Property. At the time of this report, Stantec has not been notified by the department with any information pertaining to the Property. If files become available at a later date, Stantec would issue an addendum to this report with a summary of findings. However, based on its review of other sources, Stantec considers it unlikely that any records from this agency would alter the conclusions or recommendations of this report.

4.3.5 California Division of Oil, Gas, and Geothermal Resources (DOGGR)

Agency Name, Contact Information	Findings
DOGGR 4800 Stockdale Hwy., Suite 100 Bakersfield, CA 93309-0279 (661) 322-4031 September 9, 2019	Stantec reviewed DOGGR's Well Finder online database to review potential oil wells at the Property or in the vicinity. According to the well finder, and as confirmed by measurements provided in the records, there are two oil wells at the Property, as discussed below. Lease by National Security Oil Co. "1" (API: 0402932491) is listed on the DOGGR Well Finder as a plugged dry hole. The well record available through the Well Finder database contains only two pages of information from the early 1920s—one that indicates its location and proposed operations, and the other is a letter indicating that the well was drilled to 111 feet. The location reported in the record is not clearly written but appears to indicate that it is 1,020 feet (or potentially 1,520 feet) east and 200 feet south of the northwest corner of Section 11, Township S2S, RS7E in Kern County. Either of the two probable locations specified in the record indicates that the well is in the northern portion of APN: 302-32-101, as shown on Figure 2. Childs-Wall "1" (API: 0402932490) is listed on the DOGGR Well Finder as a plugged dry hole. The well record indicates that the well was drilled in1945 to a depth of 2,232 feet. The record from 1946/1947 indicates that there is no casing in the hole and that it is a square wood conductor box that was cemented in place. The well was "closed" with a board nailed to the conductor box so the property owner could potentially convert it to a water well at a later date. According to the locational information provided in the well record, this well is located in the northwest portion of APN: 302-020-14. This location conflicts slightly with the DOGGR online map, which plots it near the adjoining boundary between APN: 302-020-15 and APN: 302-020-18. However, plotted well locations on the Well Finder have been acknowledged by DOGGR to occasionally be incorrect and that it is more reliable to use the well location specified in the original well record. Based on a review of available well records, the wells do not have any casing and therefore would not be able to be located using geophysical survey methods. Given the proposed use of the Property as a solar farm, the wells are considered unlikely to represent an environmental concern. However, if these wells are encountered during Property redevelopment, Stantec recommends that work be

Agency Name, Contact Information	Findings
	stopped in the area and DOGGR be contacted for evaluation and determination as to any further requirements.

4.4 HISTORICAL RECORDS REVIEW

4.4.1 Land Title Records/Deeds

Land title records, deeds, environmental liens, and activity and use limitation documentation was not provided by the User, and public records were not searched by Stantec.

4.4.2 Aerial Photographs

Stantec reviewed historical aerial photographs provided by EDR. Copies of the aerial photographs are included in Appendix D. The general type of activity on a property and land use changes can often be discerned from the type and layout of structures visible in the photographs. However, specific elements of a facility's operation usually cannot be discerned from aerial photographs alone. The following table summarizes Stantec's observations of the reviewed historical aerial photographs.

Year	Observations, Property and Adjoining Properties
1952	The Property is undeveloped desert land with native vegetation consisting predominantly of low-lying shrubs. There are a few spots on the Property where there are small circular areas (~5,000 square feet) that are void of vegetation. However, there is no indication of activities in these areas. Natural drainages trend southwest-northeast across the Property and surrounding properties.
1972	The Property and surrounding area appear the same as the previous photograph except that farming operations are visible offsite on a parcel to the northeast of the intersection of Yucaipa Street and Phillips Road.
1977	The Property and surrounding area appear similar to the previous photographs.
1985-1986	The Property and surrounding area appear similar to the previous photographs except that an approximate 2,200-square-foot dark surface feature appears in the northwest corner of APN: 302-34-201. As indicated below, this feature is not present in any of the other aerial photographs.
1994	The Property and surrounding area appear similar to the previous photographs.
2005	The Property and surrounding area appear similar to the previous photographs.
2009	The Property and surrounding area appear similar to the previous photographs.
2012	The Property and surrounding area appear similar to the previous photographs.
2016	The Property and surrounding area appear similar to the previous photographs.

Former agricultural use was not identified at the Property. Additionally, no commercial use or other developed use was identified at the Property that would be considered an environmental concern.

4.4.3 Historical Fire Insurance Maps

Fire insurance maps were developed for use by insurance companies to depict facilities, properties, and their uses for many locations throughout the United States. These maps provide information on the history of prior land use and are useful in assessing whether there may be potential environmental contamination on or near the Property. These maps, which have been periodically updated since the late 19th century, often provide valuable insight into historical Property uses.

Stantec requested fire insurance maps from EDR; however, no coverage exists for the Property. The Sanborn® Map Search Report indicating "no coverage" is presented in Appendix D.

4.4.4 Historical Topographic Maps

Stantec reviewed historical USGS 7.5-minute topographic maps of the Mojave NE, California City North, Cinco, Cantil, Castle Butte, Salt Dale, and Cross Mountain Quadrangles to help identify past Property usage and areas of potential environmental concern.

No RECs were noted during our review of the topographic maps. Copies of the historical maps are provided in Appendix D. The following table summarizes the maps reviewed and our observations.

Year	Scale	Observations, Property and Adjoining Properties
1915	1:125,000	Only the southwest portion of the Property was available. A portion of the Southern Pacific Railroad passes through the western portion of the Property. There are no other improvements within the Property boundaries.
1943	1:63,500	All of the Property is illustrated on this map, but there are no structures on the Property. Only dirt roads are depicted, and an area in the western portion of the Property is labeled as Neuralia.
1947	1:50,000	The Property and surrounding area appear similar to the previous map.
1956	1:62,500	The Property and surrounding area appear similar to the previous map except that several "wells" and a "water tank" are depicted. Only one of the wells is within the Property boundary along a proposed gen-tie line in the eastern portion of the Property. The remaining wells and water tank are offsite.
1973	1:24,000	The Property and surrounding area appear similar to the previous map.
1980	1:24,000	This map shows the west half of the Property. The Property and surrounding area appear similar to the previous map.
1994	1:24,000	This map shows the west ¾ of the Property. The Property and surrounding area appear similar to the previous map.
2012	1:24,000	The entire Property is shown and appears the same as the previous map.

4.4.5 Other Historical Sources

Stantec Consulting Services, Inc (Stantec), 2017. Phase I Environmental Site Assessment, Eland 1 Solar Farm, Unincorporated Area of Kern County, California, November 14.

Records Review
December 4, 2019

This report is a Phase 1 ESA that was prepared for the Eland 1 Solar Farm proposed in the surrounding area. The Phase 1 concluded that potential impacts from total petroleum hydrocarbons, metals, and pesticides may be present in soils from aboveground fuel tanks and agricultural activities. The Property is not adjacent to areas of this parcel where the tanks and former agricultural uses were noted and are therefore not considered an environmental concern.

5.0 SITE RECONNAISSANCE

A visit to the Property and its vicinity was Mr. Nicholas Drachenberg, Stantec Environmental Scientist, and Ms. Sarah Toback, Stantec Staff Biologist, on August 12, 2019. Mr. Drachenberg and Ms. Toback were unaccompanied during the Property visit. Access to the Property was coordinated through the User. Figure 2 provides information about the Property and adjoining properties and the location of potential areas of environmental concern. Photographs collected during the Property visit are included in Appendix A.

5.1 SITE RECONNAISSANCE METHODOLOGY

The site reconnaissance focused on observation of current conditions and observable indications of past uses and conditions of the Property that may indicate the presence of RECs. The reconnaissance of the Property was conducted on foot, and Stantec used the following methodology to observe the Property:

- Traverse the outer Property boundary.
- Traverse transects across the Property.

Weather conditions during the visit to the Property were clear and sunny. There were no weather-related Property access restrictions encountered during the site reconnaissance visit.

5.2 GENERAL DESCRIPTION

Property and Area Description:	The Property is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. It consists of 72 parcels totaling 1,965.95 acres of predominantly vacant and undeveloped land in unincorporated Kern County and California City. The User has proposed the construction and operation of an up to 500 MW-AC utility-scale solar farm with energy storage, known as the Kudu Solar Farm. The Property is adjacent to the proposed/approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 Solar Farms and southeast of the LADWP Beacon Solar facility.
Property Operations.	Most of the Property is currently vacant and undeveloped. However, the northeast corner of APN: 469-17-010 overlaps with a portion of the neighboring residential property to the east/northeast.
Structures, Roads, Other Improvements:	There are no structures or improvements at the Property other than dirt or asphalt paved roads.
Property Size (acres):	1,965.95 acres
Estimated % of Property Covered by Buildings and/or Pavement:	<1%
Observed Current Property Use/Operations:	Vacant, desert land
Observed Evidence of Past Property Use(s):	Vacant, desert land

Sewage Disposal Method (and age):	Unknown/undeveloped
Potable Water Source:	Unknown/undeveloped
Electric Utility:	Unknown/undeveloped

5.3 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

The following table summarizes Stantec's observations during the Property reconnaissance.

Observations	Description/Location
Hazardous Substances and Petroleum Products as Defined by CERCLA 42 U.S.C. § 9601(14):	None observed
Drums (≥ 5 gallons):	None observed
Strong, Pungent, or Noxious Odors:	None observed
Pools of Liquid:	None observed
Unidentified Substance Containers:	None observed
Polychlorinated Biphenyl-Containing Equipment:	None observed
Other Observed Evidence of Hazardous Substances or Petroleum Products:	Four discarded cans of paint were observed in the western portion of APN:302-34-219 that ranged from 1 to 5 gallons. No staining or evidence of a release was observed on the surrounding soil.

5.4 INTERIOR OBSERVATIONS

The Property is undeveloped with no interior areas to inspect.

5.5 EXTERIOR OBSERVATIONS

Stantec made the following observations during the site reconnaissance of exterior areas of the Property and/or identified the following information during the interview or records review portions of the assessment:

Observations	Description
On-site Pits, Ponds, or Lagoons:	None observed
Stained Soil or Pavement:	None observed
Stressed Vegetation:	None observed
Waste Streams and Waste Collection Areas:	None observed
Solid Waste Disposal:	None observed other than discarded wood and occasional trash.
Potential Areas of Fill Placement:	No mounds, piles, or depressions suggesting the placement of fill material were observed on the Property.

Observations	Description
Wastewater:	No exterior wastewater discharge was observed.
Stormwater:	There are no engineered stormwater structures or channels. Stormwater would follow overland following the topographic gradient to the northeast.
Wells:	Suspect water wells were observed during the field reconnaissance near the Property boundaries. Stantec recommends that all known and unknown (those encountered during proposed development activities) irrigation/water wells be abandoned in accordance with applicable regulations unless the wells would be used by the Project.
Septic Systems:	No visible evidence of the existence of a septic system was observed.
Other Exterior Observations:	None

5.6 UNDERGROUND STORAGE TANKS/STRUCTURES

Existing Underground Storage Tanks (USTs):	No visible evidence (fill pipes, vent pipes, dispensers, surface patches), which would indicate the presence of USTs, was discovered during the site reconnaissance.
Former USTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface patches), reports, or other evidence of the former presence of USTs was discovered during this Phase I ESA.
Other Underground Structures:	None observed

5.7 ABOVEGROUND STORAGE TANKS

Existing Aboveground Storage Tanks (ASTs):	No visible evidence (fill pipes, vent pipes, dispensers, surface stains), which would indicate the presence of ASTs, was discovered during the site reconnaissance.
Former ASTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface stains), reports, or other evidence of the former presence of ASTs was discovered during this Phase I ESA.

5.8 ADJOINING PROPERTIES

5.8.1 Current Uses of Adjoining Properties

As viewed from the Property and/or from public rights-of-way, adjoining properties mostly consist of undeveloped land. However, a railroad easement crosses through the Property, but a buffer of undeveloped land that is approximately 75 feet or more is present between the boundary and the railroad tracks. The one exception to this is in areas where the proposed gen-tie lines would cross the railroad tracks. Given the distance from the Property boundary to the railroad tracks, no further assessment is recommended. However, if subsurface work is proposed for the installation of gen-tie lines or poles in areas that are within 20 feet of the railroad tracks, Stantec would

recommend evaluation of soil samples to determine whether metals concentrations in soil are above California hazardous waste levels or regulatory thresholds that may pose a risk to future onsite construction workers.

The California City Municipal Airport is located adjacent to the south of the Property. Residential properties are located adjacent to some of the proposed gen-tie line locations. A residential property is adjacent to APN 469-17-010 in the northeast portion of the Property. The rear yard of this residential property overlaps the northeast corner of Property parcel but appears to only be used for equipment storage.

5.8.2 Observed Evidence of Past Uses of Adjoining Properties

Observations of adjoining properties providing indications of past use and activities, if any, are described below.

NORTH	None observed
EAST	None observed
SOUTH	None observed
WEST	The properties appear predominantly undeveloped except for remnant row crops to the west of the southernmost Property parcel.

5.8.3 Pits, Ponds or Lagoons on Adjoining Properties

As viewed from the Property and/or from public rights-of-way, Stantec made the following observations about the presence of pits, ponds, and lagoons on adjoining properties:

NORTH	None observed
EAST	None observed
SOUTH	None observed
WEST	None observed

5.9 OBSERVED PHYSICAL SETTING

Topography of the Property and Surrounding Area:	Property topography slopes to the northeast at elevations ranging from approximately 2,440 feet amsl to approximately 2,280 feet amsl

6.0 INTERVIEWS

The AAI final rule requires that a site interview be conducted with the property owner or site occupant that is most familiar with the site. The landowner representatives of the parcels associated with the Property were not available for interview. However, given that the Property consists of undeveloped vacant land, the lack of an interview is not considered a significant data gap.

7.0 EVALUATION

This section provides a summary overview of or findings, opinions, and conclusions.

7.1 FINDINGS AND OPINIONS

Information gathered from reviews of existing data and a property inspection was evaluated to determine if RECs are present in connection with the Property. Based on this information, Stantec made the following findings and developed the following opinions.

- Suspect water wells were observed during the field reconnaissance near the Property boundaries.

  Stantec recommends that all known and unknown (those encountered during proposed development activities) irrigation/water wells be abandoned in accordance with applicable regulations unless the wells would be used by the Project.

- Four discarded cans of paint were observed in the western portion of APN:302-34-219 that ranged from 1 to 5 gallons. No staining or evidence of a release was observed on the surrounding soil.

- An environmental records search was performed and identified sites within their respective ASTM E 1527-13 search radii of the Property that may represent RECs, HRECs, or *de minimis* conditions.

  Based on distance from the Property, position of sites with respect to assumed groundwater flow direction, the native soils, and/or regulatory status, none of the sites identified in the in the environmental records search report are expected to affect soil or groundwater quality at the Property. The environmental records search identified no RECs, HRECs or *de minimis* conditions at or near the Property.

- A railroad easement crosses through the Property, but a buffer of undeveloped land that is approximately 75 feet or more is present between the boundary and the railroad tracks. The one exception to this is in areas where the proposed gen-tie lines will cross the railroad tracks.

  Given the distance from the Property boundary to the railroad tracks, no further assessment is recommended. However, if subsurface work is proposed for the installation of gen-tie lines or poles in areas that are within 20 feet of the railroad tracks, Stantec would recommend evaluation of soil samples to determine whether metals concentrations in soil are above California hazardous waste levels or regulatory thresholds that may pose a risk to future onsite construction workers.

- Stantec reviewed DOGGR's Well Finder online database to review potential oil wells at the Property or in the vicinity. According to the well finder, and as confirmed by measurements provided in the records, there are two oil wells at the Property.

  Based on Stantec's review of the records, the wells do not have any casing, and one of the wells reportedly consists of a square wood conductor box that was cemented in place. Given the lack of casing in these wells, they would not be able to be located using geophysical survey methods. Due to the proposed use of the Property

as a solar farm, the wells are considered unlikely to represent an environmental concern since access could be made to the well locations of record in the future since the solar panels would not be permanent structures. However, if these wells are encountered during Property redevelopment, Stantec recommends that work be stopped in the area and DOGGR be contacted for evaluation and determination regarding any further requirements.

7.2 DATA GAPS

The federal AAI final rule [40 CFR 312.10(a)] and ASTM E1527-13 identify a "data gap" as the lack or inability to obtain information required by the standards and practices of the rule despite good faith efforts by the EP or the User.

Any data gaps resulting from the Phase I ESA described in this report are listed and discussed below.

Gap	Discussion
Deletions or Exceptions from Scope of Work Referenced in Section 1.4:	None
Weather-Related Restrictions to Site Reconnaissance:	None
Facility Access Restrictions to Site Reconnaissance:	It was not within our scope to walk the entire Property. Stantec drove through the Property and observed the vicinity from high elevations, where possible.
Other Site Reconnaissance Restrictions:	None
Data Gaps from Environmental Records Review:	None
Data Gaps from Historical Records Review:	None
Data Gaps from Interviews:	The landowner representatives of the parcels associated with the Property were not available for interview. However, given that the Property consists of undeveloped vacant land, the lack of an interview is not considered a significant data gap.
Other Data Gaps:	A completed user questionnaire was not provided. Given the historical documents available for the Property, the lack of a completed user questionnaire is not considered a significant data gap.

7.3 CONCLUSIONS

We have performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 for the Property. Any exceptions to or deletions from this practice are described in Section 7.2, Data Gaps. This assessment has revealed no evidence of RECs in connection with the Property. No further investigation appears to be warranted at this time.

However, the following items of note were identified during this ESA:

- **Oil Wells.** Based on Stantec's review of DOGGR's Well Finder online database and as confirmed by measurements provided in the individual well records, there are two oil wells on the Property. The wells are identified as National Security Oil Co. "1" (API: 0402932491) and Childs-Wall "1" (API: 0402932490). According to the records, National Security Oil Co. "1" was drilled in the early 1920s to 111 feet bgs and deemed a dry hole. The handwritten location in the record is not clearly written so there are two potential locations for the well, but both would fall in the northern portion of APN: 302-32-101, as shown on Figure 2.

  The Childs-Wall "1" well was drilled in 1945 to a depth of 2,232 feet bgs and found to be a dry hole. The records indicate that there is no casing in the hole and that it is a square wood conductor box that was cemented in place. The well was "closed" with a board nailed to the conductor box so the property owner could potentially convert it to a water well at a later date. According to the locational information provided in the well record, this well is located in the northwest portion of APN: 302-020-14.

  Based on a review of available well records, the wells do not have any casing and therefore would not be able to be located using geophysical survey methods. Given that the wells were determined to by "dry holes" and because of the proposed use of the Property as a solar farm, the wells are not considered a REC, but it should be noted that they may be encountered during development. If these wells are encountered during grading/development, Stantec recommends that work be stopped in the area and DOGGR be contacted for evaluation and determination for any further requirements.

- **Adjacent Railroad Easement.** A railroad easement crosses through the Property, but a buffer of undeveloped land that is approximately 75 feet or more is present between the boundary and the railroad tracks. The one exception to this is in areas where the proposed gen-tie lines would cross the railroad tracks.

  Given the distance from the Property boundary to the railroad tracks, no further assessment is recommended. However, if subsurface work is proposed for the installation of gen-tie lines or poles in areas that are within 20 feet of the railroad tracks, Stantec recommends the evaluation of soil samples to determine whether metals concentrations in soil are above California hazardous waste levels or regulatory thresholds that may pose a risk to future onsite construction workers.

- **Potential Water Wells.** Suspect water wells were observed during the field reconnaissance near the Property boundaries. Stantec recommends that all known and unknown (those encountered during proposed development activities) water wells be abandoned in accordance with applicable regulations unless the wells will be used by the Project.

8.0 NON-SCOPE CONSIDERATIONS

The following ASTM E1527-13 non-scope services were performed as part of this Phase I ESA:

8.1 LEAD-BASED PAINT

Concern for lead-based paint (LBP) is primarily related to residential structures. The EPA's Final Rule on Disclosure of Lead-Based Paint in Housing (40 CFR Part 745) defines LBP as paint or other surface coatings that contain lead equal to or in excess of 1.0 milligram per square centimeter or 0.5 percent by weight.

The risk of lead toxicity in LBP varies based upon the condition of the paint and the year of its application. The U.S. Department of Housing and Urban Development has identified the following risk factors:

- The age of the dwelling as follows: maximum risk is from paint applied before 1950.
- There is severe risk from paint applied before 1960.
- There is moderate risk from deteriorated paint applied before 1970.
- There is slight risk from the paint that is intact but applied before 1977.
- The condition of the painted surfaces.
- The presence of children and certain types of households in the building.
- Previously reported cases of lead poisoning in the building or area.

Given that there are no structures on the Property, LBP is not considered an environmental concern to the Property.

8.2 ASBESTOS

Asbestos can be found in many applications, including sprayed-on or blanket-type insulation, pipe wraps, mastics, floor and ceiling tiles, wallboard, mortar, roofing materials, and a variety of other materials commonly used in construction. The greatest asbestos-related human health risks are associated with friable asbestos, which is an asbestos-containing material (ACM) that can be reduced to powder by hand pressure. Friable asbestos can become airborne and inhaled, which has been associated with specific types of respiratory disease. The manufacturing and use of asbestos in most building products was curtailed during the late 1970s.

Stantec makes no warranty as to the possible existence or absence of inaccessible materials or to their evaluation with respect to asbestos content. Samples of suspect ACM should be collected for laboratory analysis of asbestos prior to any renovation or building demolition to be compliant with, EPA National Emission Standard for Hazardous Air Pollutants regulations.

Given that there are no structures on the Property, ACMs are not considered an environmental concern to the Property.

8.3 RADON

Radon is a colorless, tasteless radioactive gas with an EPA-specified action level of 4.0 PicoCuries per liter of air (pCi/L) for residential properties. Radon gas has a very short half-life of 3.8 days. The health risk potential of radon is

primarily associated with its rate of accumulation within confined areas near or in the ground, such as basements, where vapors can readily transfer to indoor air from the ground through foundation cracks or other pathways. Large, adequately ventilated rooms generally present limited risk for radon exposure. The radon concentrations in buildings and homes depend on many factors, including soil types, temperature, barometric pressure, and building construction (EPA 2019).

Stantec reviewed regional data published by the EPA on average indoor radon concentrations in the vicinity of the Property (http://www.epa.gov/radon/zonemap.html).

EPA Radon Zones (w/Average Measured Indoor Radon concentrations)		
Zone 1 – High (>4.0 pCi/L)	Zone 2 – Moderate (2 to 4 pCi/L)	Zone 3 – Low (<2 pCi/L)
	X	

The Property is located in Zone 2 and is considered to have medium potential for radon. To determine Property-specific radon levels, a radon survey would have to be conducted. The EDR report indicates that one site tested in zip code 93505 was 0.200 pCi/L. Therefore, further investigation of indoor radon issues is not warranted.

9.0 REFERENCES

American Society for Testing and Materials. 2013. *Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, Designation: E 1527-13*.

California Department of Water Resources. 2004. *California's Groundwater Bulletin 118, South Lahontan Hydrologic Region, Fremont Valley Basin*, Available at: < https://water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_9-sl.pdf > Last updated February 24, 2002. Accessed September 5, 2019.

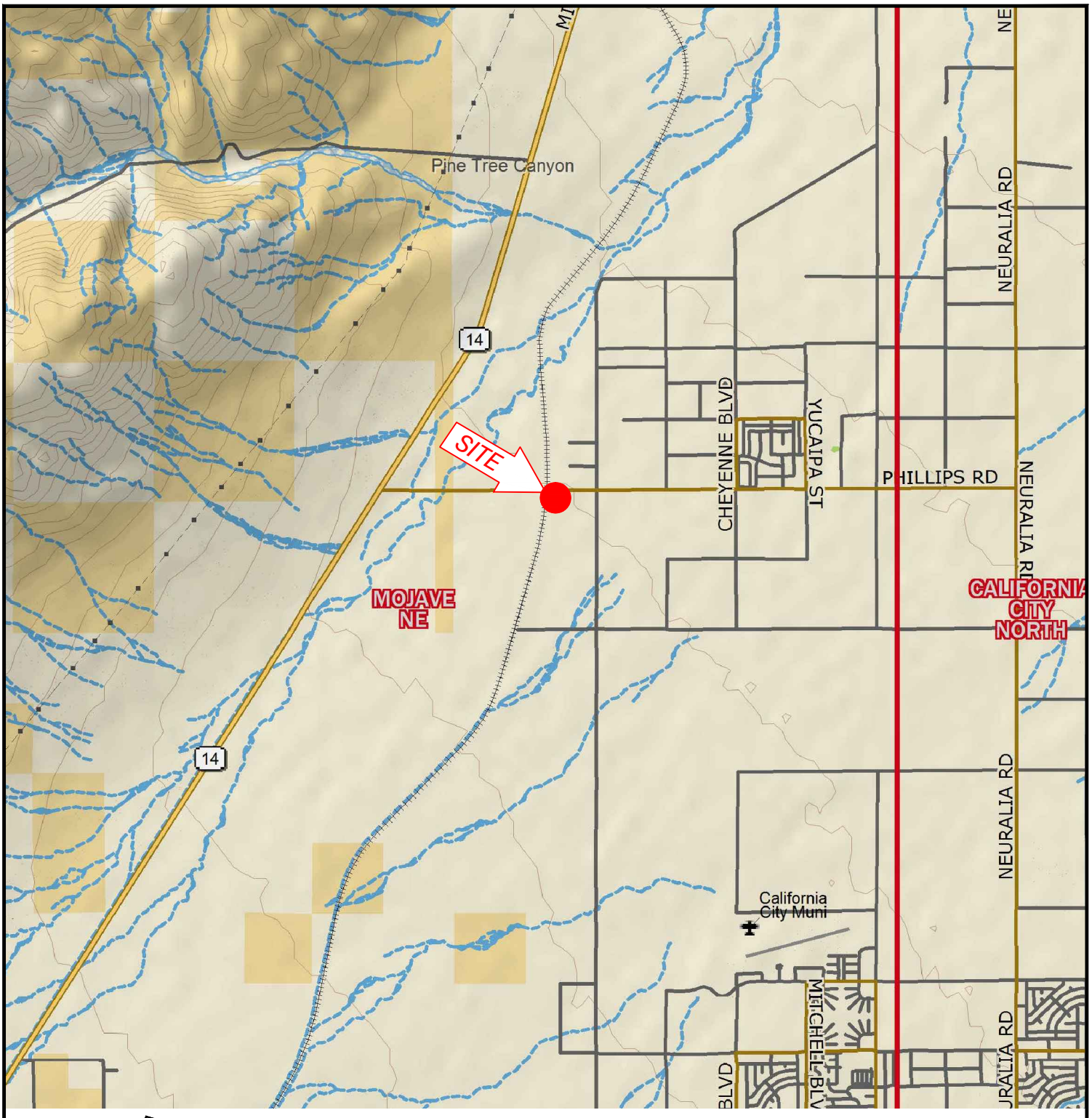
Environmental Data Resources (EDR). 2019. *Aerial Photographs, Sanborn® Map Report, Topographic Maps, EDR Area / Corridor Report, Kudu, Mojave, California*, August 21.

Stantec Consulting Services, Inc (Stantec), 2017. Phase I Environmental Site Assessment, Eland 1 Solar Farm, Unincorporated Area of Kern County, California, November 14.

United States Geological Survey (USGS). 2012. 7.5-minute topographic maps of the Mojave, California Quadrangle (scale 1:24,000).

United States Environmental Protection Agency (EPA). 2019. EPA Radon Zones. Available at: < https://www.epa.gov/radon/find-information-about-local-radon-zones-and-state-contact-information> Last updated February 2019. Accessed September 5. 2019.

FIGURES



North

CALIFORNIA

REFERENCE: DELORME TOPO MAP, MOHAVE NE, CALIFORNIA

0 1/2 1

APPROXIMATE SCALE (MILES)

2000 0 2000 4000 6000

APPROXIMATE SCALE (FEET)

Stantec
735 E. CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408
www.stantec.com

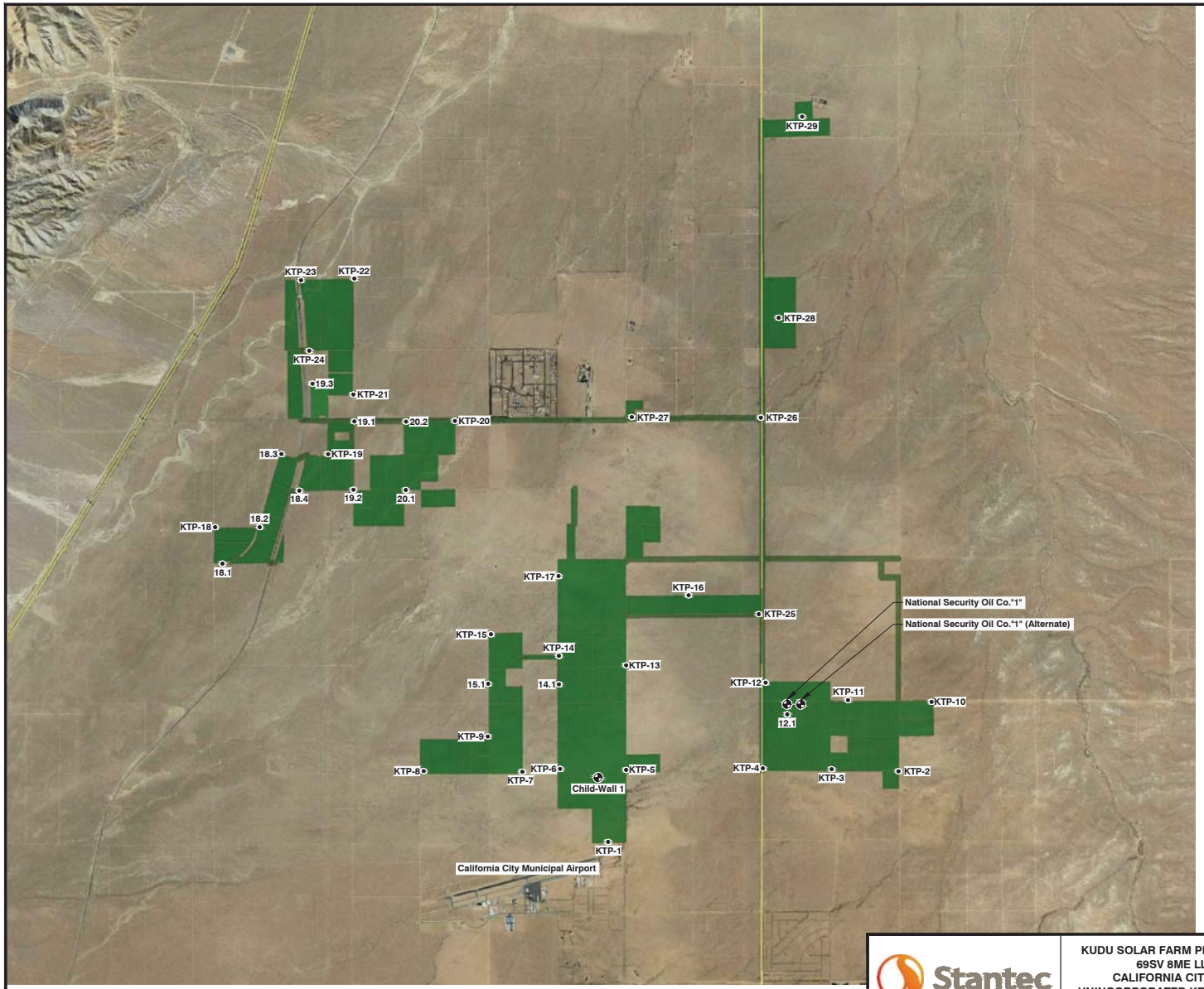
KUDU SOLAR FARM PHASE 1 ESA
69SV 8ME LLC
CALIFORNIA CITY AND
UNINCORPORATED KERN COUNTY
CALIFORNIA

PROPERTY LOCATION MAP

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185704635	STA	DM	KM	09/10/19

FILEPATH:V:\1857\active\185704635\FIG 1_69SV 8ME LLC_SITE LOCATION MAP.dwg | Layout Tab: 1 | Drafter: saguinaldo | Sep 10, 2019 at 13:59



LEGEND:

- PHOTOGRAPH LOCATION (APPENDIX A)
- OIL WELL LOCATION

N

0 4000 8000

APPROXIMATE SCALE IN FEET

REFERENCE: GOOGLE EARTH PRO AND STANTEC FIELD NOTES.

Stantec
735 E. CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA. 92408
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KUDU SOLAR FARM PHASE 1 ESA
69SV 8ME LLC
CALIFORNIA CITY AND
UNINCORPORATED KERN COUNTY
CALIFORNIA

PROPERTY DETAILS AND PHOTO LOCATION MAP

FIGURE: 2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185704635	STA	DM	KM	09/10/19

FILEPATH:V:\1857\active\185704635\FIG 2_69SV 8ME LLC_SITE MAP.dwg|saguinaldo|Sep 16, 2019 at 12:00|Layout: 2

APPENDICES

Appendix A Photographs of the Property and Vicinity

Stantec

Photographic Log

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 1

Photo Location:
KTP-1

Direction:
North

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 2

Photo Location:
KTP-1

Direction:
West

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 3

Photo Location:
KTP-1

Direction:
East

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 4

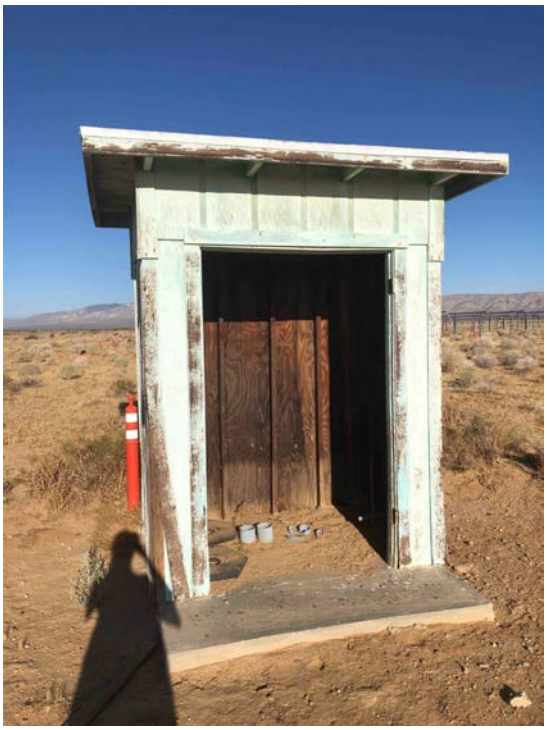
Photo Location:
KTP-1

Direction:
South

Survey Date:
8/21/2019

Comments:
Possible well

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 5 **Photo Location:** KTP-1 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Possible well	
Photograph ID: 6 **Photo Location:** KTP-1 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Abandoned structures	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 7 **Photo Location:** KTP-2 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 8 **Photo Location:** KTP-2 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 9 **Photo Location:** KTP-2 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 10 **Photo Location:** KTP-3 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 11 **Photo Location:** KTP-3 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 12 **Photo Location:** KTP-3 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 13

Photo Location:
KTP-3

Direction:
North

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 14

Photo Location:
KTP-4

Direction:
North

Survey Date:
8/21/2019

Comments:
Property area - Neuralia Blvd. pictured

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 15 **Photo Location:** KTP-4 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 16 **Photo Location:** KTP-4 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 17 **Photo Location:** KTP-5 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 18 **Photo Location:** KTP-5 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 19 **Photo Location:** KTP-5 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 20 **Photo Location:** KTP-6 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 21 **Photo Location:** KTP-6 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 22 **Photo Location:** KTP-6 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 23 **Photo Location:** KTP-6 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 24 **Photo Location:** KTP-7 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 25 **Photo Location:** KTP-7 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 26 **Photo Location:** KTP-8 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 27 **Photo Location:** KTP-8 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 28 **Photo Location:** KTP-9 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 29 **Photo Location:** KTP-9 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 30 **Photo Location:** KTP-9 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 31 **Photo Location:** KTP-10 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 32 **Photo Location:** KTP-10 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 33 **Photo Location:** KTP-11 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 34 **Photo Location:** KTP-11 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 35 **Photo Location:** KTP-12 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 36 **Photo Location:** KTP-12 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 37 **Photo Location:** KTP-12.1 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Paint cans	
Photograph ID: 38 **Photo Location:** KTP-13 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 39 **Photo Location:** KTP-13 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 40 **Photo Location:** KTP-13 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 41

Photo Location:
KTP-13

Direction:
East

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 42

Photo Location:
KTP-14

Direction:
North

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 43 **Photo Location:** KTP-14 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 44 **Photo Location:** KTP-14 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 45 **Photo Location:** KTP-14.1 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Possible abandoned water well	
Photograph ID: 46 **Photo Location:** KTP-15 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 47

Photo Location:
KTP-15

Direction:
South

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 48

Photo Location:
KTP-15.1

Direction:
North

Survey Date:
8/21/2019

Comments:
Abandoned containers - bucket and paint cans

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 49 **Photo Location:** KTP-15.1 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Abandoned containers - bucket and paint cans	
Photograph ID: 50 **Photo Location:** KTP-16 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 51 **Photo Location:** KTP-16 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 52 **Photo Location:** KTP-16 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 53 **Photo Location:** KTP-17 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 54 **Photo Location:** KTP-17 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 55 **Photo Location:** KTP-17 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 56 **Photo Location:** KTP-18 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 57 **Photo Location:** KTP-18 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 58 **Photo Location:** KTP-18 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 59 **Photo Location:** KTP-18.1 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 60 **Photo Location:** KTP-18.1 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 61 **Photo Location:** KTP-18.1 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 62 **Photo Location:** KTP-18.2 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 63 **Photo Location:** KTP-18.2 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 64 **Photo Location:** KTP-18.2 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 65 **Photo Location:** KTP-18.3 **Direction:** East **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 66 **Photo Location:** KTP-18.3 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 67 **Photo Location:** KTP-18.3 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 68 **Photo Location:** KTP-18.3 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 69 **Photo Location:** KTP-18.4 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 70 **Photo Location:** KTP-18.4 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 71

Photo Location:
KTP-19

Direction:
South

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 72

Photo Location:
KTP-19

Direction:
West

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 73 **Photo Location:** KTP-19 **Direction:** SW **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 74 **Photo Location:** KTP-19.1 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 75

Photo Location:
KTP-19.1

Direction:
South East

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 76

Photo Location:
KTP-19.1

Direction:
East

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 77

Photo Location:
KTP-19.1

Direction:
South West

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 78

Photo Location:
KTP-19.2

Direction:
South East

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 79 **Photo Location:** KTP-19.2 **Direction:** South West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 80 **Photo Location:** KTP-19.2 **Direction:** North West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 81

Photo Location:
KTP-19.3

Direction:
East

Survey Date:
8/21/2019

Comments:
Property area - adjacent railroad tracks

Photograph ID: 82

Photo Location:
KTP-19.3

Direction:
South

Survey Date:
8/21/2019

Comments:
Property area - adjacent railroad tracks

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 83

Photo Location:
KTP-19.3

Direction:
South East

Survey Date:
8/21/2019

Comments:
Property area - adjacent railroad tracks

Photograph ID: 84

Photo Location:
KTP-20

Direction:
South

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 85 **Photo Location:** KTP-20 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 86 **Photo Location:** KTP-20 **Direction:** South West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 87 **Photo Location:** KTP-20.1 **Direction:** North **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 88 **Photo Location:** KTP-20.1 **Direction:** West **Survey Date:** 8/21/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 89

Photo Location:
KTP-20.1

Direction:
South East

Survey Date:
8/21/2019

Comments:
Property area

Photograph ID: 90

Photo Location:
KTP-20.2

Direction:
East

Survey Date:
8/21/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 91 **Photo Location:** KTP-20.2 **Direction:** South **Survey Date:** 8/21/2019 **Comments:** Property area	
Photograph ID: 92 **Photo Location:** KTP-21 **Direction:** West **Survey Date:** 8/23/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 93 **Photo Location:** KTP-21 **Direction:** South West **Survey Date:** 8/23/2019 **Comments:** Property area	
Photograph ID: 94 **Photo Location:** KTP-21 **Direction:** South **Survey Date:** 8/23/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 95 **Photo Location:** KTP-22 **Direction:** East **Survey Date:** 8/23/2019 **Comments:** Property area	
Photograph ID: 96 **Photo Location:** KTP-22 **Direction:** West **Survey Date:** 8/23/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 97 **Photo Location:** KTP-22 **Direction:** South West **Survey Date:** 8/23/2019 **Comments:** Property area	
Photograph ID: 98 **Photo Location:** KTP-22 **Direction:** South **Survey Date:** 8/23/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 99 **Photo Location:** KTP-23 **Direction:** East **Survey Date:** 8/23/2019 **Comments:** Property area	
Photograph ID: 100 **Photo Location:** KTP-23 **Direction:** South East **Survey Date:** 8/23/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 101

Photo Location:
KTP-23

Direction:
South

Survey Date:
8/23/2019

Comments:
Property area

Photograph ID: 102

Photo Location:
KTP-24

Direction:
North

Survey Date:
8/23/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 103

Photo Location:
KTP-24

Direction:
North East

Survey Date:
8/23/2019

Comments:
Property area

Photograph ID: 104

Photo Location:
KTP-24

Direction:
East

Survey Date:
8/23/2019

Comments:
Property area - adjacent railroad tracks

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 105 **Photo Location:** KTP-25 **Direction:** North **Survey Date:** 9/13/2019 **Comments:** Gen-tie line path - North on Neuralia Rd.	
Photograph ID: 106 **Photo Location:** KTP-26 **Direction:** North **Survey Date:** 9/13/2019 **Comments:** Gen-tie line path - North on Neuralia Rd.	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 107 **Photo Location:** KTP-26 **Direction:** West **Survey Date:** 9/13/2019 **Comments:** Gen-tie line path - West on Neuralia Rd. at Phillips Rd.	
Photograph ID: 108 **Photo Location:** KTP-27 **Direction:** West **Survey Date:** 9/13/2019 **Comments:** Gen-tie line path - West on Phillips Rd.	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 109

Photo Location:
KTP-27

Direction:
North West

Survey Date:
9/13/2019

Comments:
Phillips Rd. looking at lot of future sub-station

Photograph ID: 110

Photo Location:
KTP-28

Direction:
North

Survey Date:
9/13/2019

Comments:
Property area

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 111 **Photo Location:** KTP-28 **Direction:** West **Survey Date:** 9/13/2019 **Comments:** Property area	
Photograph ID: 112 **Photo Location:** KTP-28 **Direction:** East **Survey Date:** 9/13/2019 **Comments:** Property area	

Client:	**8minutenergy**	**Project:**	**Phase I ESA**
Site Name:	**Kudu**	**Site Location:**	**California City, CA**

Photograph ID: 113 **Photo Location:** KTP-29 **Direction:** North **Survey Date:** 9/13/2019 **Comments:** Miscellaneous trash at northern border of property area	
Photograph ID: 114 **Photo Location:** KTP-29 **Direction:** East **Survey Date:** 9/13/2019 **Comments:** Property area	

Appendix B STANTEC RESUMES

Kyle D. Emerson PG, CEG

Managing Principal Geologist

Kyle has more than 28 years of professional experience—17 of those years with Stantec—providing geotechnical and environmental consulting. During the course of his experience, he has been involved with a wide variety of geological and engineering projects. He has been in direct charge of quality control/quality assurance (QA/QC) work for Stantec and previous firms for geological, engineering geological, and environmental services primarily in California. Additionally, Kyle has been a primary contact for Stantec with many different clients (including multi-party actions) and regulatory bodies involving contracting, workplan approvals, site assessments and closures, permitting, remedial action, and litigation support. With regard to litigation services, Kyle has extensive experience providing expert witness testimony, second-party review, and litigation support and analysis.

Kyle's extensive experience includes assessment and remediation of property-specific and regional issues involving soil and groundwater contaminated with petroleum hydrocarbons, chlorinated solvents, heavy metals, pesticides, and PCBs.

He currently serves as the managing principal geologist in Stantec's Redlands, California office.

EDUCATION

Engineering Geology/Hydrogeology, California State University, Los Angeles, California, 1984

AS, General Science, Crafton Hills College, Yucaipa, California, 1975

BS, Geological Sciences, California State University, Long Beach, California, 1982

REGISTRATIONS

Certified Engineering Geologist #1271, State of California

Professional Geologist #4066, State of California

PROJECT EXPERIENCE

Bioremediation

Excavation and Treatment of Petroleum-Contaminated Soil

Kyle designed the excavation and treatment of 45,000 cubic yards of petroleum-contaminated soil. Soil treatment included utilizing vapor extraction, combined with bioremediation.

Chemicals & Polymers

Two Former Chemical Plants, Environmental Site Assessments and Remediation, Vernon, California

Mr. Emerson was part of the team for conducting Phase I and Phase II Environmental Site Assessments (ESA) and developing remedial action plans for two former chemical plant sites with 80-year industrial histories. Phase I ESAs used historical files, maps, aerial photographs, available documents, and data from public agencies and historical directories for identifying recognized environmental concerns. Extensive Phase II ESA survey activities aided in identifying below-grade structures such as vaults/USTs, as well as assessing the extent of influence and nature of the contamination. These investigations confirmed the presence of heavy metals, petroleum hydrocarbons, volatile organic compounds, polychlorinated biphenyls, radioactive materials, semi-volatile organic compounds, and polycyclic aromatic compounds in the soils for these sites. Specific areas of concern included former settling ponds, a bone yard, maintenance areas, transformer and substations, wastewater treatment facilities, and above-ground storage tank farms. A conceptual mode was developedl for use in a health risk assessment and developed risk-based corrective actions to address potential health and environmental concerns. He assisted with the development and implementation of a remedial action plan, combined administrative controls, engineering controls, and active remediation; this resulted in the cost-effective return of one site to active use, and is reducing health risks to occupants and the public at the second site.

Kyle D. Emerson PG, CEG

Managing Principal Geologist

CONFIDENTIAL: Aerospace Adhesives and Coatings Plant, Glendale, California

Mr. Emerson was part of the team that conducted feasibility studies to evaluate remedial alternatives for remediation of chlorinated VOCs, 1,4 dioxane, and hexavalent chromium (CrVI) in soil, soil vapor, and groundwater. Feasibility studies included groundwater pump testing, benchscale column testing to evaluate in situ alternatives for reducing CrVI to the less mobile CrIII valence state, soil vapor extraction, capping, and excavation. Field pilot studies were performed to evaluate the efficiency of various CrVI reductants including the use of ferrous sulfate, calcium polysulfide, emulsified oil, and fructose. Extensive multi-depth soil vapor testing was conducted to evaluate the distribution of VOCs in the subsurface and to support vapor intrusion risk assessment. Feasibility studies were completed in 2008. Remedial actions are expected to be completed in 2011.

Condition Assessments

Assessment and Mitigation of Manufacturing Facility

Kyle managed the assessment and mitigation of an ammunition manufacturing facility covering 1,100 acres in a complex geologic environment. The contaminates involved red and white phosphorous, TNT, chlorinated solvents, solid wastes, and live ordinance.

Soil Contamination Assessment Supervision and Management

Kyle managed and supervised soil contamination assessment and in-situ remediation of heavy metals involving chromium, cadmium, nickel and zinc by chemical fixation to depths in excess of 40 feet below ground surface beneath existing structures within several manufacturing facilities.

Litigation Support and Expert Testimony

Kyle provided litigation support and expert testimony on more than 20 separate projects involving service stations, chlorinated solvent cases, heavy metal, and semi-volatile releases.

Corporate / Office

CT Realty Environmental Remediation of Former Dry Cleaners, El Centro, California

Mr. Emerson was responsible for assessments and remediation at this former dry cleaners which released the dry cleaning chemical tetrachloroethene (PCE) to the ground and underlying groundwater. The work included initial site assessment, agency interaction and negotiations with the California Regional Water Quality Control Board (CRWQCB), and Colorado Basin Region human health risk assessment (HHRA), design and implementation of remedial investigations, feasibility studies, remedial action plans, and implementation of remediation in mitigating chlorinated solvent contamination in vadose and saturated zones at concentrations indicative of DNAPL. The results of the completed remediation, as well as continued confirmation sampling and monitoring, allowed the CRWQCB to issue site closure in 2008. The site has since been redeveloped into a new commercial development.

Environmental Assessments

Siting Studies

Kyle performed initial siting studies for potential Class I, II, and III landfills. The project included detailed geologic mapping, hydrogeological studies, and permeability studies of caps and liners.

Environmental Site Remediation

Assessment and Remedial Design, California (Project Supervisor)

Kyle supervised the assessment and remedial design of a system to eliminate salt brine contamination in shallow perched water horizons in the Yucaipa, San Bernardino, and Riverside areas of southern California.

Design and Installation of Recovery Systems*

Kyle designed and installed numerous free-product recovery systems that successfully recovered product. One of the sites contained product up to 11-feet thick covering more than three city blocks. The dissolved phase had affected a multi-aquifer system and a public drinking water system.

Geophysical Characterizations*

Kyle performed and supervised numerous geophysical characterizations to determine the extent of old landfills. He provided classification studies, landfill gas monitoring, removal verification during grading, methane collection and mitigation plans, permitting, and closure plans.

** denotes projects completed with other firms*

Kyle D. Emerson PG, CEG

Managing Principal Geologist

Domestic Landfill Development*

Kyle designed and supervised the dynamic consolidation of a domestic landfill for development. He used this process to minimize expected settlement to overlying structures. Kyle designed commercial developments on closed landfills that involved complex methane collection and monitoring systems and building settlement controls.

Clay Borrow Site Studies

Kyle performed more than 10 separate clay borrow site studies for determining sources of material to cap landfills; ranged from a 20-acre dry lakebed to a 450-acre parcel in complex folded marine sediments.

Assessment, Clean Up, and Regulatory Support Management, Santa, Monica (Project Manager)

Kyle managed the assessment, clean up, and complex regulatory support of a PRP site in an MTBE case (Charnock subbasin). His work involved more than 20 environmental professionals working full time for two years to complete the assessment and clean up mandated by the regulatory agencies.

Hazardous Waste

San Gabriel Valley Superfund Site, Remediation & Closure of Multiple Source Areas, Industry, California

Mr. Emerson performed feasibility studies to evaluate appropriate and relevant remedial alternatives to mitigate constituents of concern in five AOCs contaminated with chlorinated hydrocarbons, heavy metals, petroleum fuel, and cutting oils. Ultimately, a combination of remedial alternatives was implemented that included large-diameter auger excavation to 45 feet to minimize impacts on facility operations, vapor extraction, vapor intrusion risk assessment, deed restriction, and monitored natural attenuation. At the completion of remedial actions, confirmation soil, soil vapor, and groundwater sampling were conducted and followed with risk assessment to demonstrate that remedial objectives had been achieved. No further action was recently granted by the US EPA and Los Angeles Regional Water Quality Control Board.

Mixed-Use

Port of San Diego Rohr Facility, Chula Vista, California

Mr. Enerson assisted in a detailed subsurface assessment of the Rohr facility. The intent of the assessment was to evaluate the 40-acre former aircraft part manufacturing facility for acquisition by the Port of San Diego for redevelopment into a business park and entertainment complex. The assessment identified the presence of soil, soil vapor, and groundwater impacts by petroleum hydrocarbons, VOCs, heavy metals, PCBs, and semi-volatile organic compounds. He utilized many sampling techniques to assess the limits and concentrations of contaminants in the subsurface. Ultimately, the team was able to develop a cost estimate for potential remedial action cost associated to corrective action to allow redevelopment.

Master Planned Commercial/Residential Redevelopment Project, Whittier, California (Project Manager)

Kyle oversaw the assessment of 26 contiguous properties that are part of a 21-acre master planned commercial/residential redevelopment project. The properties included industrial facilities, platting lines, fuel USTs, and metal processing plants, among others. The estimated cleanup costs are approximately $2 million.

Multi-Unit / Family Residential

Residential Development Assessment, Ventura, California (Project Director)

Kyle directed an assessment of a 40-acre former agricultural property proposed for residential development. Pesticides were identified above hazardous waste levels and preliminary remediation goals established by the U.S. Environmental Protection Agency. Through corrective grading methods and onsite placement of the pesticide impacted soils, all material were re-used on site without offsite disposal. The over all cost savings for the client was more than $1 million. Total cost was less than $250,000 for all necessary activities.

Oil & Gas

Oil Field Site Assessments*

Kyle performed site assessments at oil field leases involving refineries, bulk storage areas, piping systems and wellhead, and drilling mud pit contamination.

** denotes projects completed with other firms*

Kyle D. Emerson PG, CEG

Managing Principal Geologist

Environmental Protection Agency Superfund Action, Culver City, California (Project Manager)
Kyle served as the project manager representing a major oil company in the assessment, remedial action, and litigation support in a multi-party contamination case affecting a City water supply. The assessment involved more than 250 continuous core borings up to 100 feet, as well as extensive remedial actions. The total cost for all related activities was $22 million. The case is settled and the closure of the site is pending.

Project Management
Liability and Property Management Consulting Services
Kyle is providing liability and property management consulting services to more than 10 medium to large property development firms in the US. His work involves property transaction assessments, contract review, acquisition guideline development, liability management evaluation, insurance acquisition, and strategic planning.

Residential Development
Environmental Development Management and Review (Project Manager)
Kyle manages and reviews environmental development issues for a large residential developer specializing in development of contaminated industrial properties by providing innovative solutions in developing contaminated properties for residential use through risk assessment, engineering, and administrative and property development controls.

Site Management and Remediation
Design and Implementation of Biodegradation Programs*, California
Kyle designed and implemented one of the first in-situ biodegradation programs in California; it involved 50,000 cubic yards of diesel-contaminated soils, and groundwater to depths of 70 feet below ground surface.

Soil and Groundwater Remediation Systems
Soil and Groundwater Contamination Assessments and Mitigation*, California (Project Manger)
Kyle managed numerous chlorinated solvent soil and groundwater contamination assessments and mitigation programs in southern California. The projects involved releases that impacted soil and groundwater to depth of groundwater more than 700 feet in multi-aquifer systems. One case involved with plume dimensions more than 1 mile from the source affecting residential properties.

Soil and Groundwater Assessment and Remediation Programs*
Implemented hundreds of soil and groundwater assessment and remediation programs at various service station facilities in Southern and Northern California, and Nevada. Work involved assessment, remedial design, installation, maintenance and monitoring. Closure has been received on a majority of these sites.

Assessment and Remediation Management*
Kyle managed the assessment and remediation of soil and groundwater manufacturing at dry cleaning facilities contaminated with chlorinated solvents.

Warehouse / Light Industrial
Glendale Redevelopment Project, Glendale, California (Project Manager)
Kyle managed the assessment and remedial actions during the redevelopment of and industrial property. The project involved the demolition of a historic manufacturing facility and a commercial dry cleaner. Each of these facilities were associated with releases of solvents and petroleum hydrocarbons. Remedial actions involved excavation by pattern drilling and off site disposal along with removal of former USTs. The total cost of remediation and assessment was $450,000.00.

** denotes projects completed with other firms*

Kyle D. Emerson PG, CEG

Managing Principal Geologist

Compton Redevelopment Project, Compton, California (Project Manager)

Kyle is serving as project manager for the assessment and remedial actions for a large redevelopment project. The project involves the redevelopment of a historic manufacturing facility and a former dry cleaner. Each of these facilities were associated with releases of solvents and petroleum hydrocarbons. The industrial facility was also associated with significant volumes of buried waste that required removal and disposal. These wastes also included the chemical referenced above, as well as PCBs and heavy metals. Remediation has included excavation, vapor extraction, and chemical fixation. The total cost of this project has been $2.8 million to date.

** denotes projects completed with other firms*

Kyle D. Emerson PG, CEG

Managing Principal Geologist

PUBLICATIONS

In-Situ Bioremediation of an Underground Diesel Fuel Spill: A Case Study. *Environmental Management*, 1989.

Dion Monge

Project Scientist

Dion has extensive knowledge of underground storage tank investigations, Phase I and II environmental site assessment, groundwater monitoring and reporting, soil, soil vapor, and groundwater quality assessments, and testing for asbestos and lead based paint. His project experience is extensive and wide ranging and includes many types of soil, soil vapor, and groundwater assessment and monitoring for planned, existing, and former sites. Dion also has experience in testing fill soils placed on grading sites.

He has experience on redevelopment of former oil field sites that include submittal of construction site review plans, oil well mitigation (venting and casing alterations), abandonment of oil wells, and remedial investigations and remediation involving soil contamination.

Dion also has experience working with 1166 AQMD air monitoring on projects ranging from limited access dry cleaner excavations, solvent excavations, and petroleum excavations related to underground storage tank releases. Included in this type of monitoring is the assessment of a safe work environment for the contractors involved with this type of work.

He has considerable knowledge in asbestos and lead based paint sampling as a building inspector and lead sampling technician. Asbestos and lead based paint surveys have ranged from large office buildings to sampling highway bridges.

EDUCATION

BS, Soil Science, California Polytechnic University, Pomona, Pomona, California, 2004

Health & Safety Certification (29 CFR 1910.120),, 40-Hour OSHA Health & Safety Certification, Redlands, California, 2005

Health & Safety Annual Update Certification, 8-Hour OSHA, Redlands, California, 2009

First Aid/CPR, American Red Cross, Redlands, California, 2009

Certified Building Inspector, AHERA 8-Hour Refresher, Redlands, California, 2009

PROJECT EXPERIENCE

Asbestos, Lead Based Paint, and Hazardous Material Management

Haller Wash Bridge No. 54-0891R&L, San Bernardino County, California (Asbestos and Lead-Based Paint Sampling Assistant)

Dion conducted asbestos and lead based paint survey on highway bridge. He assisted with planning field operations, measuring bridge dimensions, and collecting samples. Tasks included sample collection, bridge measurements, and documentation.

Project Management Oversight

Magnolia Plaza, Fountain Valley, California

Dion is providing project management of soil, soil vapor, and quarterly groundwater sampling related to a solvent release at a former dry cleaning facility. Tasks include preparation of work plans for approval by the Regional Water Quality Control Board and oversight of field sampling, including lithologic logging, for soil and soil vapor investigations performed within a multi-tenant strip center. Additional tasks include preparation of investigative reports and quarterly groundwater monitoring reports. The site remains an open case and preparation of a work plan to use electrical resistive heating ("ERH") will be prepared in the coming weeks.

Dion Monge

Project Scientist

Former Superb Dry Cleaners, Anaheim, California
Dion performed field oversight, direction, and confirmation soil sampling of a limited access excavation within a former dry cleaner unit. Post excavation field activities included application of a barrier type floor sealant along with post excavation indoor air sampling. Remedial work led to regulatory closure being granted from the local agency.

Site Assessment

Proposed Friends Christian High School, Yorba Linda, California
Dion prepared preliminary site assessment (PSA) report for future private school site to identify recognized environmental conditions ("RECs") related to past property usage as an oil field with 21 oil wells abandoned prior to 1990. Completion of the PSA led to his management of the project through site closure. Field investigations and reporting by Dion included Phase II investigations, methane survey, oil well leak testing and venting, backfill and compaction (including soils testing), DOGGR Construction Site Review, and excavation and onsite management of more than 5,000 cubic yards of petroleum impacted soils.

SR-58 Widening, San Bernardino County, California
Dion performed Initial Site Assessment (ISA) for Caltran at Kramer Junction for the proposed widening of State Route 58. The ISA was performed in accordance with guidelines promulgated by the American Society for Testing and Materials (ASTM) and included historical research and coordination of permit/file reviews with local building/planning departments and environmental agencies. Dion's role included the field visit, observation documentation, agency reviews, and reporting.

Soil Sampling

Caltrans I-15, Task Order 28, Hesperia, California
Dion conducted a soil investigation for metals analysis alongside I-15 for disposal recommendations during construction of mortar-lined channels at several locations. He assisted with planning field operations and collected soil samples. Tasks included sample collection, preservation, and documentation.

** denotes projects completed with other firms*

Appendix C ENVIRONMENTAL AGENCY DATABASE SEARCH REPORT

Kudo
Kudo
California City, CA 93505

Inquiry Number: 5759392.2s
August 21, 2019

EDR Area / Corridor Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

SUBJECT PROPERTY INFORMATION

ADDRESS

KUDO
CALIFORNIA CITY, CA 93505

TARGET PROPERTY SEARCH RESULTS

The Target Property was identified in the following databases.

Page Numbers and Map Identifcations refer to the EDR Area/Corridor Report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

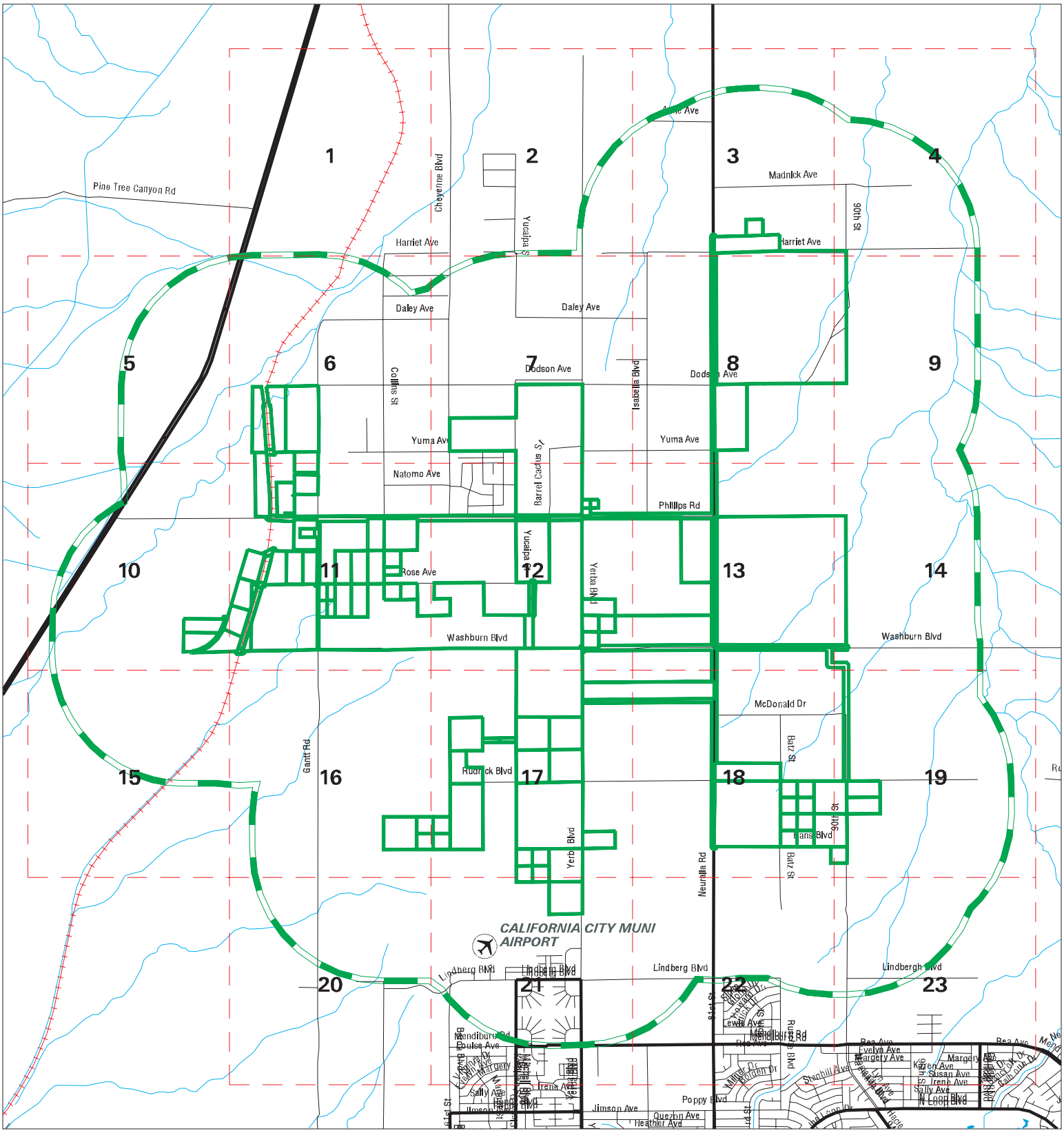
MAPPED SITES SUMMARY

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Key Map - 5759392.2s



SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19 3:23 PM

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 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	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	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								
LUCIS	0.500		0	0	0	NR	NR	0
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

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 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
CPS-SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
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
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
State and tribal Brownfields sites								
BROWNFIELDS	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								
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
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST 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
CDL	TP		NR	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
CERS TANKS	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LIENS 2	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
MCS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
ICE	TP		NR	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
PEST LIC	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
UIC GEO	TP		NR	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	TP		NR	NR	NR	NR	NR	0
PROJECT	TP		NR	NR	NR	NR	NR	0
WDR	TP		NR	NR	NR	NR	NR	0
CIWQS	TP		NR	NR	NR	NR	NR	0
CERS	TP		NR	NR	NR	NR	NR	0
NON-CASE INFO	TP		NR	NR	NR	NR	NR	0
OTHER OIL GAS	TP		NR	NR	NR	NR	NR	0
PROD WATER PONDS	TP		NR	NR	NR	NR	NR	0
SAMPLING POINT	TP		NR	NR	NR	NR	NR	0
WELL STIM PROJ	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

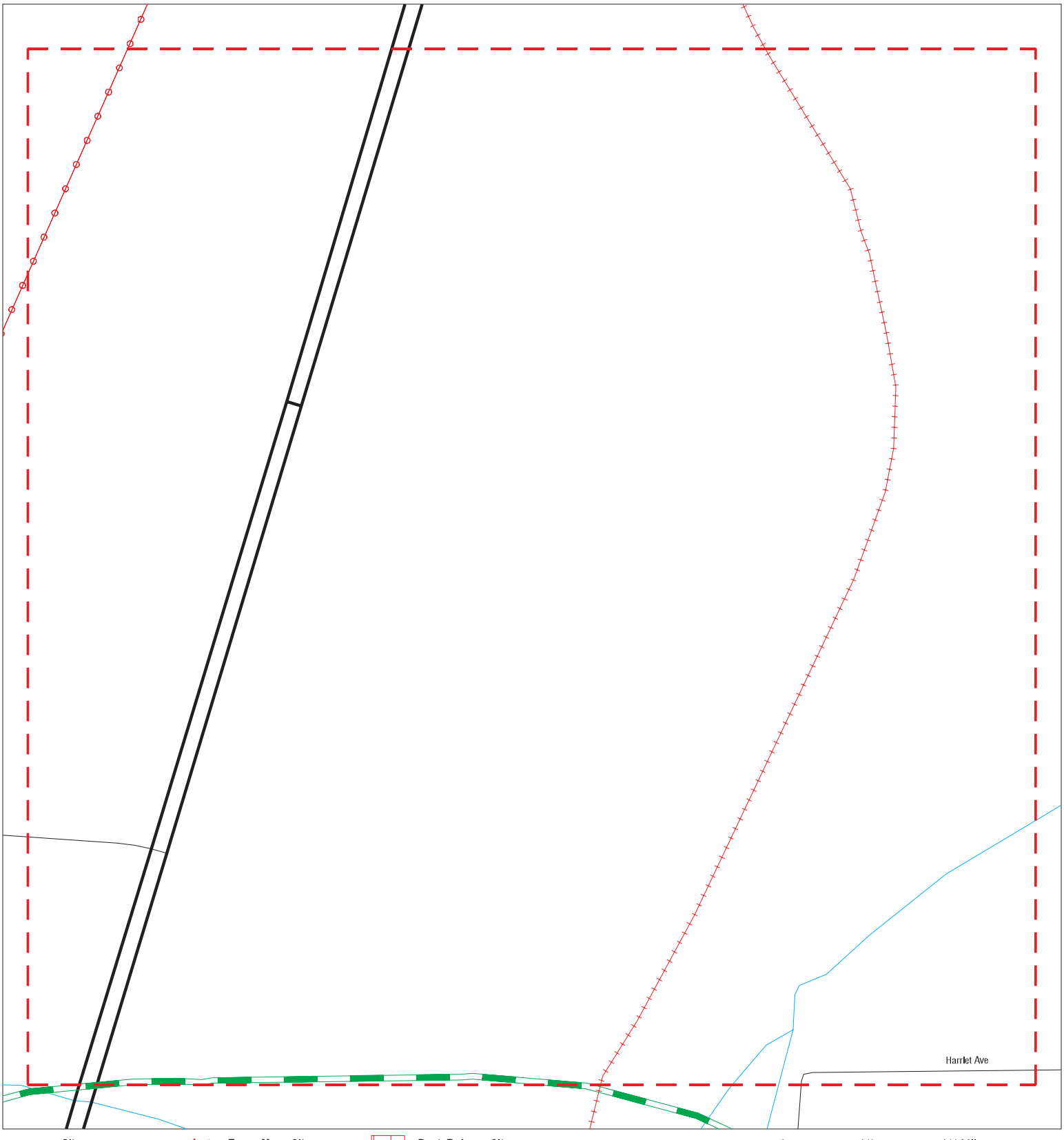
NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Focus Map - 1 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

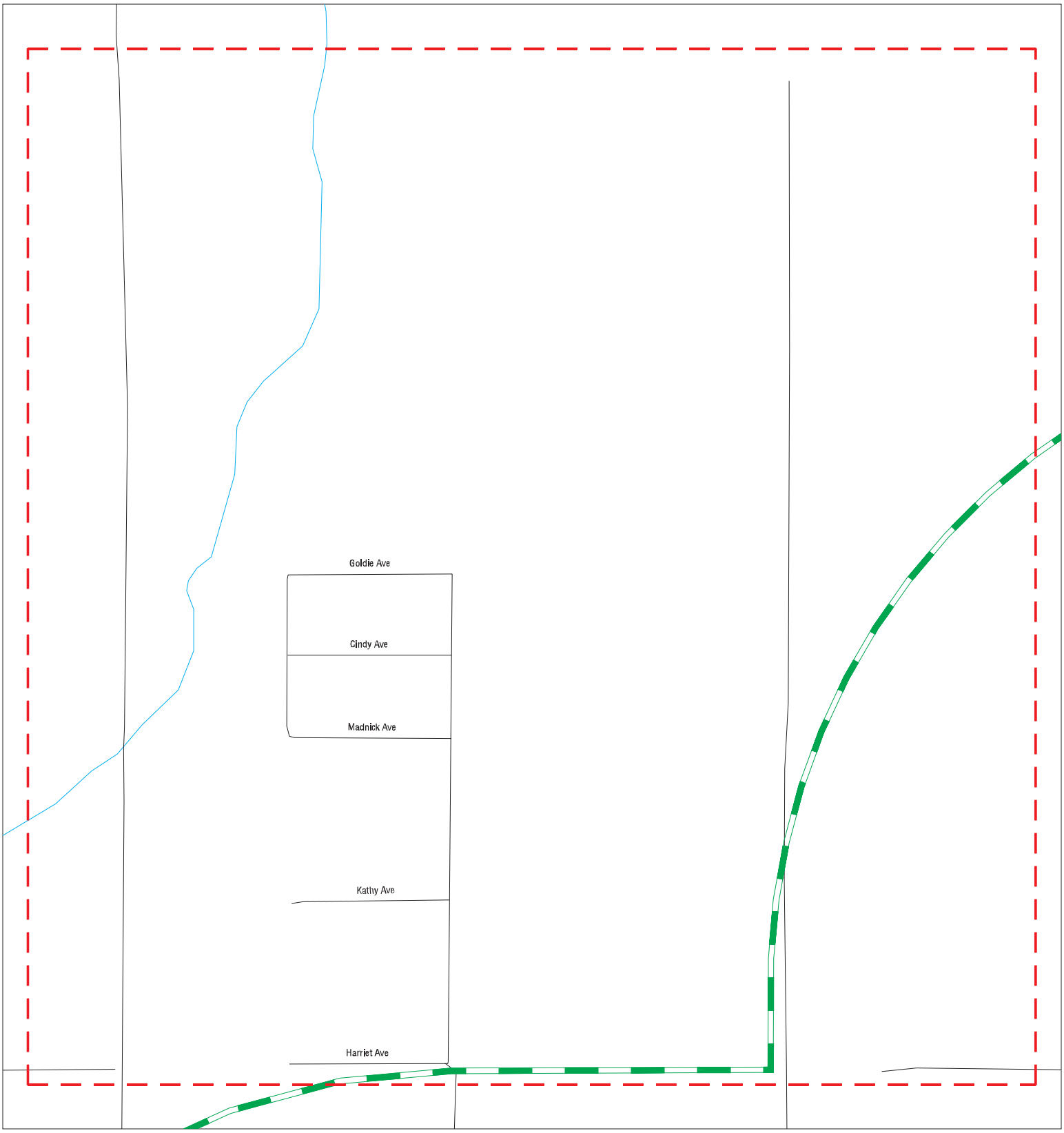
MAPPED SITES SUMMARY - FOCUS MAP 1

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 2 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

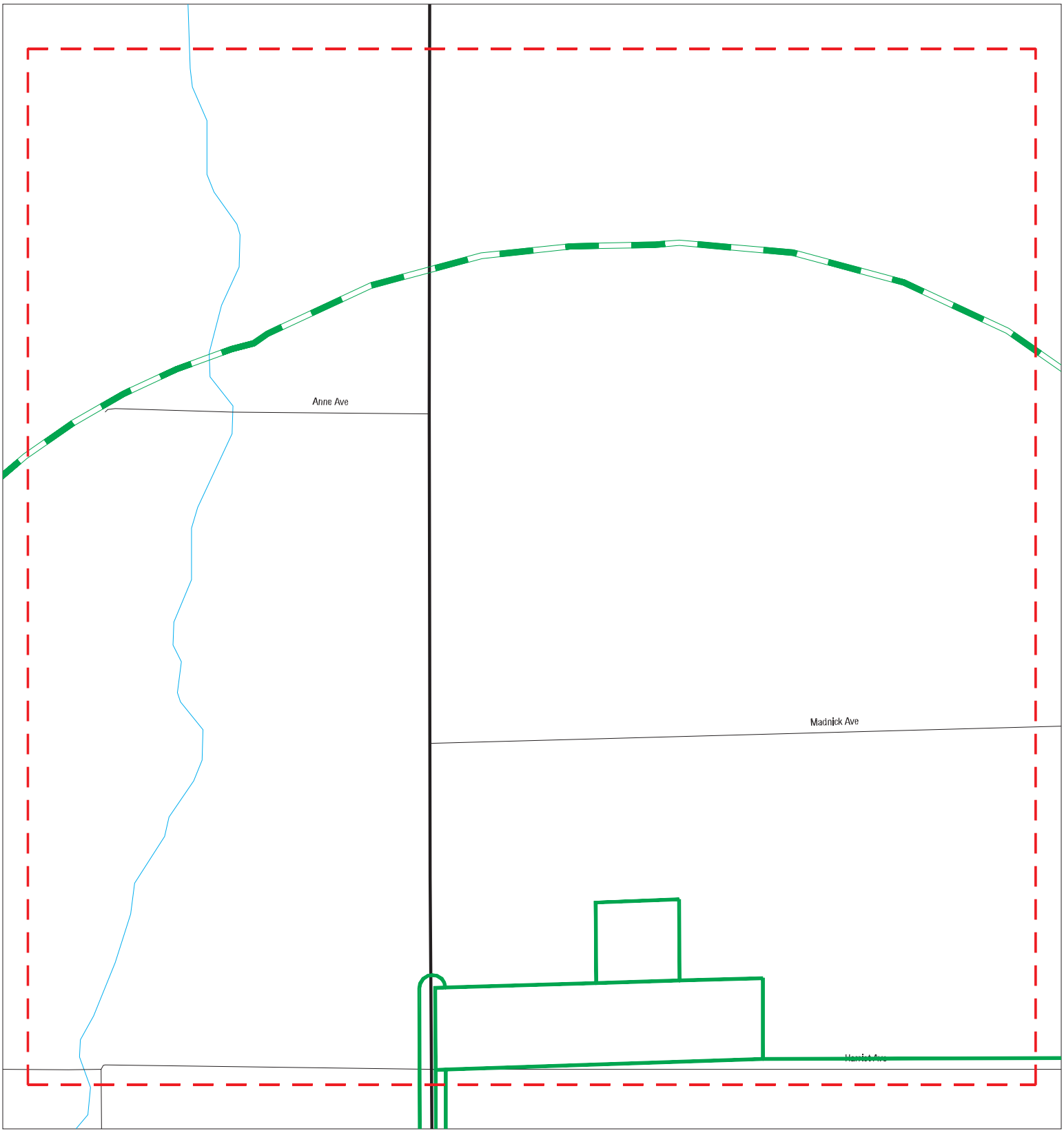
MAPPED SITES SUMMARY - FOCUS MAP 2

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 3 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo ADDRESS: Kudo CITY/STATE: California City CA ZIP: 93505	CLIENT: Stantec CONTACT: Alicia Jansen INQUIRY #: 5759392.2s DATE: 08/21/19

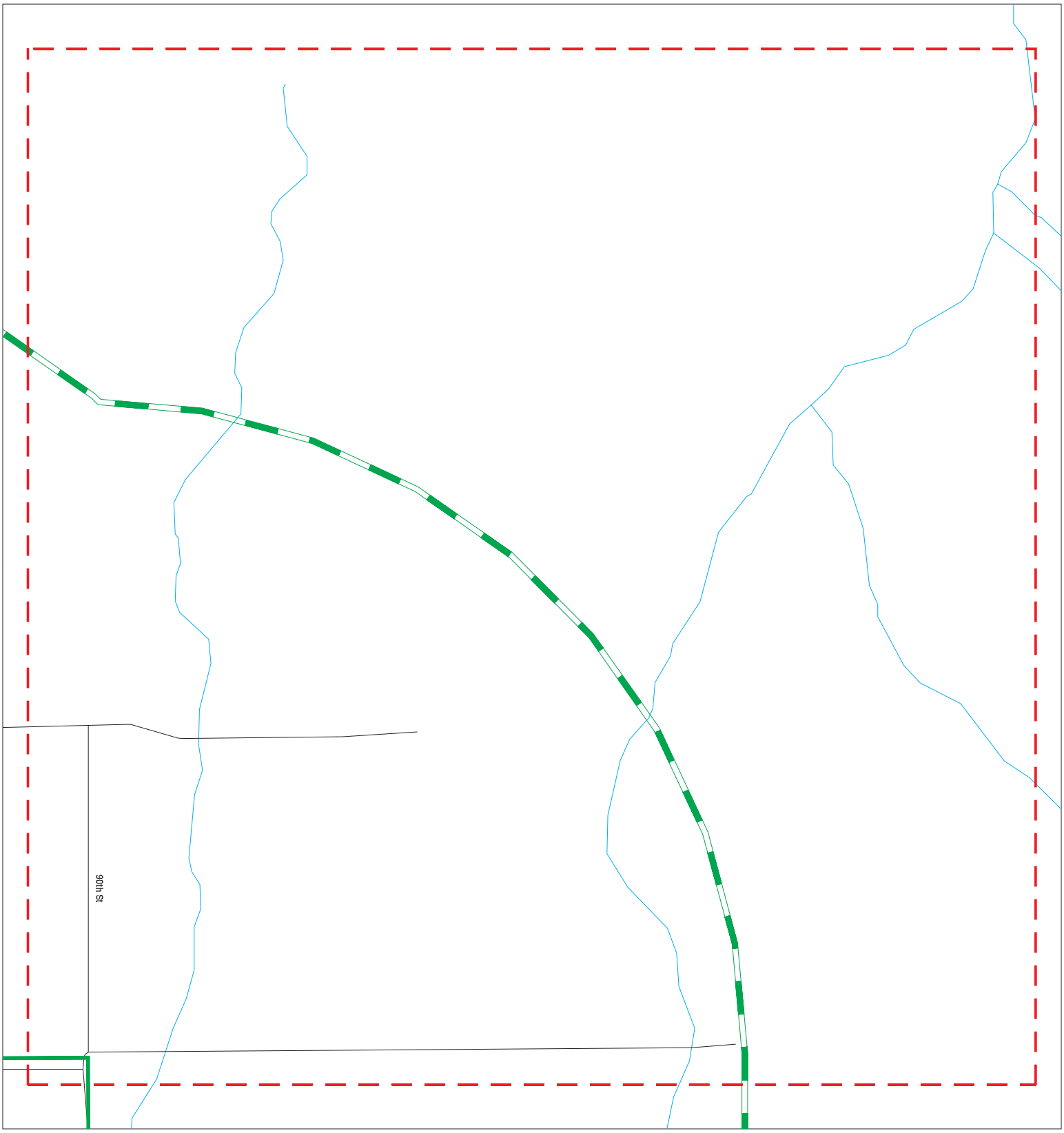
MAPPED SITES SUMMARY - FOCUS MAP 3

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 4 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo ADDRESS: Kudo CITY/STATE: California City CA ZIP: 93505	CLIENT: Stantec CONTACT: Alicia Jansen INQUIRY #: 5759392.2s DATE: 08/21/19

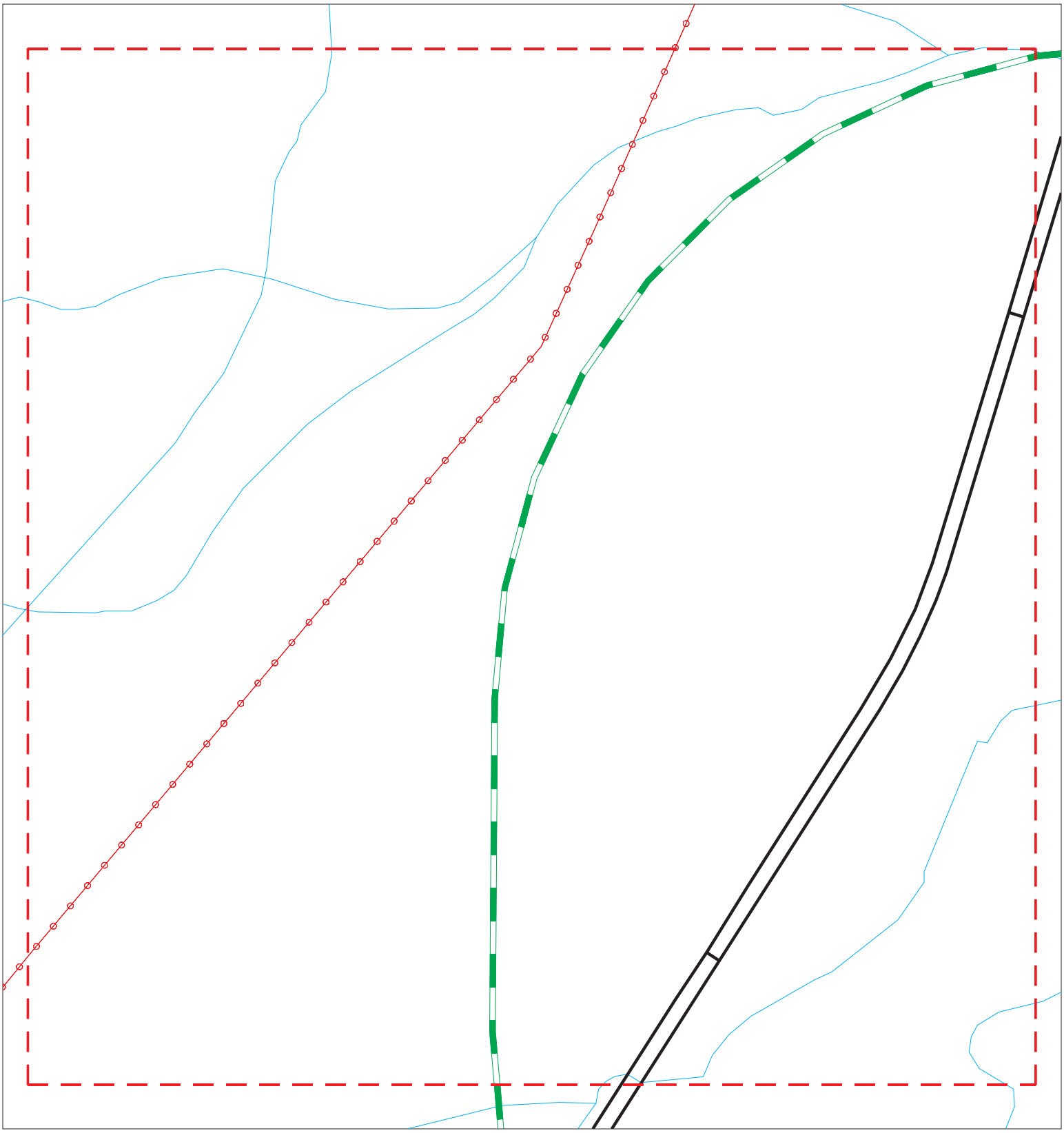
MAPPED SITES SUMMARY - FOCUS MAP 4

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 5 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

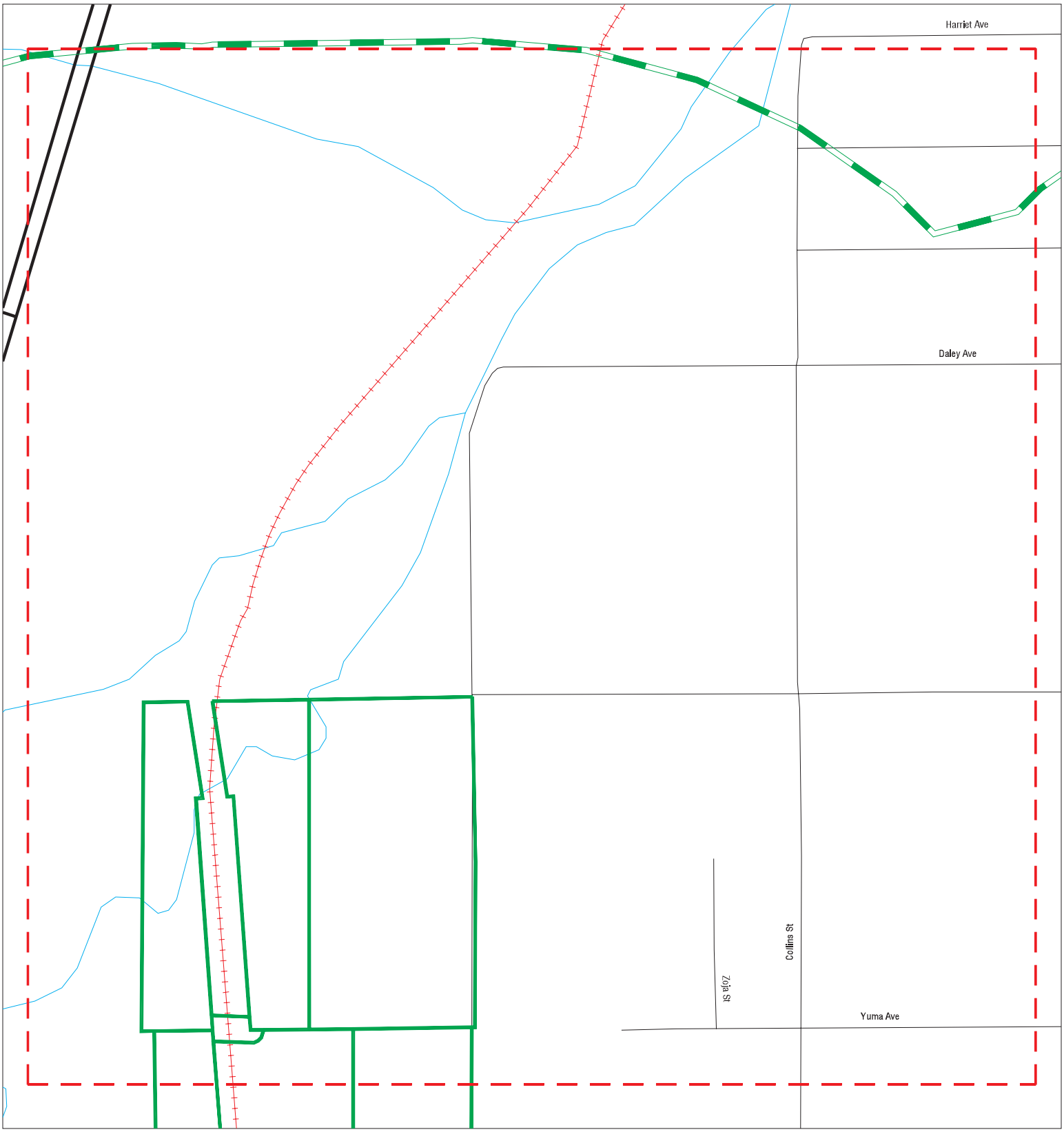
MAPPED SITES SUMMARY - FOCUS MAP 5

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 6 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

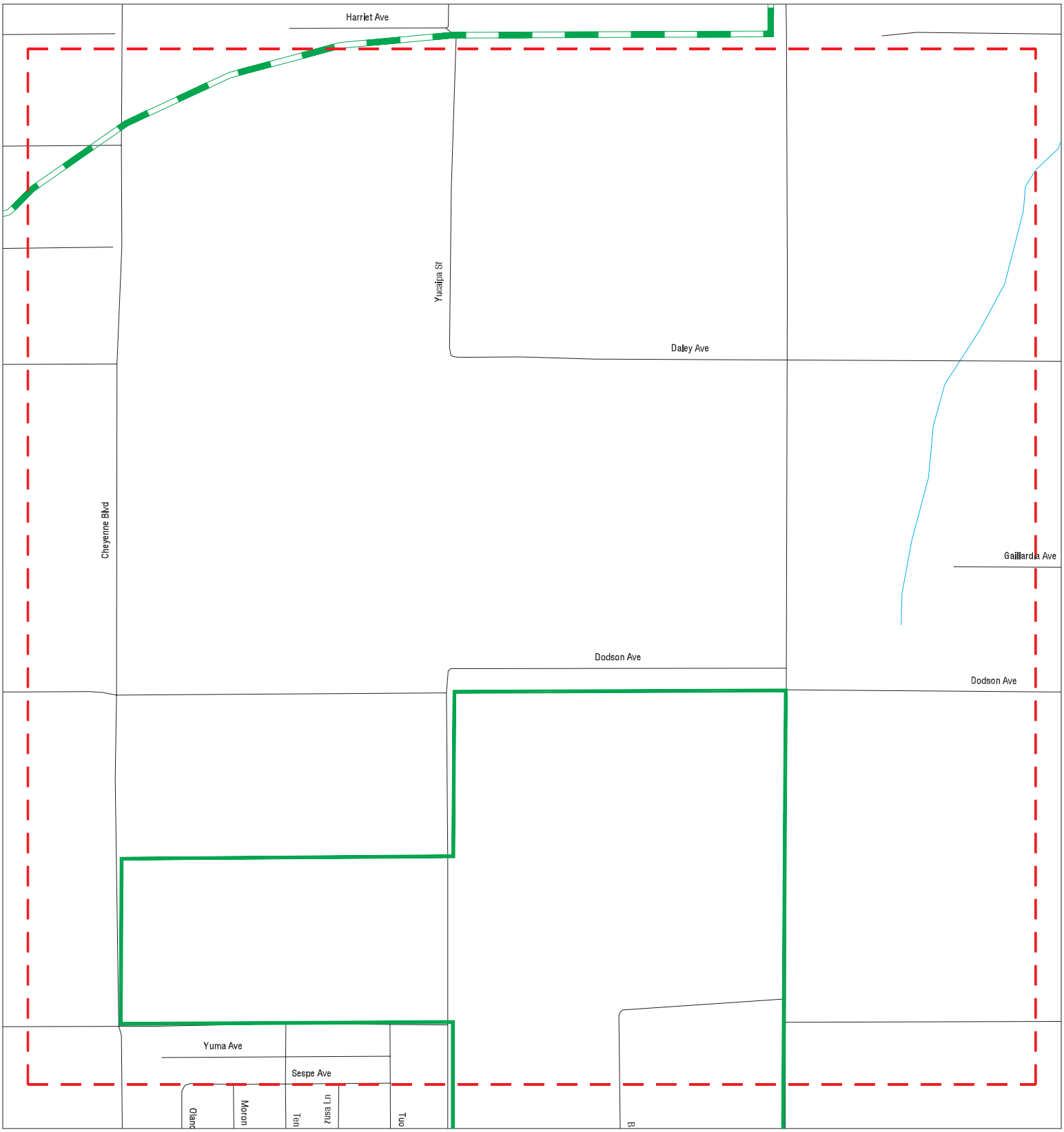
MAPPED SITES SUMMARY - FOCUS MAP 6

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 7 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

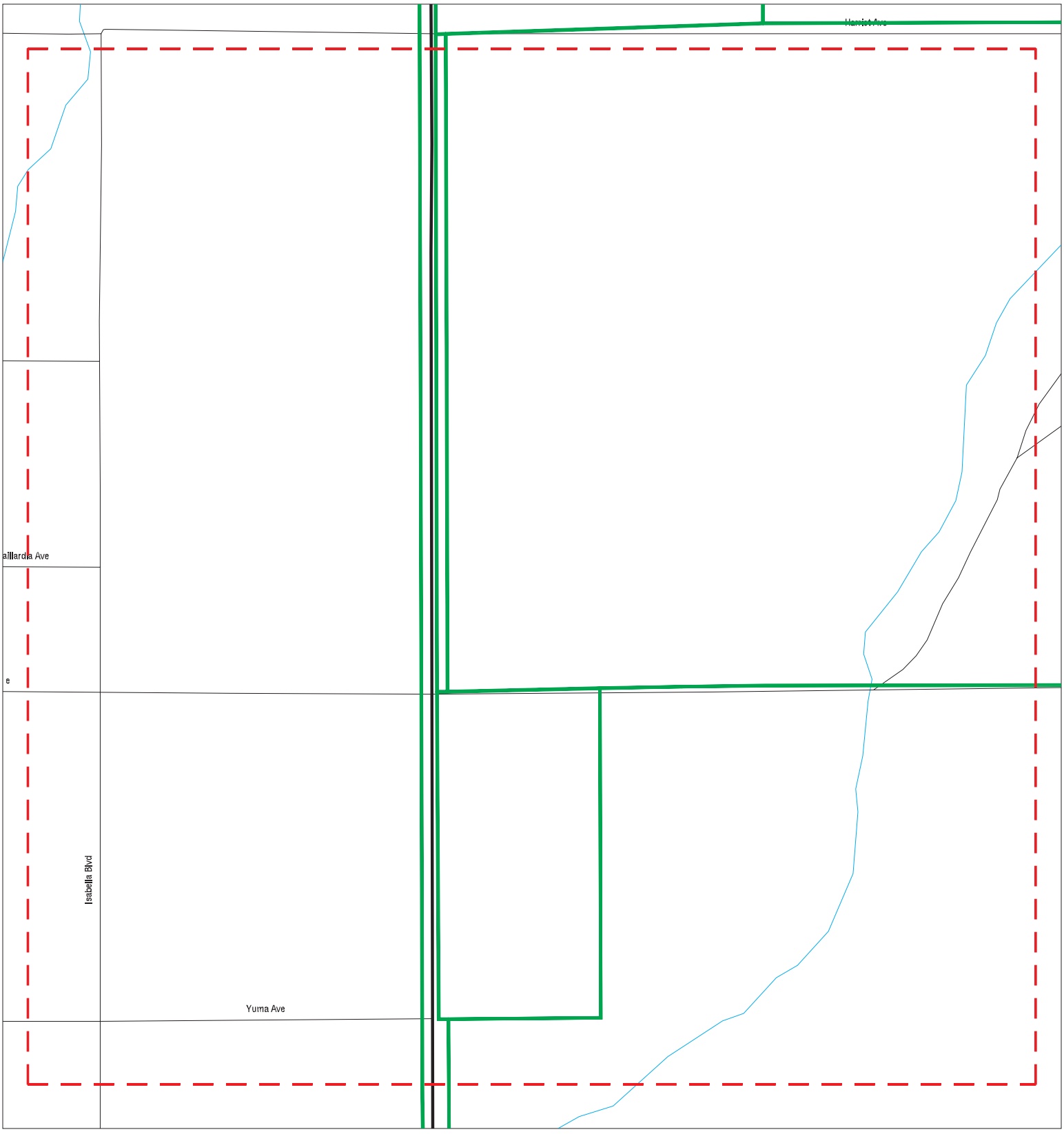
MAPPED SITES SUMMARY - FOCUS MAP 7

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 8 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

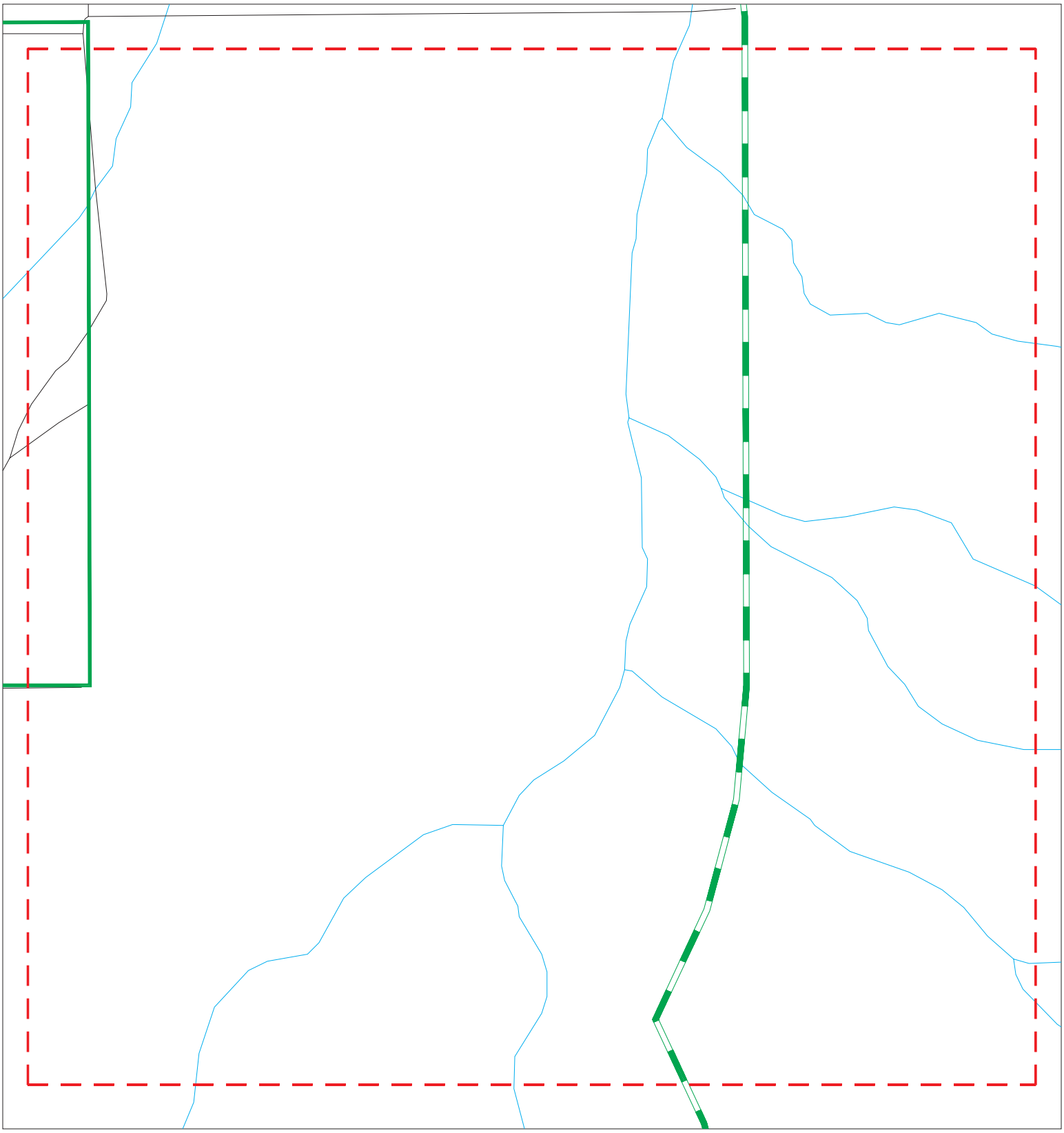
MAPPED SITES SUMMARY - FOCUS MAP 8

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 9 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

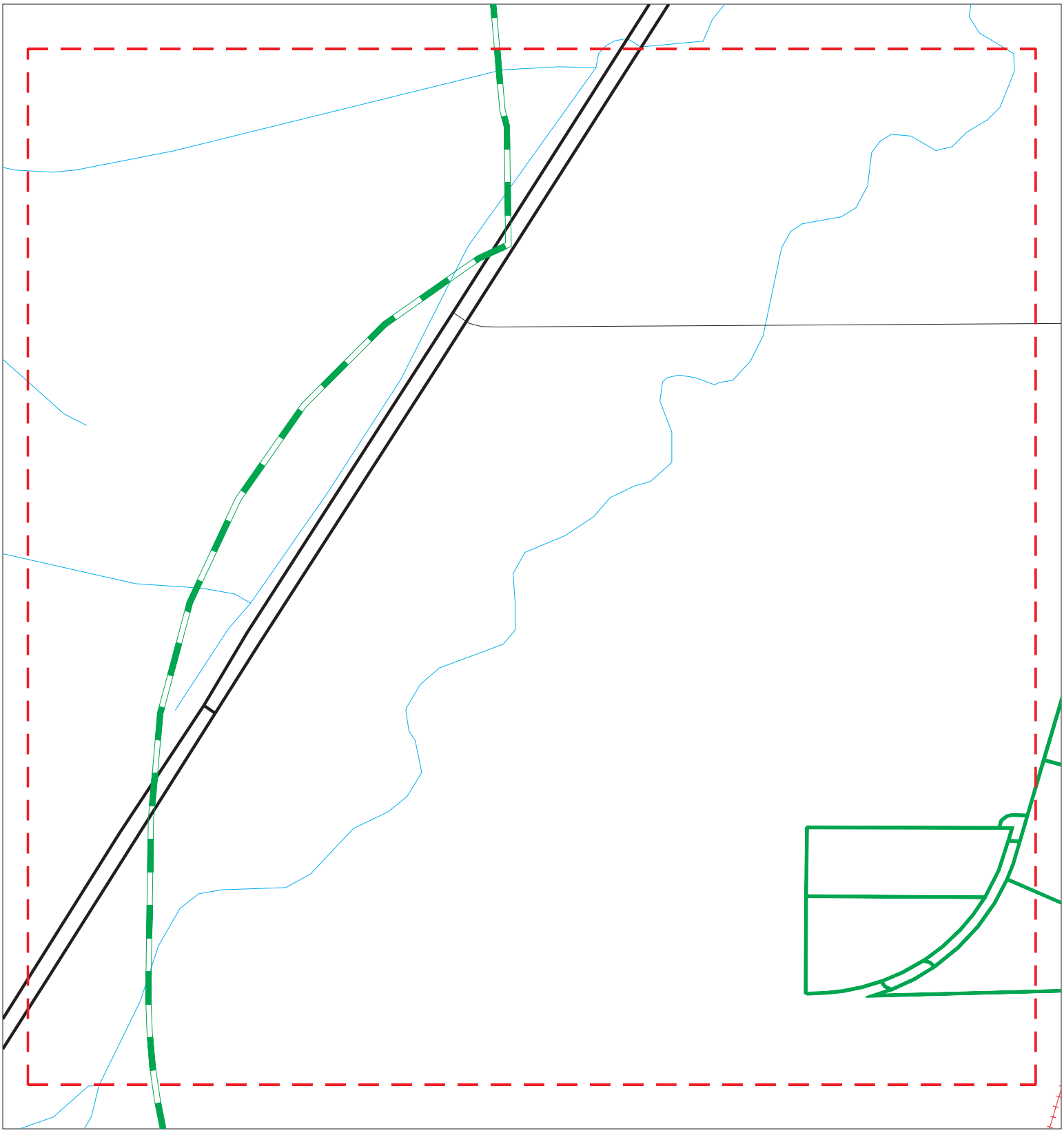
MAPPED SITES SUMMARY - FOCUS MAP 9

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 10 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

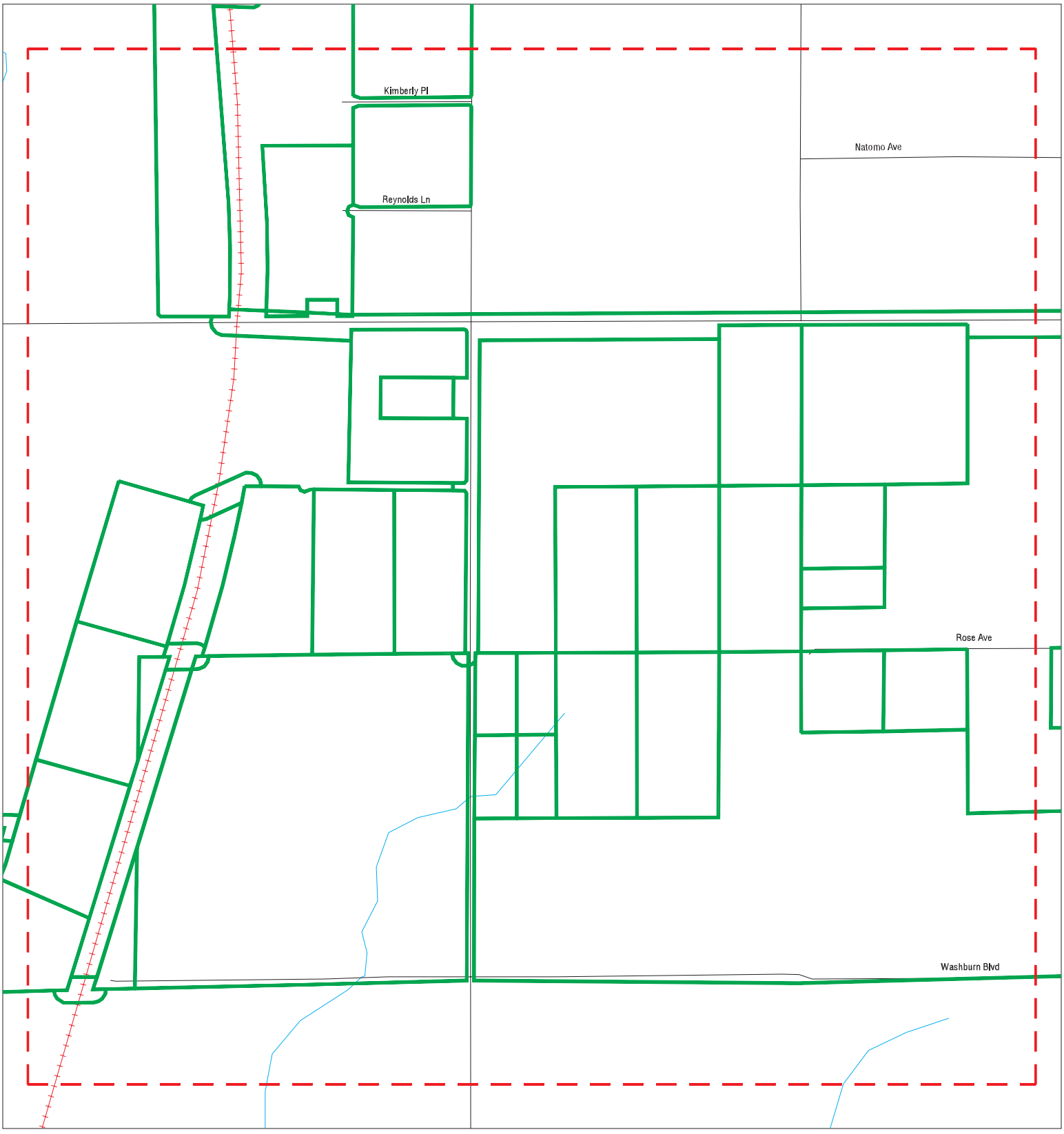
MAPPED SITES SUMMARY - FOCUS MAP 10

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 11 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

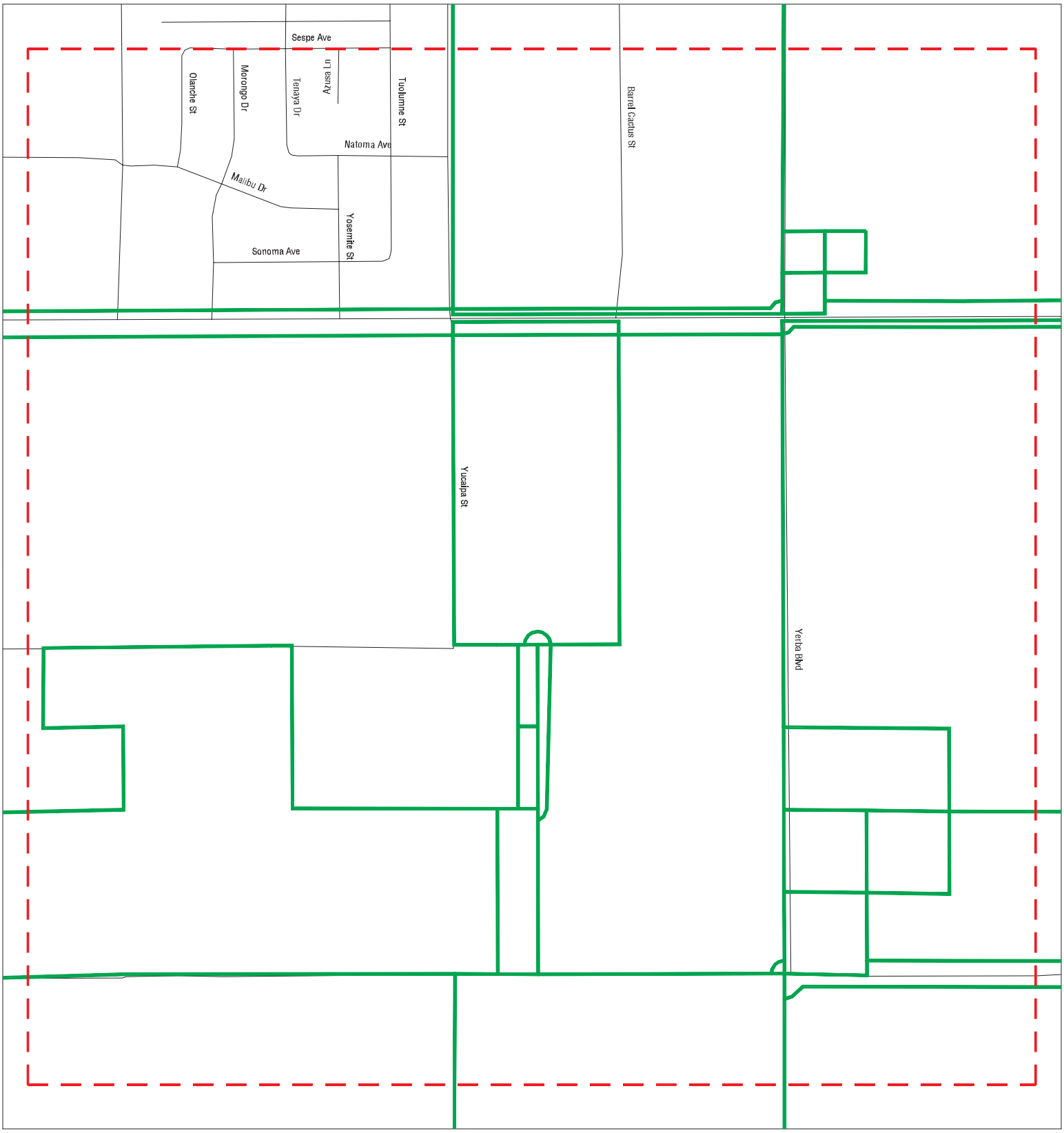
MAPPED SITES SUMMARY - FOCUS MAP 11

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 12 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

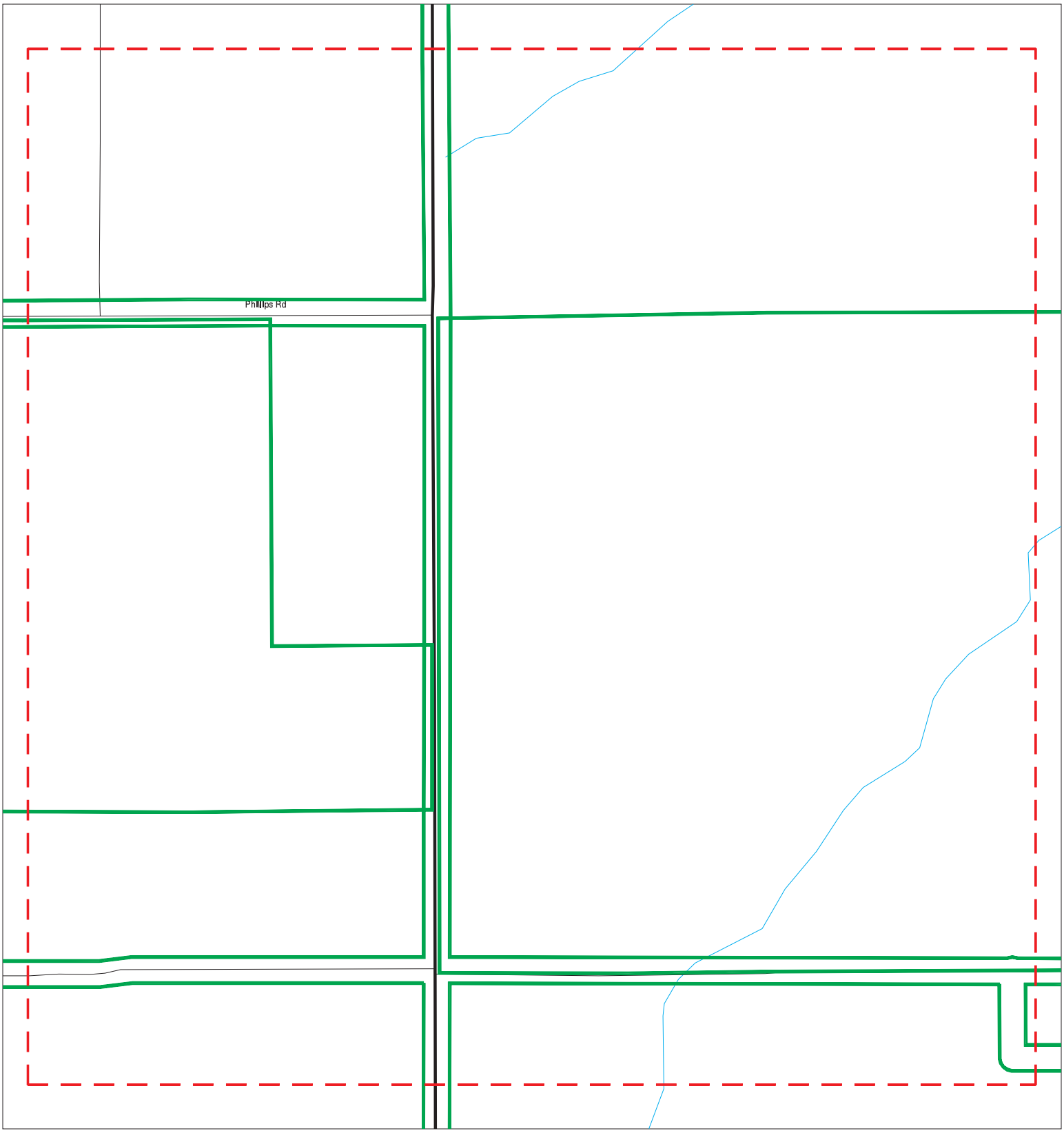
MAPPED SITES SUMMARY - FOCUS MAP 12

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 13 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

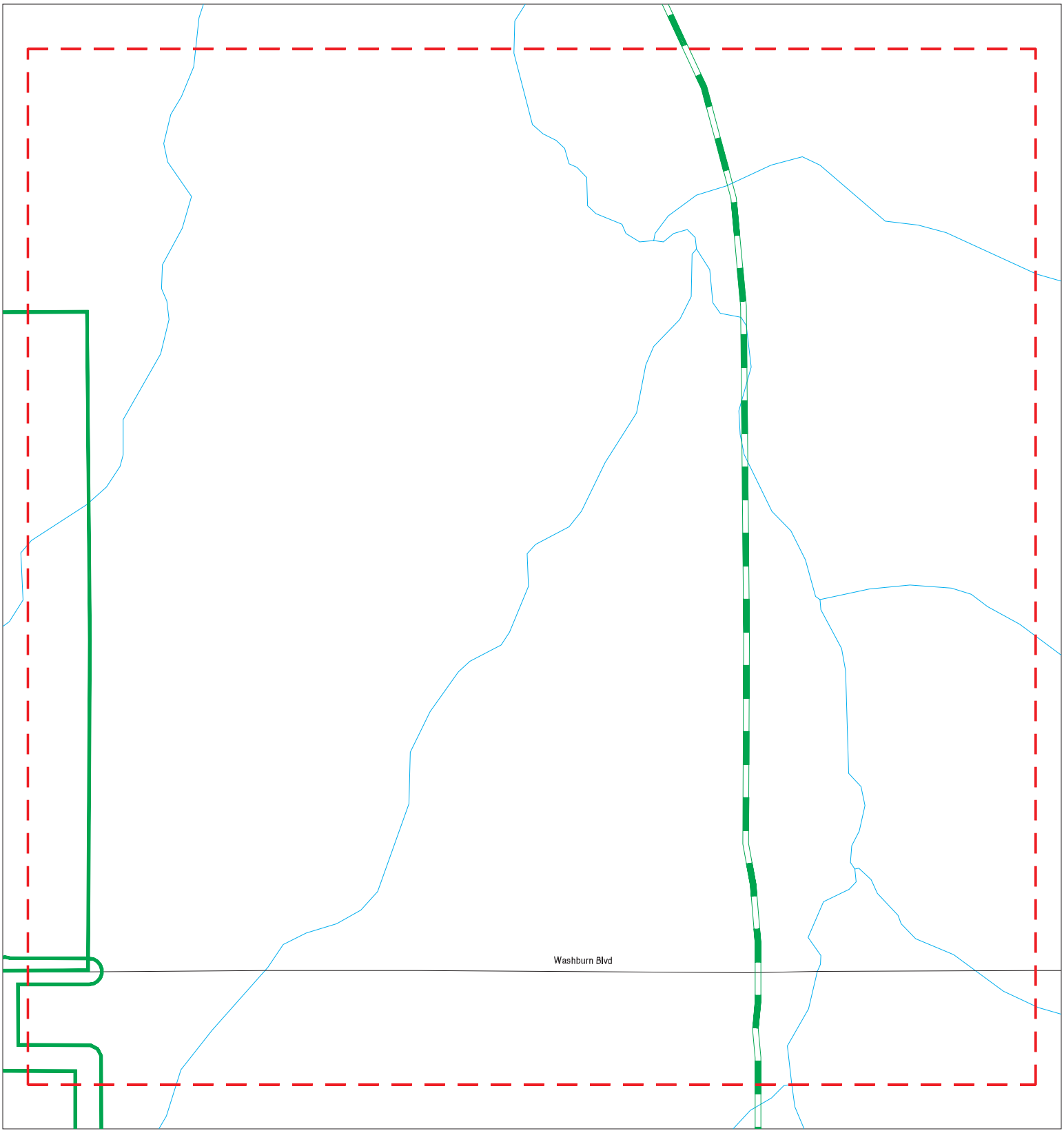
MAPPED SITES SUMMARY - FOCUS MAP 13

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 14 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

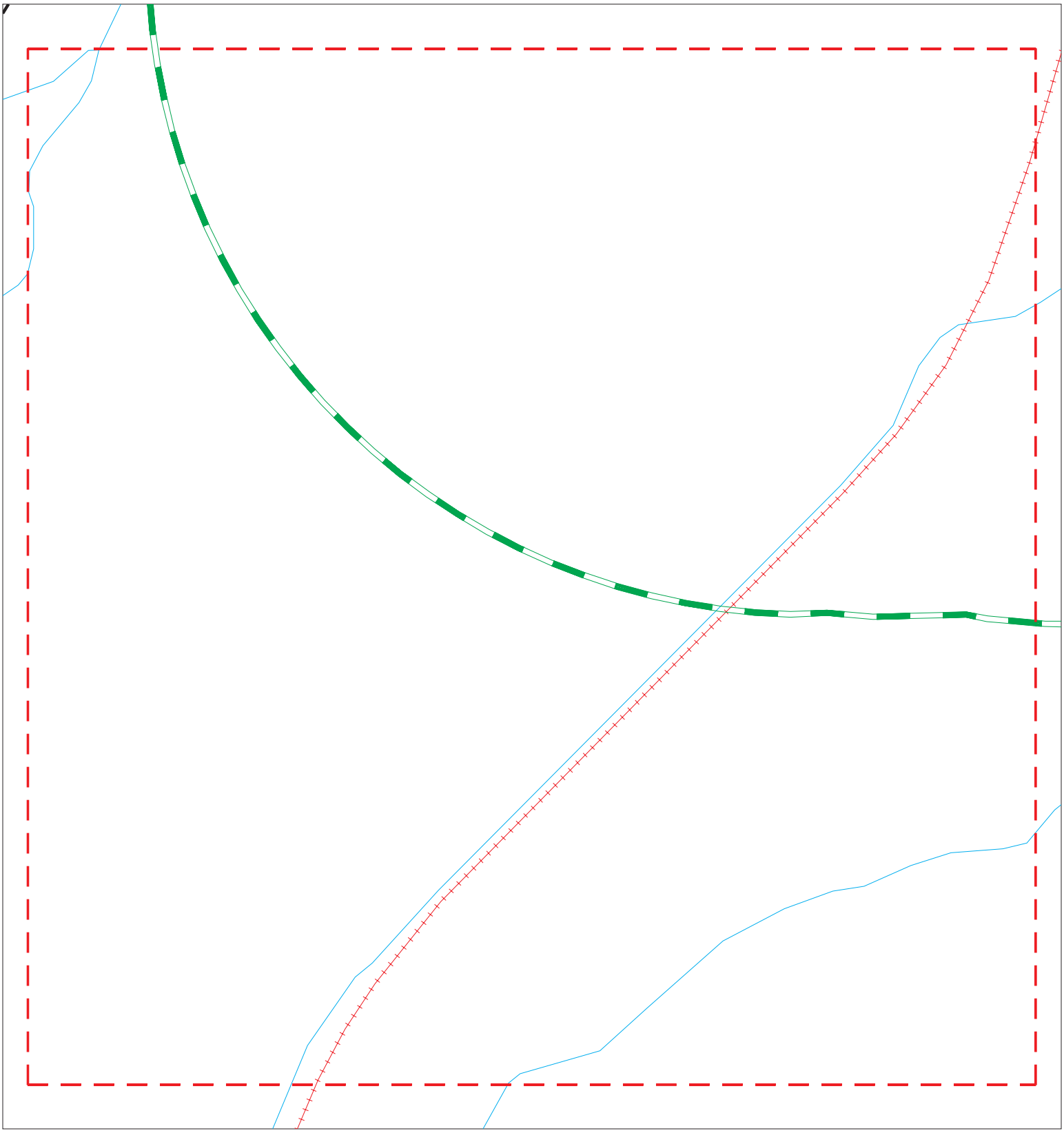
MAPPED SITES SUMMARY - FOCUS MAP 14

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 15 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo ADDRESS: Kudo CITY/STATE: California City CA ZIP: 93505	CLIENT: Stantec CONTACT: Alicia Jansen INQUIRY #: 5759392.2s DATE: 08/21/19

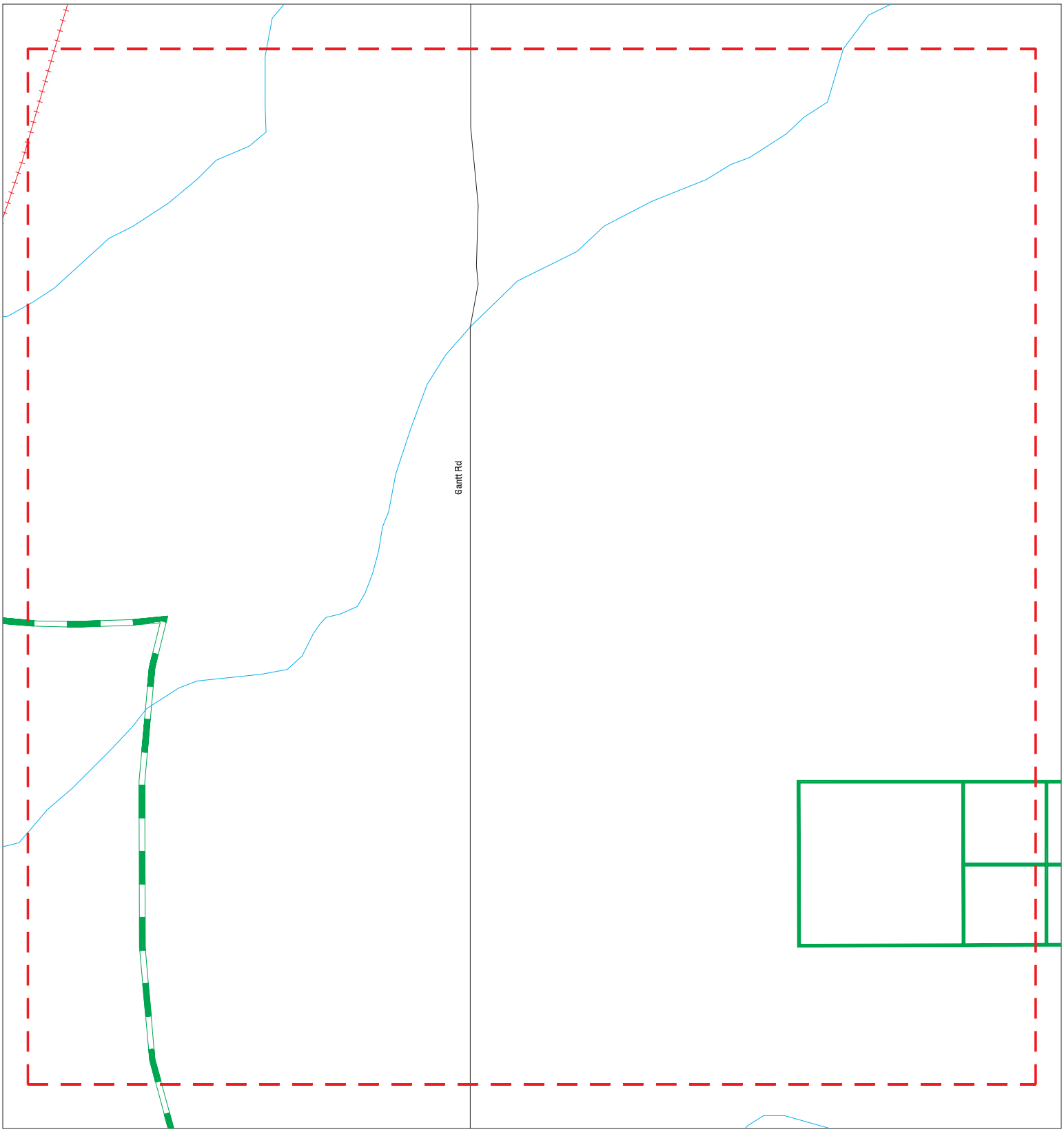
MAPPED SITES SUMMARY - FOCUS MAP 15

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 16 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

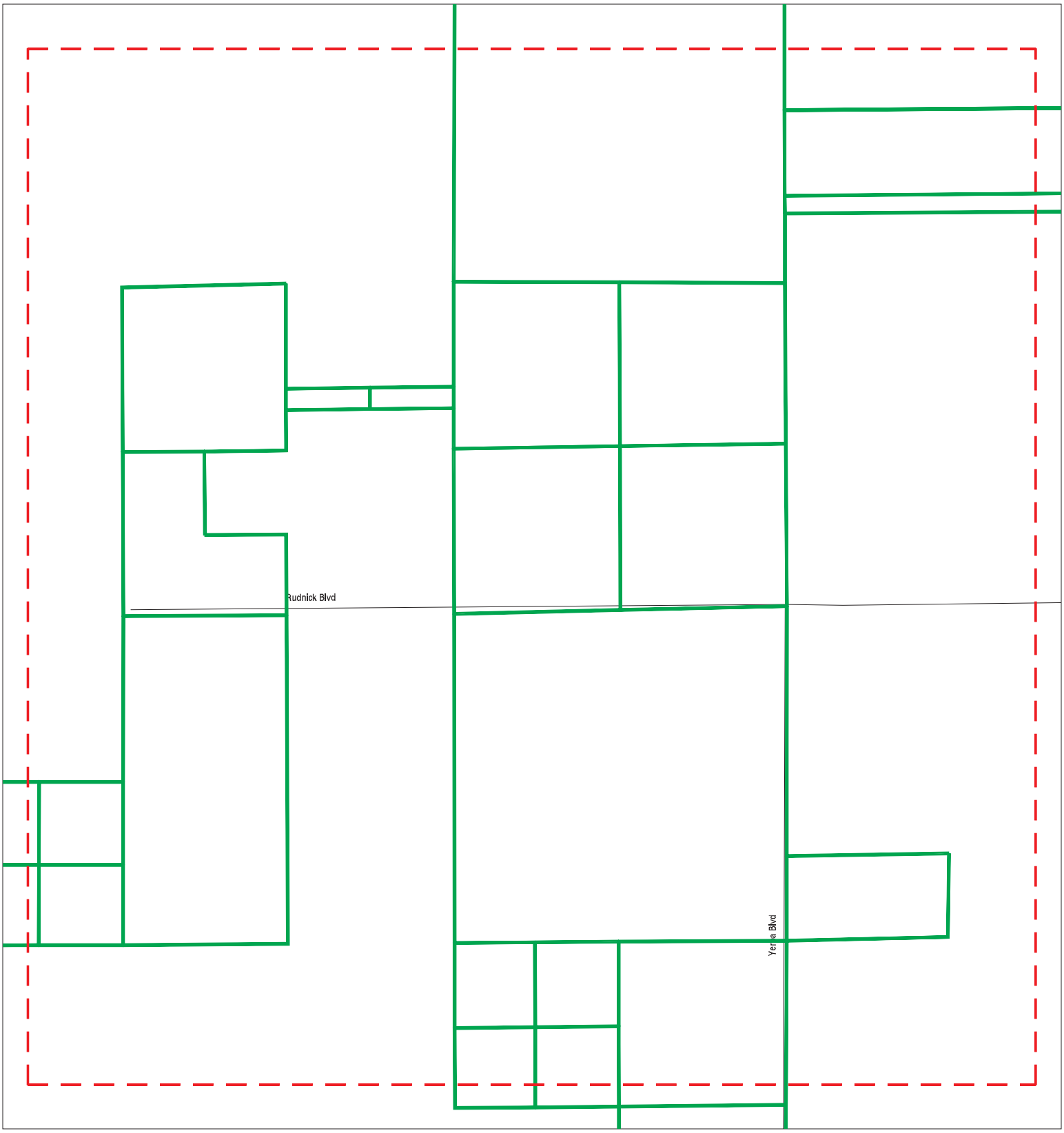
MAPPED SITES SUMMARY - FOCUS MAP 16

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 17 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

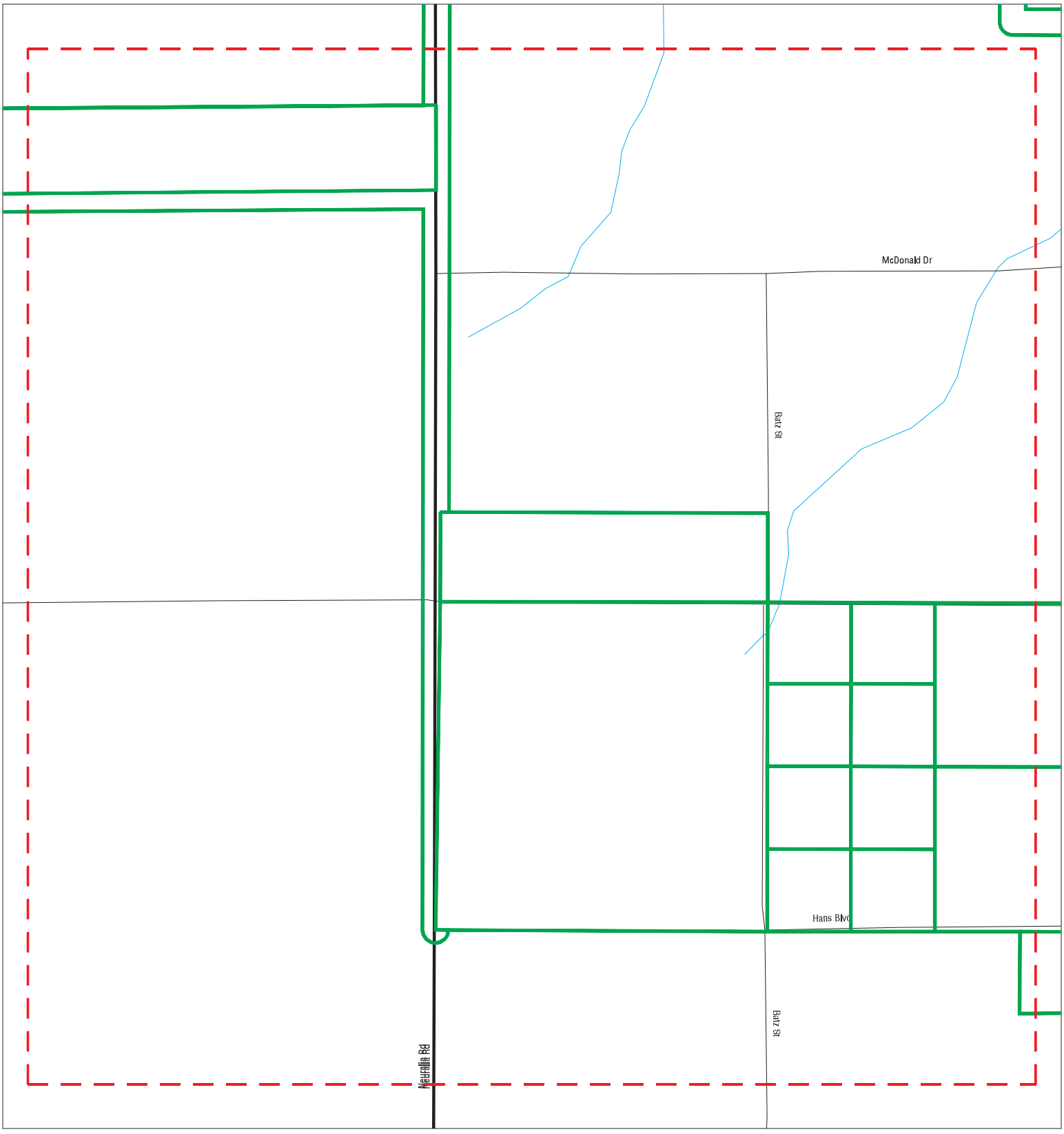
MAPPED SITES SUMMARY - FOCUS MAP 17

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 18 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo ADDRESS: Kudo CITY/STATE: California City CA ZIP: 93505	CLIENT: Stantec CONTACT: Alicia Jansen INQUIRY #: 5759392.2s DATE: 08/21/19

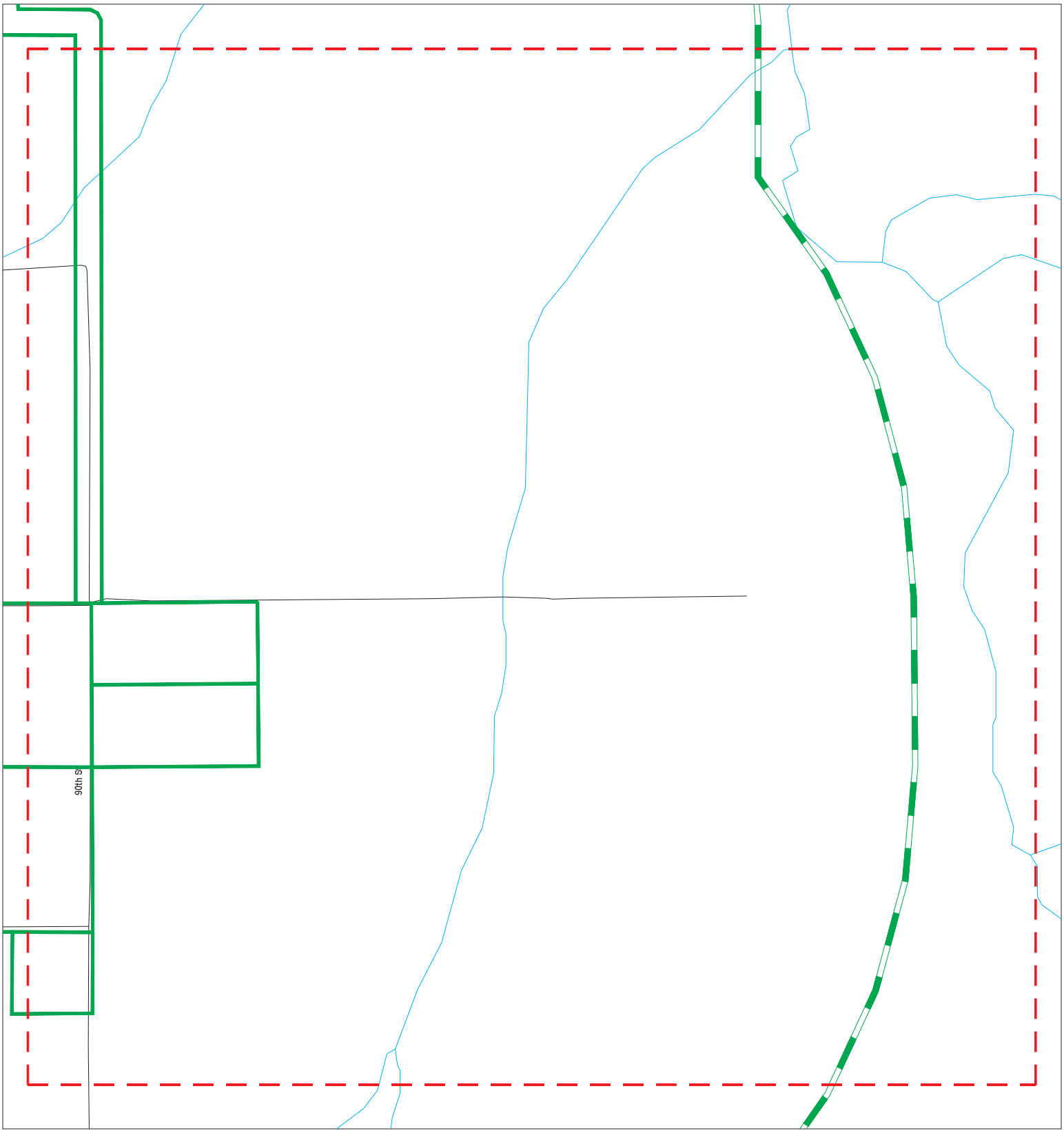
MAPPED SITES SUMMARY - FOCUS MAP 18

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 19 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

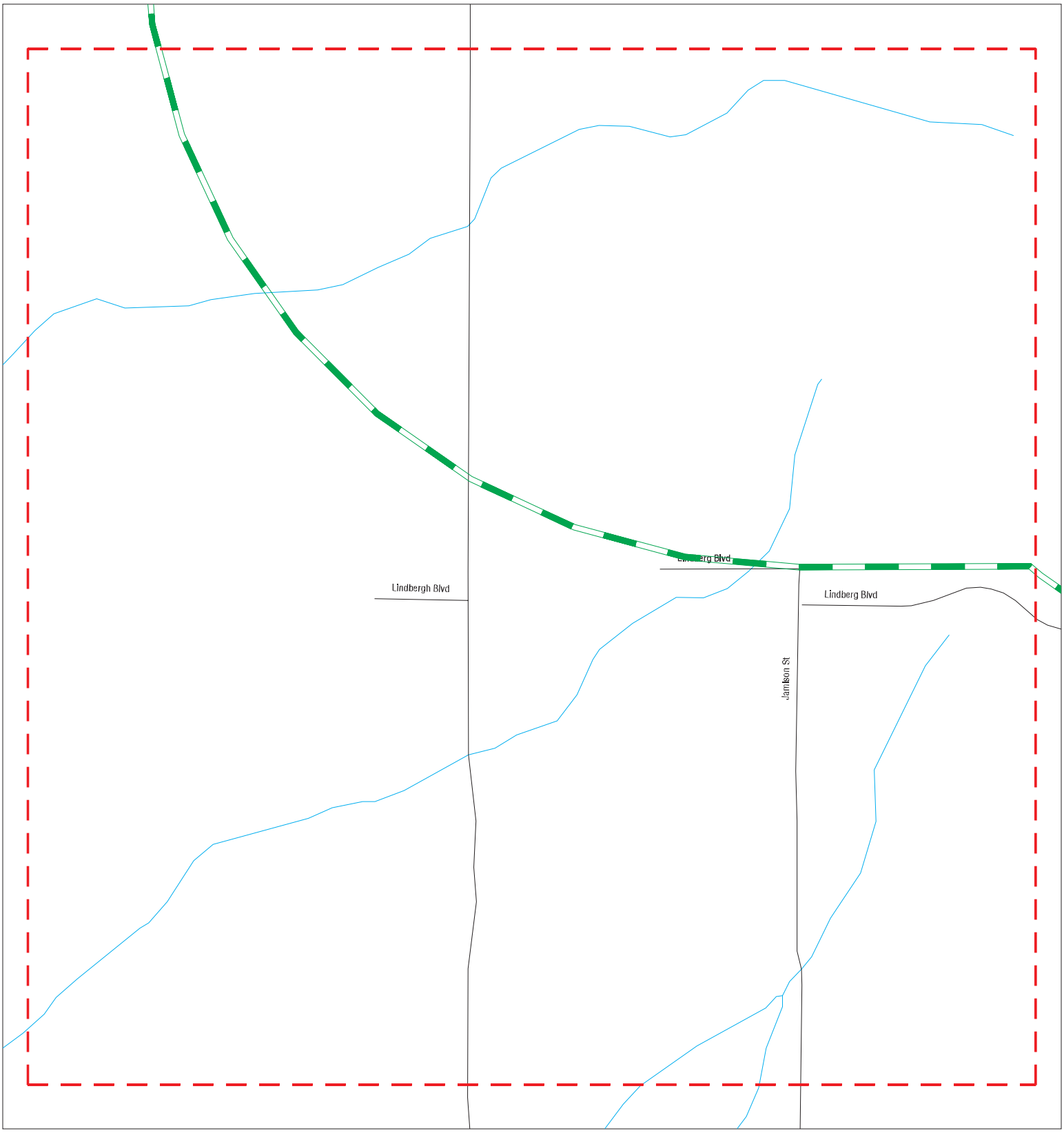
MAPPED SITES SUMMARY - FOCUS MAP 19

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 20 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo ADDRESS: Kudo CITY/STATE: California City CA ZIP: 93505	CLIENT: Stantec CONTACT: Alicia Jansen INQUIRY #: 5759392.2s DATE: 08/21/19

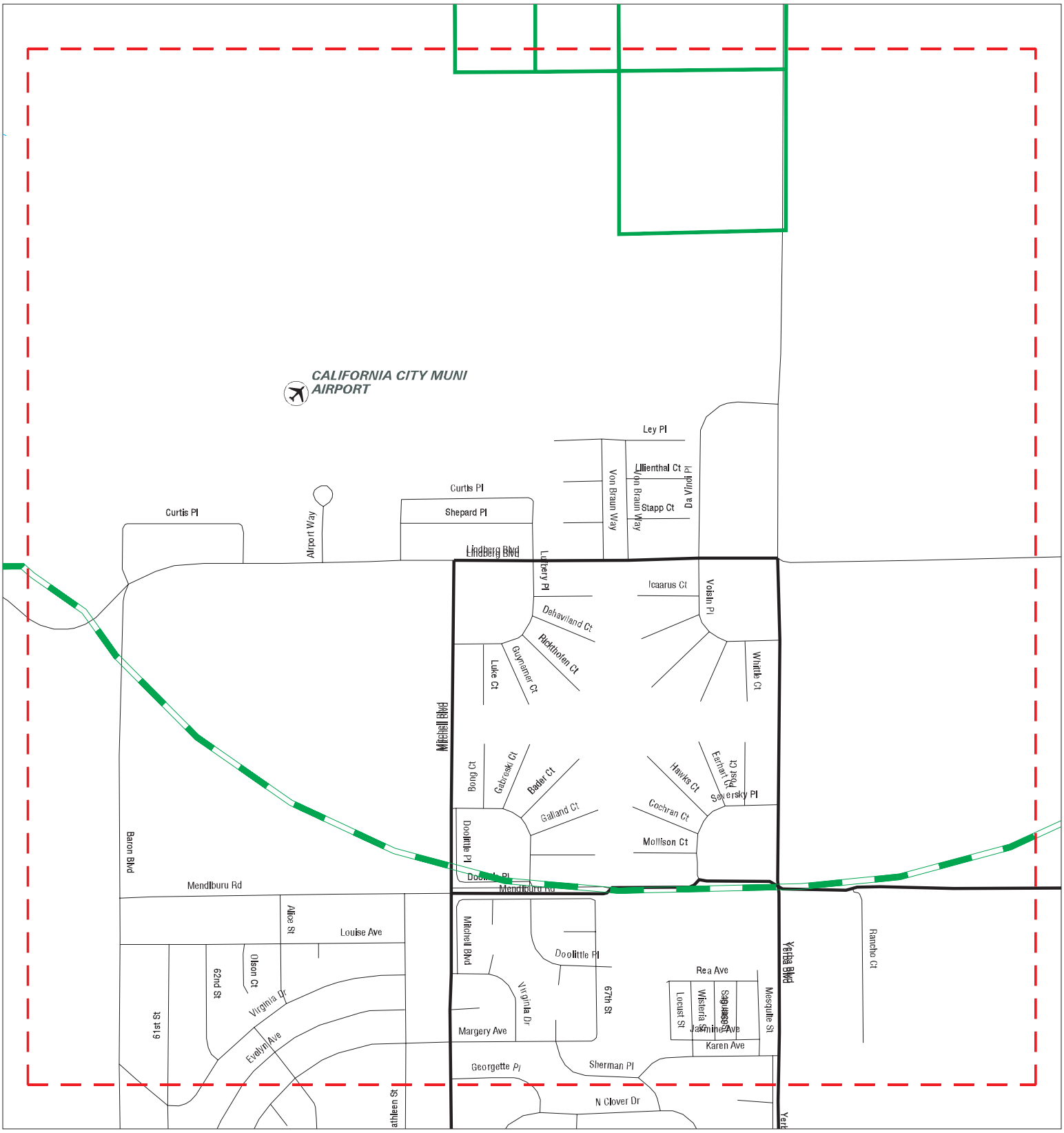
MAPPED SITES SUMMARY - FOCUS MAP 20

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 21 - 5759392.2s



SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

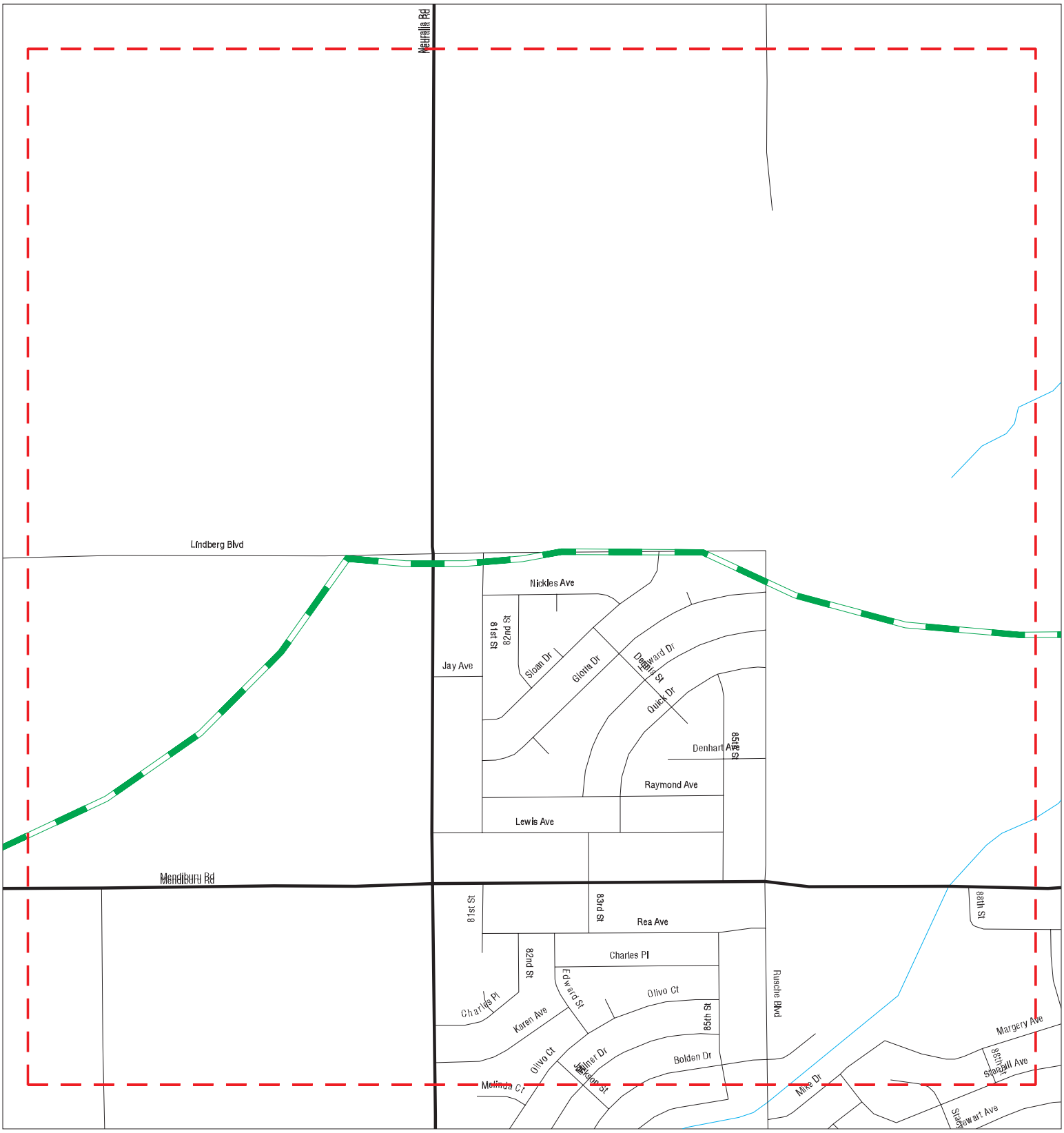
MAPPED SITES SUMMARY - FOCUS MAP 21

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 22 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

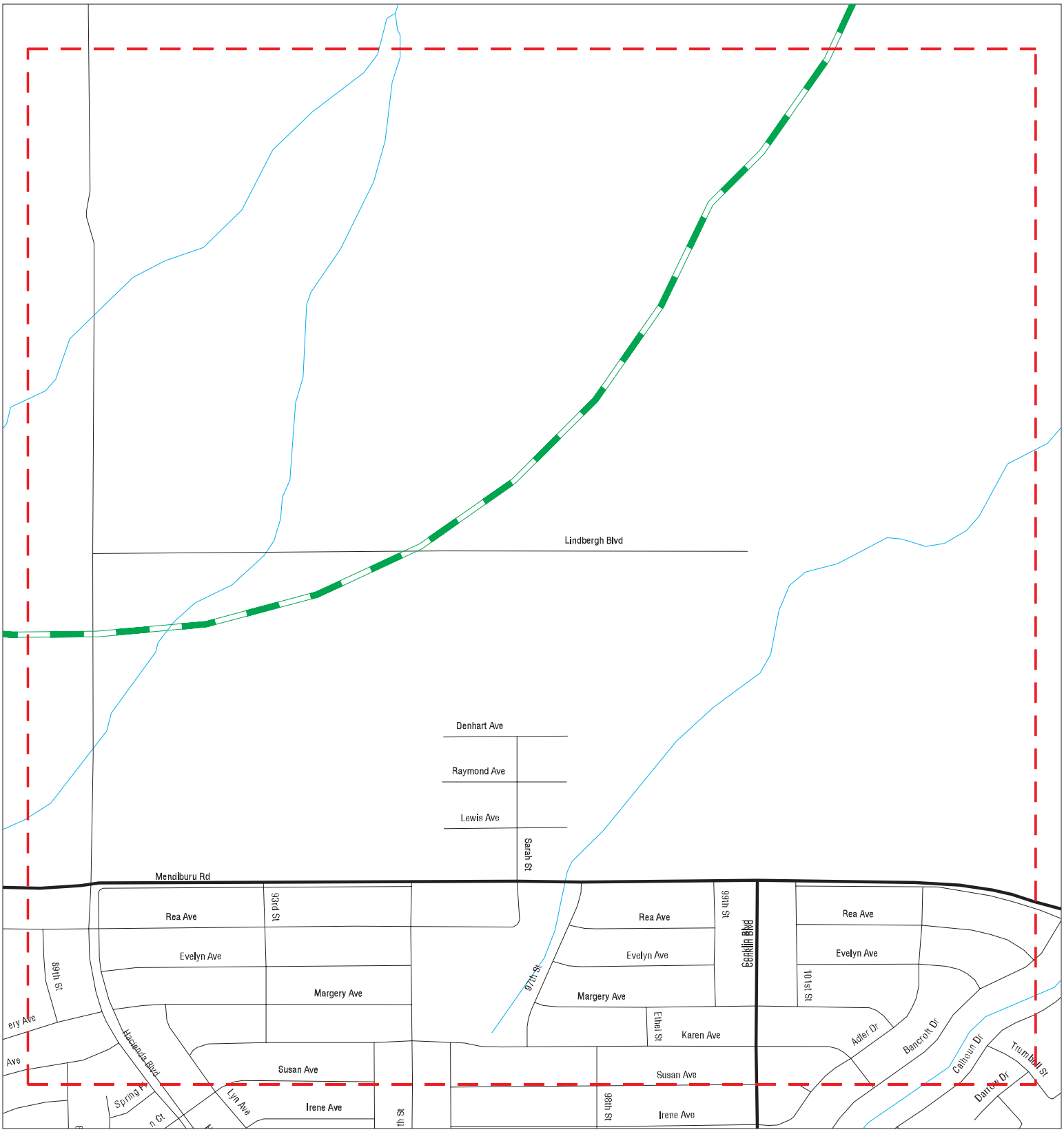
MAPPED SITES SUMMARY - FOCUS MAP 22

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 23 - 5759392.2s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: Kudo	CLIENT: Stantec
ADDRESS: Kudo	CONTACT: Alicia Jansen
CITY/STATE: California City CA	INQUIRY #: 5759392.2s
ZIP: 93505	DATE: 08/21/19

MAPPED SITES SUMMARY - FOCUS MAP 23

Target Property:
KUDO
CALIFORNIA CITY, CA 93505

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 21 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
CALIFORNIA CITY	S114001219		NORTH LOOP BLVD BETWEEN HACIENDA AND 90TH STREETS	93505	CHMIRS
CALIFORNIA CITY	S105647245		90TH CALIFORNIA CITY BLVD	93505	CHMIRS
CALIFORNIA CITY	S123302467	MJ UNLIMITED	MARIAN WAY AND COLLINS BLVD	93505	NPDES
CALIFORNIA CITY	S121655061	MENDIBURU RD CAL CITY HIGH SCHOOL	MENDIBURU RD FROM YERBA BLVD TO RUSCHE B	93505	CIWQS
CANTIL	1016954065	AMERICAN HONDA MOTOR CO, INC	30216 NEURALIA RD	93519	RCRA-CESQG
CANTIL	A100417087	AMERICAN HONDA MOTOR CO., INC.	30216 NEURALIA RD	93519	AST
CANTIL	1024788890	AMERICAN HONDA MOTOR CO INC	30216 NEURALIA RD	93519	RCRA NonGen / NLR
CANTIL	1017391655	AMERICAN HONDA MOTOR CO, INC	30216 NEURALIA RD	93519	FINDS, ECHO
CANTIL	1023240651	AMERICAN HONDA MOTOR CO.NA INC.	30216 NEURALIA RD	93519	FINDS
CANTIL	1023309926	ARCIERO RANCHES	1200 NEURALIA	93519	FINDS
CANTIL	1023375763	SPRINGBOK 1 SOLAR FARM	29999 NEURALIA RD	93519	FINDS
CANTIL	1023354486	SPRINGBOK 2 SOLAR FARM	29977 NEURALIA RD	93519	FINDS
CANTIL	S118210096	AMERICAN HONDA MOTOR CO., INC.	30216 NEURALIA ROAD	93519	HAZNET
CANTIL	S123616932	AMERICAN HONDA MOTOR CO INC	30216 NEURALIA RD	93519	HAZNET
CANTIL	S123592772	AMERICAN HONDA MOTOR CO., INC.	30216 NEURALIA ROAD	93519	HAZNET
KERN COUNTY	901704		SOUTH OF BUTE LA ROSE ON		ERNS
KERN COUNTY	9164674		MOBIL ROSE STATION		ERNS
KERN COUNTY	S105637059		PHILLIPS LAB SEWAGE PLANT EDWARDS AFB		CHMIRS
KERN COUNTY	S120028234	E&B, DRILLING SUMPS, MCDONALD ANTICLINE OIL FIELD	MCDONALD ANTICLINE OIL FIELD		CIWQS
MOJAVE	S106389830		KERN CO AQUA DUCT,BETWEEN CAL CITY ISABELLA AND MOJAVE		CHMIRS
WILLOW SPRINGS RD. A	S123729997	1X SIGITAS F. AND DANUTE S. BABUSIS	OFF OF 90TH WEST, 2 MI. NO. OF	93501	HAZNET

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.

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: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/14/2019
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: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/14/2019
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: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

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: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 04/03/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/03/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list 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). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 35

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Quarterly

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS 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 the 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. The 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 potential NPL site.

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 35

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Quarterly

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

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: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

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: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
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: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
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: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

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: 02/22/2019
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 41

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/10/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Varies

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: 01/31/2019
Date Data Arrived at EDR: 02/04/2019
Date Made Active in Reports: 03/08/2019
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2019
Next Scheduled EDR Contact: 09/09/2019
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: 01/31/2019
Date Data Arrived at EDR: 02/04/2019
Date Made Active in Reports: 03/08/2019
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

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: 03/25/2019
Date Data Arrived at EDR: 03/26/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 36

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent NPL

CA 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: 04/29/2019
Date Data Arrived at EDR: 04/30/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 58

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 04/30/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

CA 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: 04/29/2019
Date Data Arrived at EDR: 04/30/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 58

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 04/30/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

CA 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: 05/13/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/14/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

CA 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: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

CA 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: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

CA 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: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CA 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: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

CA 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: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

CA 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: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

CA LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/10/2018
Date Data Arrived at EDR: 12/11/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA 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: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

CA 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: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

CA 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: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

CA 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: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

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: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/13/2018
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 55

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/24/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

CA CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/10/2018
Date Data Arrived at EDR: 12/11/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA 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: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

CA 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: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

CA 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: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

CA 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: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

CA 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: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

CA 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: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CA 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: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CA 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: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

CA 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: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

CA 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: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: No Update Planned

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/10/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Varies

State and tribal registered storage tank lists

CA MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/12/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 41

Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 42

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Semi-Annually

CA AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R1: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

Date of Government Version: 04/06/2016
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: N/A
Telephone: N/A
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

CA 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: 04/29/2019
Date Data Arrived at EDR: 04/30/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 58

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 04/30/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Quarterly

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

INDIAN VCP R1: 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

State and tribal Brownfields sites

CA BROWNFIELDS: Considered Brownfieds Sites Listing

A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 03/25/2019
Date Data Arrived at EDR: 03/26/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 06/25/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/17/2018
Date Data Arrived at EDR: 12/18/2018
Date Made Active in Reports: 01/11/2019
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

CA 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: 04/25/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: No Update Planned

CA SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 03/11/2019
Date Data Arrived at EDR: 03/13/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 48

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 03/26/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 34

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/09/2019
Next Scheduled EDR Contact: 08/26/2019
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: 04/26/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

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: 415-947-4219
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: No Update Planned

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

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 04/23/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/24/2019
Date Data Arrived at EDR: 02/26/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 50

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: No Update Planned

Local Lists of Hazardous waste / Contaminated Sites

CA 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

CA 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: 04/29/2019
Date Data Arrived at EDR: 04/30/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 58

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 04/30/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Quarterly

CA 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: 12/31/2017
Date Data Arrived at EDR: 06/12/2018
Date Made Active in Reports: 08/06/2018
Number of Days to Update: 55

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 07/08/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Varies

CA CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 04/09/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 05/08/2019
Number of Days to Update: 27

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 07/23/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Quarterly

CA 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

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: 02/24/2019
Date Data Arrived at EDR: 02/26/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 50

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Quarterly

CA PFAS: PFAS Contamination Site Location Listing

A listing of PFAS contaminated sites included in the GeoTracker database.

Date of Government Version: 06/28/2019
Date Data Arrived at EDR: 06/28/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 26

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/28/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

CA 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

CA UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/04/2018
Date Data Arrived at EDR: 12/06/2018
Date Made Active in Reports: 12/14/2018
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Annually

CA 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

CA SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 09/11/2018
Date Data Arrived at EDR: 09/12/2018
Date Made Active in Reports: 10/11/2018
Number of Days to Update: 29

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 05/02/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

CA CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 04/09/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 05/08/2019
Number of Days to Update: 27

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 07/23/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Quarterly

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

Local Land Records

CA LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 02/28/2019
Date Data Arrived at EDR: 03/01/2019
Date Made Active in Reports: 04/02/2019
Number of Days to Update: 32

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

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: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 35

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/02/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Semi-Annually

CA 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: 03/04/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 04/01/2019
Number of Days to Update: 27

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Semi-Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/25/2019
Date Data Arrived at EDR: 03/26/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 49

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

Records of Emergency Release Reports

CA 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: 10/24/2018
Date Data Arrived at EDR: 01/24/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 40

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 06/24/2019
Next Scheduled EDR Contact: 08/05/2019
Data Release Frequency: Semi-Annually

CA LDS: Land Disposal Sites Listing (GEOTRACKER)

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/10/2018
Date Data Arrived at EDR: 12/11/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 35

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA MCS: Military Cleanup Sites Listing (GEOTRACKER)

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

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: 03/25/2019
Date Data Arrived at EDR: 03/27/2019
Date Made Active in Reports: 04/17/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

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: 03/07/2019
Date Data Arrived at EDR: 04/03/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 50

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/21/2019
Next Scheduled EDR Contact: 09/02/2019
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: 888-275-8747
Last EDR Contact: 07/09/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Semi-Annually

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: 07/10/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: N/A

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: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63
Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/13/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/25/2019
Date Data Arrived at EDR: 03/26/2019
Date Made Active in Reports: 05/07/2019
Number of Days to Update: 42
Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/06/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73
Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/10/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

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: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/18/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Every 4 Years

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: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Annually

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: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/24/2019
Next Scheduled EDR Contact: 08/05/2019
Data Release Frequency: Annually

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: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 35

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/25/2019
Date Data Arrived at EDR: 05/02/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

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

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 35
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 08/19/2019
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: 03/20/2019
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 34
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/12/2019
Next Scheduled EDR Contact: 10/21/2019
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: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/03/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Quarterly

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: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: 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: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

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: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant 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: 06/07/2019
Next Scheduled EDR Contact: 09/16/2019
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: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/07/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/26/2019
Next Scheduled EDR Contact: 08/05/2019
Data Release Frequency: Varies

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: 04/02/2019
Date Data Arrived at EDR: 04/02/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 42
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Quarterly

HIST FTTS: 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

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

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 12/03/2018
Date Data Arrived at EDR: 01/29/2019
Date Made Active in Reports: 03/21/2019
Number of Days to Update: 51

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 04/30/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Quarterly

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: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 30

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/08/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Varies

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: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Biennially

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: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/10/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 08/08/2017
Date Data Arrived at EDR: 09/11/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 3

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/02/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

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: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/18/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/01/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Varies

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem

Date of Government Version: 10/27/2009
Date Data Arrived at EDR: 11/10/2009
Date Made Active in Reports: 12/08/2009
Number of Days to Update: 28

Source: N/A
Telephone: N/A
Last EDR Contact: 11/12/1996
Next Scheduled EDR Contact: N/A
Data Release Frequency: Annually

US AIRS MINOR: Aerometric Information Retrieval System Facility Subsystem

Date of Government Version: 10/27/2009
Date Data Arrived at EDR: 11/10/2009
Date Made Active in Reports: 12/08/2009
Number of Days to Update: 28

Source: N/A
Telephone: N/A
Last EDR Contact: 11/12/1996
Next Scheduled EDR Contact: N/A
Data Release Frequency: Annually

US MINES: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

US MINES 2: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/27/2019
Date Data Arrived at EDR: 03/28/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 34

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/19/2019
Next Scheduled EDR Contact: 09/23/2019
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: 02/15/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 03/15/2019
Number of Days to Update: 10

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/05/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 07/26/2018
Date Made Active in Reports: 10/05/2018
Number of Days to Update: 71

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 04/07/2019
Date Data Arrived at EDR: 04/09/2019
Date Made Active in Reports: 05/23/2019
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 07/09/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 01/17/2019
Date Made Active in Reports: 04/01/2019
Number of Days to Update: 74

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/15/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/19/2019
Date Data Arrived at EDR: 02/21/2019
Date Made Active in Reports: 04/01/2019
Number of Days to Update: 39

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/21/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Quarterly

Other Ascertainable Records

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 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).

Date of Government Version: 03/25/2019
Date Data Arrived at EDR: 03/26/2019
Date Made Active in Reports: 05/01/2019
Number of Days to Update: 36

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 06/25/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

CA CUPA LIVERMORE-PLEASANTON: CUPA Facility Listing

list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64

Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 05/14/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Varies

CA CUPA SAN FRANCISCO CO: CUPA Facility Listing

Cupa facilities

Date of Government Version: 04/18/2019
Date Data Arrived at EDR: 04/19/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 11

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 04/18/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

CA 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: 03/01/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 35

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Annually

CA DRYCLEAN AVAQMD: Antelope Valley Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 02/27/2019
Date Data Arrived at EDR: 02/28/2019
Date Made Active in Reports: 04/01/2019
Number of Days to Update: 32

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

CA DRYCLEAN SOUTH COAST: South Coast Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 03/19/2019
Date Data Arrived at EDR: 03/22/2019
Date Made Active in Reports: 04/09/2019
Number of Days to Update: 18

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 05/23/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

CA EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/20/2018
Date Made Active in Reports: 08/06/2018
Number of Days to Update: 47

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/24/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Varies

CA ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 11/01/2018
Date Data Arrived at EDR: 11/02/2018
Date Made Active in Reports: 12/13/2018
Number of Days to Update: 41

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 07/18/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

CA Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

CA 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: 05/15/2019
Date Data Arrived at EDR: 05/16/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 63

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/09/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CA 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. This database begins with calendar year 1993.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 05/29/2019
Date Made Active in Reports: 07/22/2019
Number of Days to Update: 54

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 07/12/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Annually

CA ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 05/20/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 58

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 05/21/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Quarterly

CA 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]. This listing is no longer updated by the state agency.

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

CA HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 05/20/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 58

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/21/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Quarterly

CA 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: 04/08/2019
Date Data Arrived at EDR: 04/09/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 51

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 07/09/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Quarterly

CA MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 12/10/2018
Date Data Arrived at EDR: 12/12/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 34

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA 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: 02/20/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 04/02/2019
Number of Days to Update: 28

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

CA NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 05/13/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/14/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: Quarterly

CA PEST LIC: Pesticide Regulation Licenses Listing

A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 03/04/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 04/05/2019
Number of Days to Update: 31

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Quarterly

CA PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 03/11/2019
Date Data Arrived at EDR: 03/13/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 47

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA NOTIFY 65: Proposition 65 Records

Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 03/18/2019
Date Data Arrived at EDR: 03/19/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 41

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: No Update Planned

CA UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 04/27/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA UIC GEO: Underground Injection Control Sites (GEOTRACKER)
Underground control injection sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region's active disposal pits are operating without permission.

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 09/13/2018
Number of Days to Update: 64

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 07/12/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Varies

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: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: No Update Planned

CA 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: 06/19/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: No Update Planned

CA MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)
Military privatized sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA WDR: Waste Discharge Requirements Listing
In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. Exemptions from Title 27 may be granted for nine categories of discharges (e.g., sewage, wastewater, etc.) that meet, and continue to meet, the preconditions listed for each specific exemption. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Date of Government Version: 03/11/2019
Date Data Arrived at EDR: 03/13/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 47

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

CA CIWQS: California Integrated Water Quality System

The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 03/05/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 04/02/2019
Number of Days to Update: 28

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

CA CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 04/09/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 05/08/2019
Number of Days to Update: 27

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 07/23/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

CA NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)

Non-Case Information sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)

Other Oil & Gas Projects sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)

Produced water ponds sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)

Sampling point - public sites

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

CA WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)

Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 06/10/2019
Date Data Arrived at EDR: 06/11/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 43

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/11/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Varies

EDR MGP: 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

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

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: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

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: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

CA RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

CA RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

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: 01/09/2019
Date Data Arrived at EDR: 01/11/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 53

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/08/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/10/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 06/20/2019
Number of Days to Update: 70

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List
Cupa Facility List

Date of Government Version: 06/27/2019
Date Data Arrived at EDR: 06/28/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 26

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 07/08/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/02/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 27

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 06/24/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 05/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 58

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 08/19/2019
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: 05/22/2019
Date Data Arrived at EDR: 05/23/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 56

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 04/29/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 02/20/2019
Date Data Arrived at EDR: 05/01/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 29

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 04/25/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 06/05/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 47

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 04/29/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

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: 04/10/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 19

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: No Update Planned

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/11/2018
Date Data Arrived at EDR: 12/13/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 33

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/20/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/24/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 63

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 05/06/2019
Date Data Arrived at EDR: 05/07/2019
Date Made Active in Reports: 07/16/2019
Number of Days to Update: 70

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/02/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/16/2019
Date Data Arrived at EDR: 05/17/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 13

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/30/2019
Date Data Arrived at EDR: 05/31/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 53

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 07/15/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Varies

LASSEN COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
Cupa facility list

Date of Government Version: 01/17/2019
Date Data Arrived at EDR: 01/18/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 46

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

LOS ANGELES COUNTY:

Key Areas of Concerns in Los Angeles County
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office. Date of Government Version: 3/30/2009 Exide Site area is a cleanup plan of lead-impacted soil surrounding the former Exide Facility as designated by the DTSC. Date of Government Version: 7/17/2017

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: N/A
Telephone: N/A
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 05/13/2019
Date Data Arrived at EDR: 05/16/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 63

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/08/2019
Next Scheduled EDR Contact: 10/21/2019
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/15/2019
Date Data Arrived at EDR: 04/16/2019
Date Made Active in Reports: 06/21/2019
Number of Days to Update: 66

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 07/17/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 01/15/2019
Date Made Active in Reports: 03/07/2019
Number of Days to Update: 51

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 07/12/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Varies

Active & Inactive AST Inventory
A listing of active & inactive above ground petroleum storage tank site locations, located in the City of Los Angeles.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 54

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 06/25/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Varies

Methane Producing Landfills

This data was created on April 30, 2012 to represent known disposal sites in Los Angeles County that may produce and emanate methane gas. The shapefile contains disposal sites within Los Angeles County that once accepted degradable refuse material. Information used to create this data was extracted from a landfill survey performed by County Engineers (Major Waste System Map, 1973) as well as historical records from CalRecycle, Regional Water Quality Control Board, and Los Angeles County Department of Public Health

Date of Government Version: 04/30/2012
Date Data Arrived at EDR: 04/17/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 42

Source: Los Angeles County Department of Public Works
Telephone: 626-458-6973
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: No Update Planned

Active & Inactive Hazardous Materials Inventory

A listing of active & inactive hazardous materials facility locations, located in the City of Los Angeles.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 54

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 06/25/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Varies

Active & Inactive UST Inventory

A listing of active & inactive underground storage tank site locations and underground storage tank historical sites, located in the City of Los Angeles.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 54

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 06/25/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 04/08/2019
Date Data Arrived at EDR: 04/16/2019
Date Made Active in Reports: 06/21/2019
Number of Days to Update: 66

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 07/17/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 07/12/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: No Update Planned

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/04/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/20/2019
Date Data Arrived at EDR: 02/22/2019
Date Made Active in Reports: 03/07/2019
Number of Days to Update: 13

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 09/26/2018
Date Data Arrived at EDR: 10/04/2018
Date Made Active in Reports: 11/02/2018
Number of Days to Update: 29

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/29/2019
Date Data Arrived at EDR: 05/30/2019
Date Made Active in Reports: 07/22/2019
Number of Days to Update: 53

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 05/23/2019
Date Data Arrived at EDR: 05/30/2019
Date Made Active in Reports: 07/22/2019
Number of Days to Update: 53

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 05/23/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 02/05/2019
Date Data Arrived at EDR: 02/07/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 26
Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 06/28/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 02/21/2019
Date Data Arrived at EDR: 02/22/2019
Date Made Active in Reports: 03/08/2019
Number of Days to Update: 14
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/20/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9
Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/13/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/09/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 21
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/09/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 21
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 04/02/2019
Date Data Arrived at EDR: 05/07/2019
Date Made Active in Reports: 07/16/2019
Number of Days to Update: 70

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 02/28/2019
Date Data Arrived at EDR: 03/01/2019
Date Made Active in Reports: 04/12/2019
Number of Days to Update: 42

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 06/17/2019
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/12/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 18

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/11/2019
Date Data Arrived at EDR: 04/12/2019
Date Made Active in Reports: 06/20/2019
Number of Days to Update: 69

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
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: 02/05/2019
Date Data Arrived at EDR: 04/02/2019
Date Made Active in Reports: 06/18/2019
Number of Days to Update: 77

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 06/28/2019
Next Scheduled EDR Contact: 10/14/2019
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: 02/06/2019
Date Data Arrived at EDR: 04/02/2019
Date Made Active in Reports: 06/20/2019
Number of Days to Update: 79

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 06/28/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 03/11/2019
Date Data Arrived at EDR: 03/13/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 48

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 07/16/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

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: 05/31/2019
Date Data Arrived at EDR: 05/31/2019
Date Made Active in Reports: 07/22/2019
Number of Days to Update: 52

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/06/2019
Next Scheduled EDR Contact: 08/19/2019
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: 03/04/2019
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 04/02/2019
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/04/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 56
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

Local Oversight Program Listing
A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 04/24/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 63
Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
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: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: No Update Planned

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: 05/02/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: No Update Planned

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/05/2018
Date Data Arrived at EDR: 11/06/2018
Date Made Active in Reports: 12/14/2018
Number of Days to Update: 38
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/02/2019
Next Scheduled EDR Contact: 08/19/2019
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: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/17/2019
Next Scheduled EDR Contact: 09/30/2019
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/20/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 58

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 03/04/2019
Date Data Arrived at EDR: 03/13/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 47

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 03/29/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 61

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/10/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: No Update Planned

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 05/16/2019
Date Data Arrived at EDR: 05/23/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 56

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

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: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 05/24/2019
Next Scheduled EDR Contact: 09/09/2019
Data Release Frequency: No Update Planned

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/19/2019
Date Data Arrived at EDR: 05/23/2019
Date Made Active in Reports: 07/22/2019
Number of Days to Update: 60
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90
Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51
Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 09/02/2019
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/05/2019
Date Data Arrived at EDR: 03/07/2019
Date Made Active in Reports: 04/29/2019
Number of Days to Update: 53
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 47
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 06/18/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 29

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 06/19/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/03/2019
Date Data Arrived at EDR: 04/11/2019
Date Made Active in Reports: 04/30/2019
Number of Days to Update: 19

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 06/19/2019
Next Scheduled EDR Contact: 10/07/2019
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 12/11/2018
Date Data Arrived at EDR: 12/13/2018
Date Made Active in Reports: 01/15/2019
Number of Days to Update: 33

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 07/15/2019
Next Scheduled EDR Contact: 10/28/2019
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 06/03/2019
Date Data Arrived at EDR: 06/04/2019
Date Made Active in Reports: 07/23/2019
Number of Days to Update: 49

Source: Sutter County Environmental Health Services
Telephone: 530-822-7500
Last EDR Contact: 06/03/2019
Next Scheduled EDR Contact: 09/16/2019
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List
Cupa facilities

Date of Government Version: 05/20/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 07/18/2019
Number of Days to Update: 58

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 05/16/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 04/24/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 06/28/2019
Number of Days to Update: 64

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 05/09/2019
Date Data Arrived at EDR: 05/10/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 68

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 05/06/2019
Next Scheduled EDR Contact: 08/19/2019
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 07/19/2019
Next Scheduled EDR Contact: 11/04/2019
Data Release Frequency: Varies

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: 03/26/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 63

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
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: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: No Update Planned

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: 05/09/2019
Next Scheduled EDR Contact: 08/26/2019
Data Release Frequency: No Update Planned

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 03/26/2019
Date Data Arrived at EDR: 04/25/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 35

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 07/22/2019
Next Scheduled EDR Contact: 11/04/2019
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: 06/10/2019
Date Data Arrived at EDR: 06/12/2019
Date Made Active in Reports: 07/24/2019
Number of Days to Update: 42

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/12/2019
Next Scheduled EDR Contact: 09/23/2019
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 06/20/2019
Number of Days to Update: 76

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/26/2019
Next Scheduled EDR Contact: 10/14/2019
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List

CUPA facility listing for Yuba County.

Date of Government Version: 05/03/2019
Date Data Arrived at EDR: 05/07/2019
Date Made Active in Reports: 07/16/2019
Number of Days to Update: 70

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 04/25/2019
Next Scheduled EDR Contact: 08/12/2019
Data Release Frequency: Varies

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.

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). 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.

Electric Power Transmission Line Data

Source: PennWell Corporation

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GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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 was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

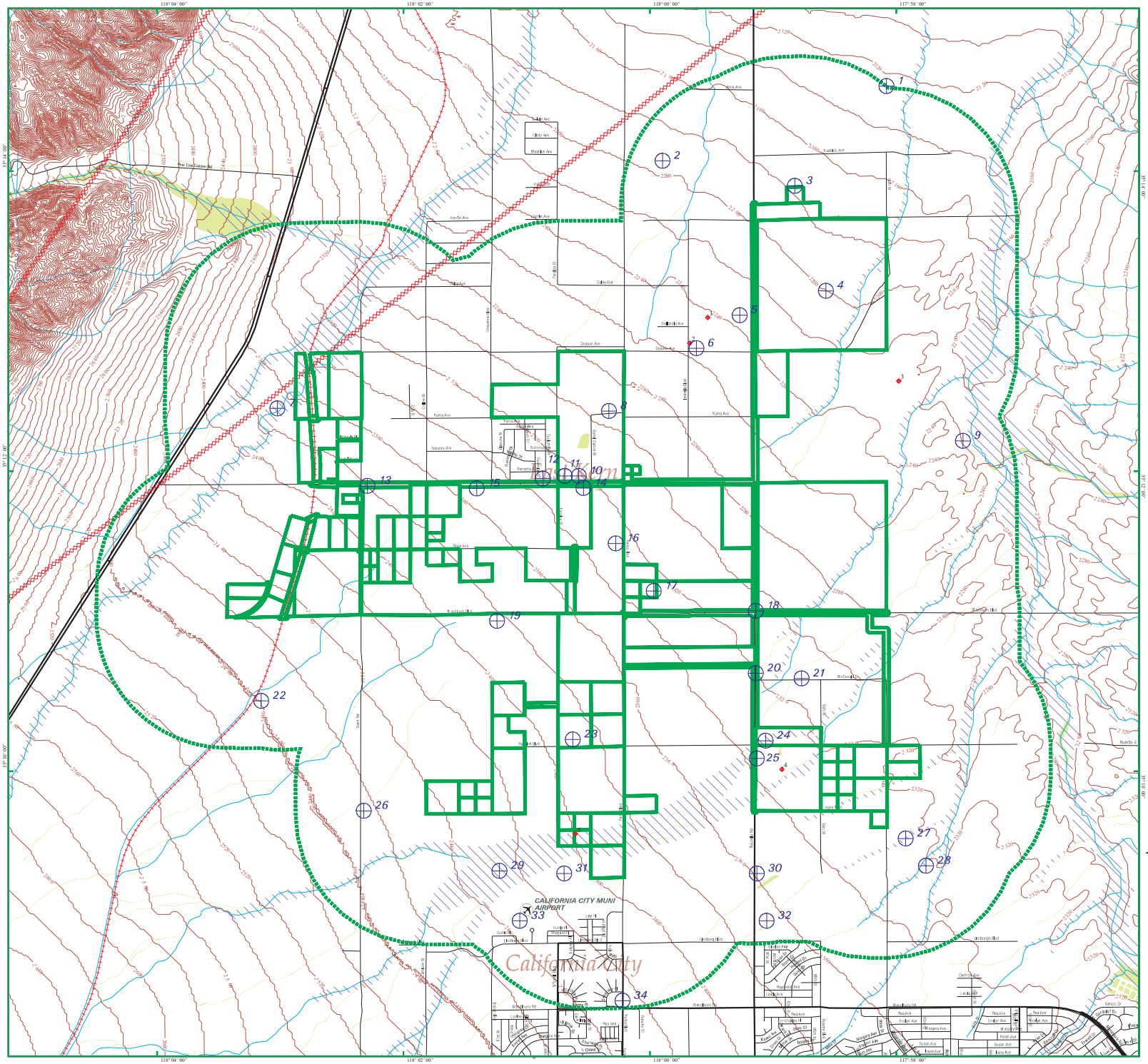
NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

STREET AND ADDRESS INFORMATION

EDR DataMap® Well Search

Kudo



- Listed Water Wells
- Oil & Gas Wells
- Study Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Fault Lines
- Water
- Superfund Sites
- 100-Yr Flood Zones
- Wetlands

California City, CA

0 1/2 1

Scale in Miles

EDR® Environmental Data Resources Inc

5756382.2s- 21 Aug 19

Kudo
California City, CA 93505

Inquiry Number: 5759392.2w
August 21, 2019

EDR DataMap™ Well Search Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID
2	USGS40000161644
3	USGS40000161611
4	USGS40000161498
5	USGS40000161484
5	USGS40000161470
6	USGS40000161434
7	USGS40000161363
8	USGS40000161360
9	USGS40000161344
10	USGS40000161309
12	USGS40000161304
13	USGS40000161300
14	USGS40000161295
15	USGS40000161296
16	USGS40000161234
17	USGS40000161194
18	USGS40000161179
19	USGS40000161176
19	USGS40000161177
20	USGS40000161136
21	USGS40000161132
22	USGS40000161122
23	USGS40000161100
24	USGS40000161096
23	USGS40000161097
23	USGS40000161098
25	USGS40000161086
26	USGS40000161057
27	USGS40000161036
28	USGS40000161015
29	USGS40000161014
30	USGS40000161011
31	USGS40000161012
34	USGS40000160917

STATE WATER WELL INFORMATION

MAP ID	WELL ID
1	CADWR8000016949
2	CADWR8000016908
3	CADWR8000016895
6	CADWR8000016784
7	CADWR8000016733
8	CADWR8000016730
9	CADWR8000016721
11	17892
10	CADWR8000016688
12	CADWR8000016686
13	CADWR8000016684
14	CADWR8000016681
15	CADWR8000016679
16	CADWR8000016633

GEOCHECK VERSION 2.1
SUMMARY

STATE WATER WELL INFORMATION

MAP ID	WELL ID
17	CADWR8000016601
18	CADWR8000016588
19	CADWR8000016586
20	CADWR8000016562
21	CADWR8000016560
23	CADWR8000016535
23	CADWR8000016534
24	CADWR8000016533
25	CADWR8000016526
26	CADWR8000016504
27	CADWR8000016492
28	CADWR8000016478
31	CADWR8000016476
30	CADWR8000016475
32	18194
33	18195
34	CADWR8000016395

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID
1	CAOG13000002552
2	CAOG13000002553
3	CAOG13000002554
4	CAOG13000002879
5	CAOG13000002878

PUBLIC WATER SUPPLY SYSTEM INFORMATION

NO WELLS FOUND

USGS TOPOGRAPHIC MAP(S)

35117-B8 CALIFORNIA CITY NORTH, CA
35118-B1 MOJAVE NE, CA

AREA RADON INFORMATION

Federal Area Radon Information for Zip Code: 93505

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.200 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

Federal EPA Radon Zone for KERN County: 2

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.

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.422 pCi/L	98%	2%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Water Well Information:

Map ID:	2		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E15L001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19800508	Well Depth:	350
Well Depth Units:	ft	Well Hole Depth:	350
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	2	Level reading date:	1980-05-08
Feet below surface:	237	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1980-05-08	Feet below surface:	237
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	3		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E14L001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Central Valley aquifer system		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19140101	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	2	Level reading date:	1953-01-22
Feet below surface:	196.60	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1929-10-01	Feet below surface:	184.50
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID: 4
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 031S037E23K001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: 19530101
Well Depth: 205
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Map ID: 5
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 031S037E22J001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: 275
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Map ID: 5
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 031S037E22R001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: 67
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Map ID: 6
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 031S037E22Q001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers

Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19140101	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	15	Level reading date:	1960-03-02
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		

Level reading date:	1959-12-02	Feet below surface:	298.21
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-03-10	Feet below surface:	274.83
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-11-05	Feet below surface:	273.73
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1957-11-22	Feet below surface:	269.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1957-11-01	Feet below surface:	269.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1957-03-06	Feet below surface:	268.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-11-27	Feet below surface:	267.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-03-22	Feet below surface:	265.99
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1955-11-15	Feet below surface:	265.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1955-03-02	Feet below surface:	262.93
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1954-12-03	Feet below surface:	262.14
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1954-03-15	Feet below surface:	260.15
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-01-22	Feet below surface:	257.77
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-09-30	Feet below surface:	253.00
Feet to sea level:	Not Reported	Note:	Not Reported

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	7		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E30F001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	331
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	21	Level reading date:	1978-03-28
Feet below surface:	0.00	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1976-03-08	Feet below surface:	322.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-10-16	Feet below surface:	322.12
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-06	Feet below surface:	321.42
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-10-23	Feet below surface:	321.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	320.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-10-02	Feet below surface:	324.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-15	Feet below surface:	325.65
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-10-12	Feet below surface:	327.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-15	Feet below surface:	319.99
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-27	Feet below surface:	319.58
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-17	Feet below surface:	318.87
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-21	Feet below surface:	318.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	318.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	321.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-20	Feet below surface:	327.82
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1967-01-04	Feet below surface:	313.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	307.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1930-03-05	Feet below surface:	300.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-10-03	Feet below surface:	300.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1917-10-03	Feet below surface:	304.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID: 8

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E28H001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	585
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	12	Level reading date:	1965-07-26
Feet below surface:	239.40	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1965-06-03	Feet below surface:	239.29
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-05-05	Feet below surface:	237.01
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-04-01	Feet below surface:	234.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-02-14	Feet below surface:	233.37
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-01-14	Feet below surface:	233.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-12-15	Feet below surface:	233.08
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-11-11	Feet below surface:	232.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-10-13	Feet below surface:	234.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-09-11	Feet below surface:	233.67

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-08-12	Feet below surface:	235.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-06-11	Feet below surface:	233.87
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	9		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E26K001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	6	Level reading date:	1958-01-30
Feet below surface:	244.36	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1958-01-01	Feet below surface:	244.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-08-16	Feet below surface:	237.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1930-03-05	Feet below surface:	231.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-09-30	Feet below surface:	231.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1918-02-06	Feet below surface:	233.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	10		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E28Q001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19560101	Well Depth:	600
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	1	Level reading date:	1958-01-28
Feet below surface:	243.43	Feet to sea level:	Not Reported
Note:	Not Reported		

Map ID: 12

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E28P001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19570101	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	1	Level reading date:	1958-01-28
Feet below surface:	266.33	Feet to sea level:	Not Reported
Note:	Not Reported		

Map ID: 13

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E32Z001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	349
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	1	Level reading date:	1917-10-03
Feet below surface:	307.00	Feet to sea level:	Not Reported
Note:	Not Reported		

Map ID: 14

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E33Z001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported

Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	2	Level reading date:	1930-03-05
Feet below surface:	256.18	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1929-09-30	Feet below surface:	255.78
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	15		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E32A001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	349
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	5	Level reading date:	1960-03-05
Feet below surface:	276.40	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1953-01-23	Feet below surface:	Not Reported
Feet to sea level:	Not Reported		
Note:	The site was dry (no water level recorded).		

Level reading date:	1930-03-05	Feet below surface:	276.40
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1929-10-01	Feet below surface:	276.20
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1917	Feet below surface:	274.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	16		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E33H001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	535
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	150	Level reading date:	2004-09-15
Feet below surface:	276.04	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	2004-09-15	Feet below surface:	276.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2004-03-30	Feet below surface:	275.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2004-03-30	Feet below surface:	275.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-09-16	Feet below surface:	275.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-09-16	Feet below surface:	275.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-03-25	Feet below surface:	275.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-03-25	Feet below surface:	275.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-09-17	Feet below surface:	275.62
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-09-17	Feet below surface:	275.62
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-03-27	Feet below surface:	275.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-03-27	Feet below surface:	275.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-09-11	Feet below surface:	275.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-09-11	Feet below surface:	275.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-03-22	Feet below surface:	275.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-03-22	Feet below surface:	275.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-09-13	Feet below surface:	275.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-09-13	Feet below surface:	275.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-03-22	Feet below surface:	275.35
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-03-22	Feet below surface:	275.35
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-11-17	Feet below surface:	275.87

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-11-17	Feet below surface:	275.87
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-03-17	Feet below surface:	274.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-03-17	Feet below surface:	274.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-11-04	Feet below surface:	275.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-11-04	Feet below surface:	275.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-03-18	Feet below surface:	274.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-03-18	Feet below surface:	274.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-11-17	Feet below surface:	275.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-11-17	Feet below surface:	275.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-03-05	Feet below surface:	275.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-03-05	Feet below surface:	275.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-11-14	Feet below surface:	275.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-11-14	Feet below surface:	275.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-04-15	Feet below surface:	275.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-04-15	Feet below surface:	275.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-12-06	Feet below surface:	275.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-12-06	Feet below surface:	275.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-04-17	Feet below surface:	275.88
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-04-17	Feet below surface:	275.88
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-10-27	Feet below surface:	276.69
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1994-10-27	Feet below surface:	276.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-04-13	Feet below surface:	276.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-04-13	Feet below surface:	276.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-11-18	Feet below surface:	277.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-11-18	Feet below surface:	277.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-04-21	Feet below surface:	277.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-04-21	Feet below surface:	277.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-11-04	Feet below surface:	278.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-11-04	Feet below surface:	278.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-04-16	Feet below surface:	277.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-04-16	Feet below surface:	277.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-10-22	Feet below surface:	278.27
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-10-22	Feet below surface:	278.27
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-03-22	Feet below surface:	278.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-03-22	Feet below surface:	278.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-10-15	Feet below surface:	282.18
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-10-15	Feet below surface:	282.18
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-03-14	Feet below surface:	278.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-03-14	Feet below surface:	278.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-10-18	Feet below surface:	280.77
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-10-18	Feet below surface:	280.77
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1989-03-21	Feet below surface:	278.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-03-21	Feet below surface:	278.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1988-03-29	Feet below surface:	280.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1988-03-29	Feet below surface:	280.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-11-04	Feet below surface:	280.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-11-04	Feet below surface:	280.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	276.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	276.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-10-23	Feet below surface:	280.15
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-10-23	Feet below surface:	280.15
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-03-26	Feet below surface:	277.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-03-26	Feet below surface:	277.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-10-31	Feet below surface:	278.42
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-10-31	Feet below surface:	278.42
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-05-16	Feet below surface:	278.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-05-16	Feet below surface:	278.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-10-30	Feet below surface:	278.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-10-30	Feet below surface:	278.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	276.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	276.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-10-27	Feet below surface:	278.19
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1983-10-27	Feet below surface:	278.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	277.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	277.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-10-07	Feet below surface:	279.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-10-07	Feet below surface:	279.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	274.14
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	274.14
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-11-19	Feet below surface:	279.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-11-19	Feet below surface:	279.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-16	Feet below surface:	278.85
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-16	Feet below surface:	278.85
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-10-15	Feet below surface:	281.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-10-15	Feet below surface:	281.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	279.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	279.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-10-24	Feet below surface:	279.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-10-24	Feet below surface:	279.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-13	Feet below surface:	275.26
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-13	Feet below surface:	275.26
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	277.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	277.40
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1977-03-08	Feet below surface:	279.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-08	Feet below surface:	279.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	276.78
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	276.78
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-01-06	Feet below surface:	275.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-01-06	Feet below surface:	275.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-05	Feet below surface:	273.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-05	Feet below surface:	273.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	275.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	275.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-15	Feet below surface:	272.73
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-15	Feet below surface:	272.73
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-15	Feet below surface:	280.31
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-15	Feet below surface:	280.31
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	277.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	277.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-17	Feet below surface:	279.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-17	Feet below surface:	279.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	278.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	278.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	279.10
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1970-03-17	Feet below surface:	279.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	277.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	277.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-21	Feet below surface:	277.83
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-21	Feet below surface:	277.83
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-04	Feet below surface:	269.34
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-04	Feet below surface:	269.34
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-04-01	Feet below surface:	268.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-04-01	Feet below surface:	268.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-01-14	Feet below surface:	267.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-01-14	Feet below surface:	267.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-12-15	Feet below surface:	267.52
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-12-15	Feet below surface:	267.52
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-10-13	Feet below surface:	268.23
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-10-13	Feet below surface:	268.23
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-09-11	Feet below surface:	268.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-09-11	Feet below surface:	268.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	274.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	274.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-02-04	Feet below surface:	270.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-02-04	Feet below surface:	270.00
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1958-01-28	Feet below surface:	274.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	274.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-06-19	Feet below surface:	230.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-06-19	Feet below surface:	230.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID: 17

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E34A001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19140101	Well Depth:	205
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	8	Level reading date:	1958-01-29
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		
Level reading date:	1958-01-29	Feet below surface:	Not Reported
Feet to sea level:	Not Reported		
Note:	The site was dry (no water level recorded).		
Level reading date:	1953-01-22	Feet below surface:	200.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-01-22	Feet below surface:	200.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1930-03-05	Feet below surface:	201.11
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1930-03-05	Feet below surface:	201.11
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-10-01	Feet below surface:	200.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-10-01	Feet below surface:	200.61
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	18		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	031S037E35N001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19520101	Well Depth:	405.25
Well Depth Units:	ft	Well Hole Depth:	444
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	97	Level reading date:	2004-09-15
Feet below surface:	254.16	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	2004-03-30	Feet below surface:	253.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-09-16	Feet below surface:	254.02
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2003-03-25	Feet below surface:	254.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-09-17	Feet below surface:	254.31
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2002-03-27	Feet below surface:	253.94
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-09-11	Feet below surface:	254.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-03-22	Feet below surface:	253.81
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-09-13	Feet below surface:	254.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-03-22	Feet below surface:	254.52
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-11-17	Feet below surface:	254.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-03-17	Feet below surface:	253.76
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-11-04	Feet below surface:	254.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-03-18	Feet below surface:	254.11
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-11-17	Feet below surface:	254.66
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-03-05	Feet below surface:	254.60
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1996-11-14	Feet below surface:	254.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-04-15	Feet below surface:	255.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-12-06	Feet below surface:	255.85
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-04-17	Feet below surface:	256.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-10-27	Feet below surface:	256.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-04-13	Feet below surface:	257.44
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-11-18	Feet below surface:	257.46
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-04-21	Feet below surface:	257.54
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-11-04	Feet below surface:	258.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-04-16	Feet below surface:	256.53
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-10-22	Feet below surface:	257.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-04-18	Feet below surface:	257.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-10-15	Feet below surface:	259.60
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-03-14	Feet below surface:	258.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-10-18	Feet below surface:	258.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-03-21	Feet below surface:	257.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1988-03-29	Feet below surface:	257.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-11-04	Feet below surface:	258.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	255.76
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-10-23	Feet below surface:	257.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-03-26	Feet below surface:	255.35
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1985-10-31	Feet below surface:	256.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-05-16	Feet below surface:	256.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-10-30	Feet below surface:	256.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	256.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-10-27	Feet below surface:	256.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	256.03
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-10-07	Feet below surface:	256.66
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	254.84
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-11-19	Feet below surface:	255.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-16	Feet below surface:	256.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-10-15	Feet below surface:	257.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	258.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-10-24	Feet below surface:	261.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-13	Feet below surface:	255.37
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-10-16	Feet below surface:	255.89
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	254.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-10-12	Feet below surface:	256.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-08	Feet below surface:	256.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-11-03	Feet below surface:	254.89
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	254.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-10-16	Feet below surface:	255.45
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1975-02-05	Feet below surface:	251.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-10-23	Feet below surface:	253.18
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	251.60
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-10-02	Feet below surface:	254.01
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-14	Feet below surface:	253.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-10-12	Feet below surface:	254.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-15	Feet below surface:	253.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	253.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-17	Feet below surface:	252.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	250.65
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	249.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-09-18	Feet below surface:	255.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	267.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-10-31	Feet below surface:	249.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-21	Feet below surface:	248.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-10-11	Feet below surface:	248.12
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-04-12	Feet below surface:	247.33
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-04	Feet below surface:	247.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1966-10-17	Feet below surface:	246.37
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1966-03-09	Feet below surface:	244.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-10-18	Feet below surface:	244.00
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1965-03-16	Feet below surface:	242.54
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-10-07	Feet below surface:	242.68
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-03-04	Feet below surface:	244.49
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-11-07	Feet below surface:	244.41
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-03-13	Feet below surface:	244.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1962-11-09	Feet below surface:	243.73
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1962-03-15	Feet below surface:	245.18
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-11-14	Feet below surface:	245.49
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-02-27	Feet below surface:	246.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1960-11-10	Feet below surface:	245.60
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1960-03-02	Feet below surface:	247.38
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-12-02	Feet below surface:	247.92
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-03-10	Feet below surface:	246.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-03-04	Feet below surface:	243.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-03-01	Feet below surface:	244.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-30	Feet below surface:	244.08
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-04-14	Feet below surface:	292.50
Feet to sea level:	Not Reported	Note:	The site was being pumped.
Level reading date:	1953-01-22	Feet below surface:	230.79
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	19		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E04D001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19520101	Well Depth:	650
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	6	Level reading date:	1967-01-04
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		
Level reading date:	1961-07-26	Feet below surface:	312.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-02-04	Feet below surface:	323.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	335.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-04-17	Feet below surface:	365.00
Feet to sea level:	Not Reported	Note:	The site was being pumped.
Level reading date:	1953-01-23	Feet below surface:	301.06
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	19		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E04D002M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Map ID:	20		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E02E001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported

Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	6
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	3	Level reading date:	1930-02-25
Feet below surface:	242.63	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1929-09-30	Feet below surface:	251.40
Feet to sea level:	Not Reported		
Note:	The site had been pumped recently.		

Level reading date:	1917	Feet below surface:	244.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	21		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E02F001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	206
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	2	Level reading date:	1958-01-30
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		

Level reading date:	1953-02-09	Feet below surface:	232.41
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	22		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E06L001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	85
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Map ID: 23
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 032S037E04Q001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: 427
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Ground water levels,Number of Measurements: 8
Level reading date: 1957-03-06
Feet below surface: Not Reported
Feet to sea level: Not Reported
Note: The site was dry (no water level recorded).

Level reading date: 1956-11-27
Feet below surface: Not Reported
Feet to sea level: Not Reported
Note: The site was dry (no water level recorded).

Level reading date: 1956-03-22
Feet below surface: 317.87
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 1955-03-02
Feet below surface: 310.64
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 1954-03-15
Feet below surface: 315.55
Feet to sea level: Not Reported
Note: A nearby site that taps the same aquifer was being pumped.

Level reading date: 1953-01-23
Feet below surface: 302.98
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 1930-02-25
Feet below surface: 304.30
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 1929-09-30
Feet below surface: 303.20
Feet to sea level: Not Reported
Note: Not Reported

Map ID: 24
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 032S037E01N001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: Not Reported
Well Depth Units: Not Reported
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Ground water levels,Number of Measurements: 18
Level reading date: 1967-01-04
Feet below surface: Not Reported
Feet to sea level: Not Reported
Note: The site was dry (no water level recorded).

Level reading date:	1961-02-27	Feet below surface:	Not Reported
Feet to sea level:	Not Reported		
Note:	The site was dry (no water level recorded).		
Level reading date:	1960-11-10	Feet below surface:	230.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1960-03-02	Feet below surface:	230.83
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-12-02	Feet below surface:	231.14
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-03-10	Feet below surface:	230.49
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-11-05	Feet below surface:	231.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-02-03	Feet below surface:	229.71
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-02-01	Feet below surface:	230.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1957-11-22	Feet below surface:	230.11
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1957-03-06	Feet below surface:	229.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-11-27	Feet below surface:	227.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-03-22	Feet below surface:	225.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1955-11-15	Feet below surface:	225.43
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1955-03-02	Feet below surface:	225.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1954-12-03	Feet below surface:	226.03
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1954-03-15	Feet below surface:	226.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-02-09	Feet below surface:	223.59
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	23		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E04P001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	800
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	4	Level reading date:	1976-09-06
Feet below surface:	326.24	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1961-07-26	Feet below surface:	318.58
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	339.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1952-01-01	Feet below surface:	265.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	23		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E04P002M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	812
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Map ID:	25		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E02N001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	90
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	3	Level reading date:	1953-01-22
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		
Level reading date:	1930-02-25	Feet below surface:	252.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1929-09-30	Feet below surface:	251.82
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	26		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E08E001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	410
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	3	Level reading date:	1952-09-18
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		
Level reading date:	1917-01-01	Feet below surface:	370.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1917	Feet below surface:	370.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	27		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E12M001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	1957	Well Depth:	430.82
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	41	Level reading date:	2004-03-30
Feet below surface:	249.36	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	2003-03-26	Feet below surface:	249.52
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	2002-03-27	Feet below surface:	249.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-03-23	Feet below surface:	249.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-03-22	Feet below surface:	248.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-03-16	Feet below surface:	Not Reported
Feet to sea level:	Not Reported		
Note:	An obstruction was encountered in the well above the water surface (no water level recorded).		
Level reading date:	1998-03-18	Feet below surface:	248.22
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-03-07	Feet below surface:	248.07
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-04-15	Feet below surface:	247.85
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-04-18	Feet below surface:	247.53
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-04-13	Feet below surface:	247.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-04-22	Feet below surface:	247.35
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-04-16	Feet below surface:	247.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-04-19	Feet below surface:	246.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-03-14	Feet below surface:	246.60
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-03-24	Feet below surface:	245.87
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1988-03-30	Feet below surface:	245.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	244.87
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-03-26	Feet below surface:	245.31
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-05-16	Feet below surface:	245.01
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	244.76
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	244.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	244.37

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-16	Feet below surface:	244.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	244.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-13	Feet below surface:	244.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	243.33
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-07	Feet below surface:	243.29
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	243.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-05	Feet below surface:	242.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	242.35
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-14	Feet below surface:	242.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-16	Feet below surface:	242.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	244.33
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-18	Feet below surface:	242.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	242.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	242.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	242.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-20	Feet below surface:	242.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-04	Feet below surface:	243.22
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-01	Feet below surface:	243.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID: 28
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 032S037E12P001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: Not Reported
Well Depth Units: Not Reported
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Ground water levels,Number of Measurements: 1
Level reading date: 1967-04-01
Feet below surface: 279.00
Feet to sea level: Not Reported
Note: Not Reported

Map ID: 29
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 032S037E09Z001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: Not Reported
Well Depth: 2232
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Map ID: 30
Organization ID: USGS-CA
Organization Name: USGS California Water Science Center
Monitor Location: 032S037E11N001M
Type: Well
Description: Not Reported
HUC: 18090206
Drainage Area: Not Reported
Drainage Area Units: Not Reported
Contrib Drainage Area: Not Reported
Contrib Drainage Area Unts: Not Reported
Aquifer: Basin and Range basin-fill aquifers
Formation Type: Not Reported
Aquifer Type: Not Reported
Construction Date: 19520101
Well Depth: 600
Well Depth Units: ft
Well Hole Depth: Not Reported
Well Hole Depth Units: Not Reported

Ground water levels,Number of Measurements: 66
Level reading date: 2004-03-30
Feet below surface: 295.48
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 2003-03-26
Feet below surface: 295.14
Feet to sea level: Not Reported
Note: Not Reported

Level reading date: 2002-03-27
Feet below surface: 294.52

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2001-03-23	Feet below surface:	294.20
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	2000-03-22	Feet below surface:	293.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1999-03-17	Feet below surface:	293.54
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1998-03-18	Feet below surface:	292.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1997-03-07	Feet below surface:	292.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1996-04-15	Feet below surface:	292.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1995-04-18	Feet below surface:	291.88
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-04-13	Feet below surface:	291.66
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-04-21	Feet below surface:	291.27
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1992-04-16	Feet below surface:	297.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1991-04-19	Feet below surface:	286.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1990-03-14	Feet below surface:	293.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1989-03-21	Feet below surface:	292.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1988-03-30	Feet below surface:	293.24
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	292.38
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-03-26	Feet below surface:	291.68
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1985-05-16	Feet below surface:	287.26
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	286.31
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	286.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	285.91
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1981-04-16	Feet below surface:	285.78
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	289.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	287.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-07	Feet below surface:	284.15
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	283.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-05	Feet below surface:	283.17
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	282.26
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-14	Feet below surface:	281.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-15	Feet below surface:	281.38
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	281.54
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-17	Feet below surface:	280.68
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	281.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	280.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-09-18	Feet below surface:	280.88
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	279.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-10-31	Feet below surface:	280.27
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-21	Feet below surface:	279.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-10-11	Feet below surface:	279.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-04-12	Feet below surface:	279.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-04	Feet below surface:	279.48
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1966-10-17	Feet below surface:	279.66
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1966-03-09	Feet below surface:	279.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-10-18	Feet below surface:	279.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-03-16	Feet below surface:	279.47
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-10-07	Feet below surface:	279.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1964-03-04	Feet below surface:	279.67
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-11-08	Feet below surface:	279.97
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-03-13	Feet below surface:	280.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1962-11-09	Feet below surface:	279.88
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1962-03-15	Feet below surface:	280.02
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-11-14	Feet below surface:	280.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	275.58
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-02-27	Feet below surface:	280.51
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1960-11-10	Feet below surface:	280.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1960-03-02	Feet below surface:	281.29
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-12-02	Feet below surface:	281.63
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-03-10	Feet below surface:	281.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-11-05	Feet below surface:	280.77
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-03-04	Feet below surface:	279.08
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-03-01	Feet below surface:	279.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-30	Feet below surface:	280.18
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-05-01	Feet below surface:	389.00
Feet to sea level:	Not Reported	Note:	The site was being pumped.

Level reading date:	1953-01-22	Feet below surface:	268.09
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	31		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E09Q001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	711
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	28	Level reading date:	1993-06-10
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was dry (no water level recorded).		

Level reading date:	1988-03-29	Feet below surface:	341.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1987-02-23	Feet below surface:	337.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1986-04-23	Feet below surface:	341.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-07	Feet below surface:	335.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-14	Feet below surface:	335.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-11	Feet below surface:	335.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-16	Feet below surface:	336.07
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-16	Feet below surface:	337.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-14	Feet below surface:	335.87
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-28	Feet below surface:	335.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-08	Feet below surface:	334.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-02-12	Feet below surface:	333.65
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1975-02-05	Feet below surface:	333.25

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1974-02-12	Feet below surface:	332.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1973-02-14	Feet below surface:	331.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1972-03-16	Feet below surface:	331.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-10-28	Feet below surface:	332.44
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1971-03-18	Feet below surface:	332.10
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-10-22	Feet below surface:	330.76
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1970-03-17	Feet below surface:	328.96
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1969-04-15	Feet below surface:	328.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1968-03-21	Feet below surface:	327.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1967-01-03	Feet below surface:	328.81
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	327.91
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	364.67
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-06-19	Feet below surface:	275.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-04-15	Feet below surface:	275.00
Feet to sea level:	Not Reported	Note:	Not Reported

Map ID:	34		
Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	032S037E16R001M	Type:	Well
Description:	Not Reported	HUC:	18090206
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19520101	Well Depth:	686
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Ground water levels,Number of Measurements:	18	Level reading date:	2004-08-11
Feet below surface:	Not Reported	Feet to sea level:	Not Reported
Note:	The site was being pumped.		
Level reading date:	2004-08-11	Feet below surface:	Not Reported
Feet to sea level:	Not Reported	Note:	The site was being pumped.
Level reading date:	2003-08-27	Feet below surface:	Not Reported
Feet to sea level:	Not Reported	Note:	The site was being pumped.
Level reading date:	2003-08-27	Feet below surface:	Not Reported
Feet to sea level:	Not Reported	Note:	The site was being pumped.
Level reading date:	1965-10-28	Feet below surface:	345.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1965-10-28	Feet below surface:	345.70
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-06-03	Feet below surface:	339.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1963-06-03	Feet below surface:	339.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	347.12
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1961-07-26	Feet below surface:	347.12
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-02-04	Feet below surface:	358.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1959-02-04	Feet below surface:	358.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	385.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1958-01-28	Feet below surface:	385.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-06-19	Feet below surface:	390.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1956-06-19	Feet below surface:	390.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-04-30	Feet below surface:	390.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1953-04-30	Feet below surface:	390.00
Feet to sea level:	Not Reported	Note:	Not Reported

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Water Well Information:

Map ID:	1		
State Well #:	31S37E12N001M	Station ID:	24180
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	2		
State Well #:	31S37E15L001M	Station ID:	38461
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	3		
State Well #:	31S37E14L001M	Station ID:	24183
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	6		
State Well #:	31S37E22Q001M	Station ID:	24184
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	7		
State Well #:	31S37E30F001M	Station ID:	24187
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	8		
State Well #:	31S37E28H001M	Station ID:	24185
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	9		
State Well #:	31S37E26K001M	Station ID:	38521
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	11

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Seq:	17892	Prim sta c:	31S/37E-28P02 M
Frds no:	1500333001	County:	15
District:	12	User id:	CYA
System no:	1500333	Water type:	G
Source nam:	WELL 01 - TREATED	Station ty:	WELL/AMBNT/MUN/INTAKE
Latitude:	351158.9	Longitude:	1180038.2
Precision:	3	Status:	AT
Comment 1:	500' N OF PHILLIPS RD, 325' W OF YUCAIPA ON SANOMA ST IN FREEMONT		
Comment 2:	VALLEY CA	Comment 3:	Not Reported
Comment 4:	Not Reported	Comment 5:	Not Reported
Comment 6:	Not Reported	Comment 7:	Not Reported

System no:	1500333	System nam:	ANTELOPE VALLEY WATER COMPANY
Hqname:	Not Reported	Address:	PHILLIPS RD & HWY 14
City:	MOJAVE	State:	CA
Zip:	93501	Zip ext:	Not Reported
Pop serv:	200	Connection:	71
Area serve:	Not Reported		

Sample date:	25-APR-17	Finding:	0.512
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		

Sample date:	12-APR-16	Finding:	0.655
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		

Sample date:	08-MAR-16	Finding:	450.
Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	0.17
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		

Sample date:	08-MAR-16	Finding:	100.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		

Sample date:	08-MAR-16	Finding:	76.
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	4.1
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	87.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	12.
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	52.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	180.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		

Sample date:	08-MAR-16	Finding:	0.48
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	08-MAR-16	Finding:	190.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	160.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	7.2
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	730.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	7.24
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	25.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	130.6
Chemical:	IRON	Report units:	UG/L
Dlr:	100.		
Sample date:	08-MAR-16	Finding:	508.2
Chemical:	BORON	Report units:	UG/L
Dlr:	100.		
Sample date:	08-MAR-16	Finding:	4.115
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	83.97
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	12.67
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	53.53
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	08-MAR-16	Finding:	0.48
Chemical:	TURBIDITY, LABORATORY	Report units:	NTU
Dlr:	0.1		
Sample date:	08-MAR-16	Finding:	12.
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-JUL-15	Finding:	27.4
Chemical:	SOURCE TEMPERATURE C	Report units:	C

Dlr:	0.		
Sample date:	14-JUL-15	Finding:	7.69
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-JUN-15	Finding:	27.2
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	09-JUN-15	Finding:	7.33
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	12-MAY-15	Finding:	27.3
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	12-MAY-15	Finding:	7.
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	21-APR-15	Finding:	7.
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	21-APR-15	Finding:	26.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	21-APR-15	Finding:	0.63
Chemical:	RADIUM 228 MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	21-APR-15	Finding:	7.
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	21-APR-15	Finding:	26.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	21-APR-15	Finding:	2.9
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	21-APR-15	Finding:	3.
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	21-APR-15	Finding:	0.4
Chemical:	RADIUM 226 MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	14-APR-15	Finding:	5.074
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	14-APR-15	Finding:	27.4
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		

Sample date:	14-APR-15	Finding:	7.2
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	07-APR-15	Finding:	2.017
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	10-MAR-15	Finding:	7.64
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	10-MAR-15	Finding:	27.2
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	10-FEB-15	Finding:	26.3
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	10-FEB-15	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-JAN-15	Finding:	7.2
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-JAN-15	Finding:	25.2
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	09-DEC-14	Finding:	26.1
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	09-DEC-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-NOV-14	Finding:	26.1
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	13-NOV-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-OCT-14	Finding:	7.9
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-OCT-14	Finding:	28.3
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	13-OCT-14	Finding:	2.
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		
Sample date:	16-SEP-14	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported

Dlr:	0.		
Sample date:	16-SEP-14	Finding:	28.3
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	09-SEP-14	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	27.5
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	7.3
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	19-AUG-14	Finding:	7.4
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	19-AUG-14	Finding:	27.7
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	12-AUG-14	Finding:	7.5
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	08-JUL-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	10-JUN-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-MAY-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-APR-14	Finding:	1.8
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		
Sample date:	01-APR-14	Finding:	2.021
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	11-MAR-14	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	11-FEB-14	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-JAN-14	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		

Sample date:	17-DEC-13	Finding:	4.744
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	10-DEC-13	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	12-NOV-13	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	15-OCT-13	Finding:	2.2
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		
Sample date:	08-OCT-13	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	10-SEP-13	Finding:	7.4
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-AUG-13	Finding:	7.3
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-JUL-13	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	11-JUN-13	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-MAY-13	Finding:	8.
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	16-APR-13	Finding:	4.
Chemical:	ODOR THRESHOLD @ 60 C	Report units:	TON
Dlr:	1.		
Sample date:	09-APR-13	Finding:	8.4
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-APR-13	Finding:	2.389
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	13-MAR-13	Finding:	13.
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	2.9
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	13-MAR-13	Finding:	0.56
Chemical:	LANGELIER INDEX @ 60 C	Report units:	Not Reported

Dlr:	0.		
Sample date:	13-MAR-13	Finding:	470.
Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	0.17
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		
Sample date:	13-MAR-13	Finding:	80.
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	4.2
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	85.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	12.
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	52.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	180.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	190.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	160.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	8.2
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	750.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	8.4
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	27.1
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	8.4
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		

Sample date:	13-MAR-13	Finding:	27.1
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	13-MAR-13	Finding:	110.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		
Sample date:	12-MAR-13	Finding:	8.3
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	12-MAR-13	Finding:	550.
Chemical:	BORON	Report units:	UG/L
Dlr:	100.		
Sample date:	08-JAN-13	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	11-DEC-12	Finding:	7.5
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-NOV-12	Finding:	7.6
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-OCT-12	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	11-SEP-12	Finding:	7.9
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	14-AUG-12	Finding:	7.9
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	10-JUL-12	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	12-JUN-12	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	08-MAY-12	Finding:	7.7
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-MAY-12	Finding:	2.275
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	10-APR-12	Finding:	7.8
Chemical:	PH, FIELD	Report units:	Not Reported
Dlr:	0.		
Sample date:	13-MAR-12	Finding:	7.4
Chemical:	PH, FIELD	Report units:	Not Reported

Dlr: 0.

Sample date: 14-FEB-12 Finding: 7.9
Chemical: PH, FIELD Report units: Not Reported
Dlr: 0.

Sample date: 10-JAN-12 Finding: 7.5
Chemical: PH, FIELD Report units: Not Reported
Dlr: 0.

Map ID: 10
State Well #: 31S37E28Q001M Station ID: 38522
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

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Map ID: 12
State Well #: 31S37E28P001M Station ID: 24186
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

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Map ID: 13
State Well #: 31S37E32Z001M Station ID: 24188
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

---

Map ID: 14
State Well #: 31S37E33Z001M Station ID: 24189
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

---

Map ID: 15
State Well #: 31S37E32A001M Station ID: 38523
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

---

Map ID: 16
State Well #: 31S37E33H001M Station ID: 38524
Well Name: Not Reported Well Use: Unknown
Well Type: Unknown Well Depth: 0
Basin Name: Fremont Valley Well Completion Rpt #: Not Reported

---

Map ID: 17

State Well #:	31S37E34A001M	Station ID:	24190
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	18		
State Well #:	31S37E35N001M	Station ID:	38525
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	19		
State Well #:	32S37E04D001M	Station ID:	37260
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	20		
State Well #:	32S37E02E001M	Station ID:	21571
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	21		
State Well #:	32S37E02F001M	Station ID:	37259
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	23		
State Well #:	32S37E04Q001M	Station ID:	21574
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	23		
State Well #:	32S37E04P001M	Station ID:	21573
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	24

State Well #:	32S37E01N001M	Station ID:	37258
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	25		
State Well #:	32S37E02N001M	Station ID:	21572
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	26		
State Well #:	32S37E08E001M	Station ID:	37261
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	27		
State Well #:	32S37E12M001M	Station ID:	21576
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	28		
State Well #:	32S37E12P001M	Station ID:	21577
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	31		
State Well #:	32S37E09Q001M	Station ID:	21575
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	30		
State Well #:	32S37E11N001M	Station ID:	37262
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

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Map ID:	32

Seq:	18194	Prim sta c:	32S/37E-14N01 M
Frds no:	1510032004	County:	15
District:	12	User id:	CYA
System no:	1510032	Water type:	G
Source nam:	WELL 04 - DESTROYED	Station ty:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Latitude:	350900.0	Longitude:	1175900.0
Precision:	4	Status:	DS
Comment 1:	Not Reported	Comment 2:	Not Reported
Comment 3:	Not Reported	Comment 4:	Not Reported
Comment 5:	Not Reported	Comment 6:	Not Reported
Comment 7:	Not Reported		

System no:	1510032	System nam:	CALIFORNIA CITY, CITY OF
Hqname:	Not Reported	Address:	21000 HACIENDA BLVD
City:	CALIFORNIA CITY	State:	CA
Zip:	93505	Zip ext:	Not Reported
Pop serv:	10000	Connection:	2992
Area serve:	CALIFORNIA CITY		

Map ID:	33		
Seq:	18195	Prim sta c:	32S/37E-16N01 M
Frds no:	1510032006	County:	15
District:	12	User id:	CYA
System no:	1510032	Water type:	G
Source nam:	WELL 14 - CHLORINATION	Station ty:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Latitude:	350900.0	Longitude:	1180100.0
Precision:	4	Status:	AT
Comment 1:	Not Reported	Comment 2:	Not Reported
Comment 3:	Not Reported	Comment 4:	Not Reported
Comment 5:	Not Reported	Comment 6:	Not Reported
Comment 7:	Not Reported		

System no:	1510032	System nam:	CALIFORNIA CITY, CITY OF
Hqname:	Not Reported	Address:	21000 HACIENDA BLVD
City:	CALIFORNIA CITY	State:	CA
Zip:	93505	Zip ext:	Not Reported
Pop serv:	10000	Connection:	2992
Area serve:	CALIFORNIA CITY		

Sample date:	25-JAN-18	Finding:	0.59
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		

Sample date:	01-AUG-17	Finding:	210.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		

Sample date:	01-AUG-17	Finding:	1.06
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		

Sample date:	01-AUG-17	Finding:	0.572
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		

Sample date:	01-AUG-17	Finding:	0.19
Chemical:	TURBIDITY, LABORATORY	Report units:	NTU
Dlr:	0.1		

Sample date:	01-AUG-17	Finding:	470.

Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	7.3
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	01-AUG-17	Finding:	25.
Chemical:	BARIUM	Report units:	UG/L
Dlr:	100.		
Sample date:	01-AUG-17	Finding:	4.4
Chemical:	ARSENIC	Report units:	UG/L
Dlr:	2.		
Sample date:	01-AUG-17	Finding:	0.297
Chemical:	RADIUM 228 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	0.672
Chemical:	RADIUM 228 MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	1.
Chemical:	COLOR	Report units:	UNITS
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	789.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	8.09
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	180.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	0.6
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	01-AUG-17	Finding:	130.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	36.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	9.9
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	140.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	3.1
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		

Sample date:	01-AUG-17	Finding:	81.
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		
Sample date:	01-AUG-17	Finding:	93.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		
Sample date:	01-AUG-17	Finding:	1.1
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		
Sample date:	16-MAR-17	Finding:	0.79
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	02-JUN-16	Finding:	0.423
Chemical:	RADIUM 226 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	02-JUN-16	Finding:	0.498
Chemical:	RADIUM 228 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	29-MAR-16	Finding:	0.58
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	27-AUG-15	Finding:	1.02
Chemical:	RADIUM 226 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	27-AUG-15	Finding:	0.41
Chemical:	RADIUM 228 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	27-AUG-15	Finding:	1.28
Chemical:	RADIUM 226	Report units:	PCI/L
Dlr:	1.		
Sample date:	26-AUG-15	Finding:	7.1
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	07-MAY-15	Finding:	6.9
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	27-MAR-15	Finding:	3.
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	23-FEB-15	Finding:	2.5
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		
Sample date:	25-AUG-14	Finding:	1.3
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		
Sample date:	25-AUG-14	Finding:	1.16
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L

Dlr:	0.		
Sample date:	25-AUG-14	Finding:	0.381
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	6.07
Chemical:	GROSS ALPHA	Report units:	PCI/L
Dlr:	3.		
Sample date:	25-AUG-14	Finding:	2.1
Chemical:	TOTAL TRIHALOMETHANES	Report units:	UG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	2.9
Chemical:	TURBIDITY, LABORATORY	Report units:	NTU
Dlr:	0.1		
Sample date:	25-AUG-14	Finding:	1.
Chemical:	COLOR	Report units:	UNITS
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	803.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	8.18
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	180.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	220.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	110.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	30.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	8.6
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	140.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	3.1
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	80.
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		

Sample date:	25-AUG-14	Finding:	94.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		
Sample date:	25-AUG-14	Finding:	4.4
Chemical:	ARSENIC	Report units:	UG/L
Dlr:	2.		
Sample date:	25-AUG-14	Finding:	25.
Chemical:	BARIUM	Report units:	UG/L
Dlr:	100.		
Sample date:	25-AUG-14	Finding:	14.
Chemical:	CHROMIUM (TOTAL)	Report units:	UG/L
Dlr:	10.		
Sample date:	25-AUG-14	Finding:	1000.
Chemical:	IRON	Report units:	UG/L
Dlr:	100.		
Sample date:	25-AUG-14	Finding:	1.7
Chemical:	BROMOFORM (THM)	Report units:	UG/L
Dlr:	1.		
Sample date:	25-AUG-14	Finding:	570.
Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		
Sample date:	25-AUG-14	Finding:	2.2
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	30-MAY-14	Finding:	2.1
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	01-OCT-13	Finding:	2.7
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	23-AUG-12	Finding:	9.97
Chemical:	GROSS ALPHA	Report units:	PCI/L
Dlr:	3.		
Sample date:	23-AUG-12	Finding:	0.492
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	23-AUG-12	Finding:	1.64
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	23-MAR-12	Finding:	3.1
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		

Map ID:	34		
State Well #:	32S37E16R001M	Station ID:	21578
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Basin Name:	Fremont Valley	Well Completion Rpt #:	Not Reported

---

Map ID:	1		
API #:	0402932416	Well #:	1
Well Status:	Plugged	Well Type:	DH
Operator Name:	Thos. M. Blake	Lease Name:	Cinco
Field Name:	Any Field	Area Name:	Any Area
GIS Source:	hud	Confidential Well:	N
Directionally Drilled:	N	SPUD Date:	Not Reported

Map ID:	2		
API #:	0402932417	Well #:	1
Well Status:	Plugged	Well Type:	DH
Operator Name:	Cinco Development Co., Inc		
Lease Name:	Hix	Field Name:	Any Field
Area Name:	Any Area	GIS Source:	hud
Confidential Well:	N	Directionally Drilled:	N
SPUD Date:	Not Reported		

Map ID:	3		
API #:	0402932418	Well #:	1
Well Status:	Plugged	Well Type:	DH
Operator Name:	T. L. Park	Lease Name:	Dove
Field Name:	Any Field	Area Name:	Any Area
GIS Source:	hud	Confidential Well:	N
Directionally Drilled:	N	SPUD Date:	Not Reported

Map ID:	4		
API #:	0402932491	Well #:	1
Well Status:	Plugged	Well Type:	DH
Operator Name:	National Security Oil Co.		
Lease Name:	Lease by National Security Oil Co.		
Field Name:	Any Field	Area Name:	Any Area
GIS Source:	hud	Confidential Well:	N
Directionally Drilled:	N	SPUD Date:	Not Reported

Map ID:	5		
API #:	0402932490	Well #:	1
Well Status:	Plugged	Well Type:	DH
Operator Name:	J. S. & L. Co.	Lease Name:	Childs-Wall
Field Name:	Any Field	Area Name:	Any Area
GIS Source:	hud	Confidential Well:	N
Directionally Drilled:	N	SPUD Date:	Not Reported

CALIFORNIA GOVERNMENT WELL RECORDS SEARCHED

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 Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
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.

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

California Earthquake Fault Lines
Source: California Division of Mines and Geology
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

Appendix D HISTORICAL RECORDS

Kudo

Kudo

California City, CA 93505

Inquiry Number: 5759392.6

August 20, 2019

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/20/19

Site Name:	Client Name:
Kudo	Stantec
Kudo	735 E. Carnegie Drive, Suite 280
California City, CA 93505	SAN BERNARDINO, CA 92408
EDR Inquiry # 5759392.6	Contact: Alicia Jansen

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Stantec were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # FF32-44CD-A229

PO # NA

Project NA

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: FF32-44CD-A229

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Stantec (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Kudo

Kudo

California City, CA 93505

Inquiry Number: 5759392.5

August 21, 2019

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/21/19

Site Name:	Client Name:
Kudo	Stantec
Kudo	735 E. Carnegie Drive, Suite 280
California City, CA 93505	SAN BERNARDINO, CA 92408
EDR Inquiry # 5759392.5	Contact: Alicia Jansen

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Stantec were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:		*Coordinates:*	
P.O.#	NA	**Latitude:**	35.179582 35° 10' 46" North
Project:	NA	**Longitude:**	-118.0083 -118° 0' 30" West
		UTM Zone:	Zone 11 North
		UTM X Meters:	408190.82
		UTM Y Meters:	3893423.78
		Elevation:	2367.81' above sea level

Maps Provided:

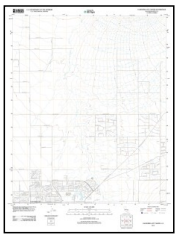
2012	1915
1994	
1980	
1973	
1967	
1956	
1947	
1943	

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets

Mojave NE
2012
7.5-minute, 24000

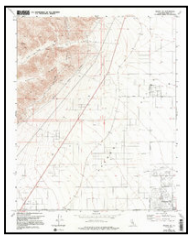


California City North
2012
7.5-minute, 24000

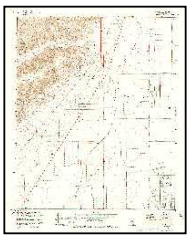
Cinco
2012
7.5-minute, 24000

Cantil
2012
7.5-minute, 24000

1994 Source Sheets



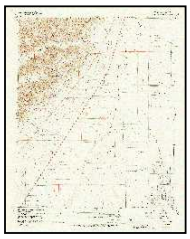
Mojave NE
1994
7.5-minute, 24000
Aerial Photo Revised 1972



MOJAVE NE
1994
7.5-minute, 24000

1980 Source Sheets

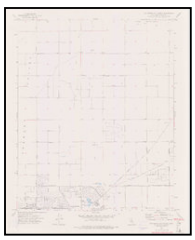
Mojave NE
1980
7.5-minute, 24000
Aerial Photo Revised 1972



MOJAVE NE
1980
7.5-minute, 24000

1973 Source Sheets

Mojave NE
1973
7.5-minute, 24000
Aerial Photo Revised 1972



California City North
1973
7.5-minute, 24000
Aerial Photo Revised 1972

Cantil
1973
7.5-minute, 24000
Aerial Photo Revised 1965

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1967 Source Sheets

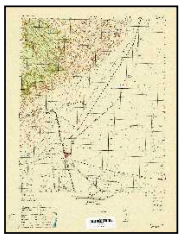
Cantil
1967
7.5-minute, 24000
Aerial Photo Revised 1965

1956 Source Sheets

Castle Butte
1956
15-minute, 62500
Aerial Photo Revised 1943

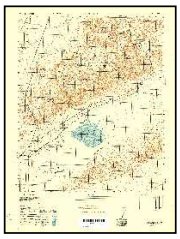
Mojave
1956
15-minute, 62500
Aerial Photo Revised 1943

1947 Source Sheets

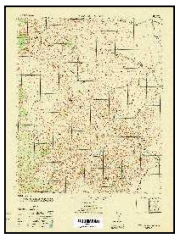


MOJAVE
1947
15-minute, 50000

Castle Butte
1947
15-minute, 50000
Aerial Photo Revised 1943



SALTDALE
1947
15-minute, 50000



CROSS MOUNTAIN
1947
15-minute, 50000

1943 Source Sheets

Saltdale
1943
15-minute, 62500
Aerial Photo Revised 1943

Castle Butte
1943
15-minute, 62500
Aerial Photo Revised 1943

Mojave
1943
15-minute, 62500
Aerial Photo Revised 1943

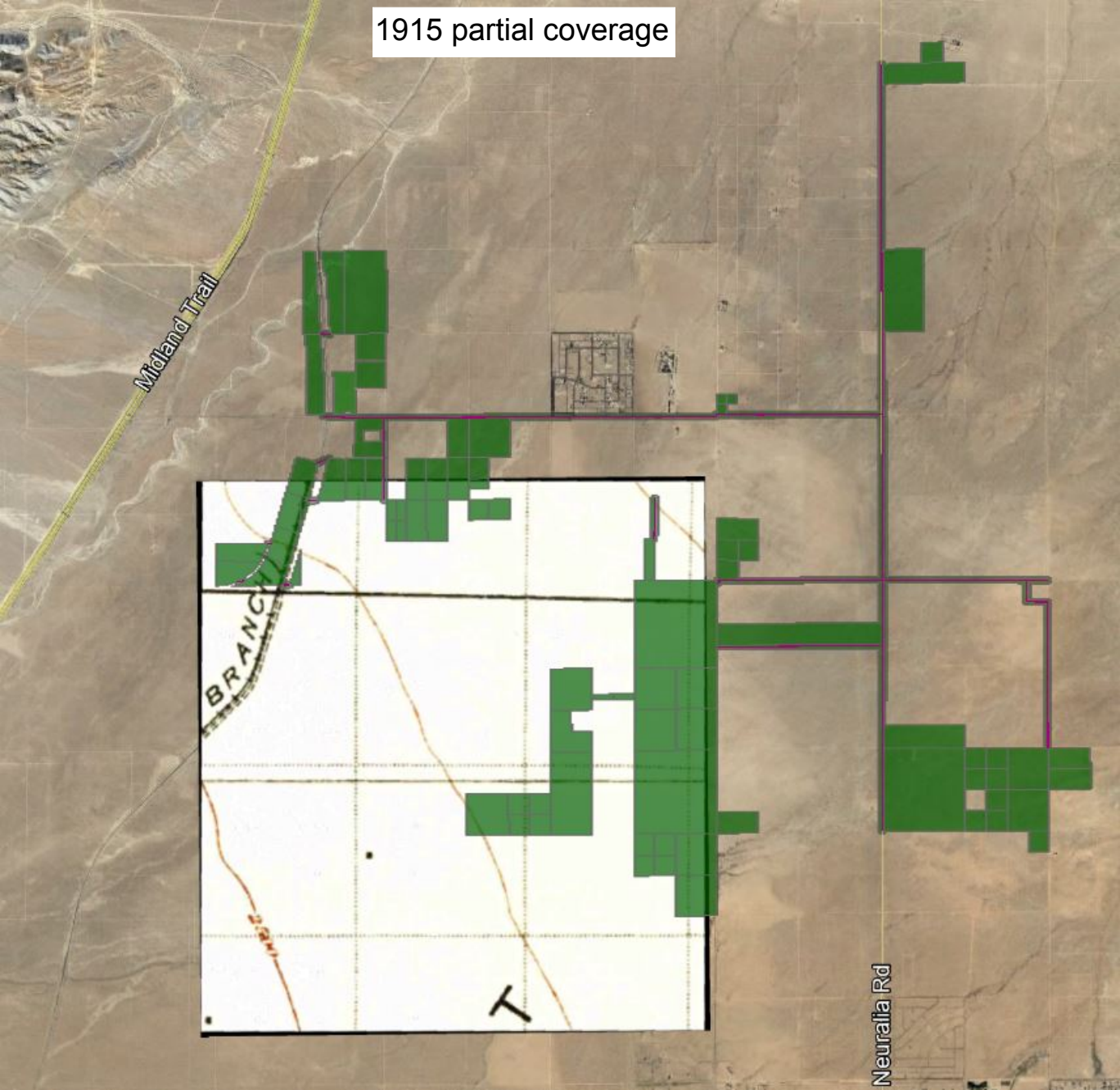
Cross Mountain
1943
15-minute, 62500
Aerial Photo Revised 1943

Topo Sheet Key

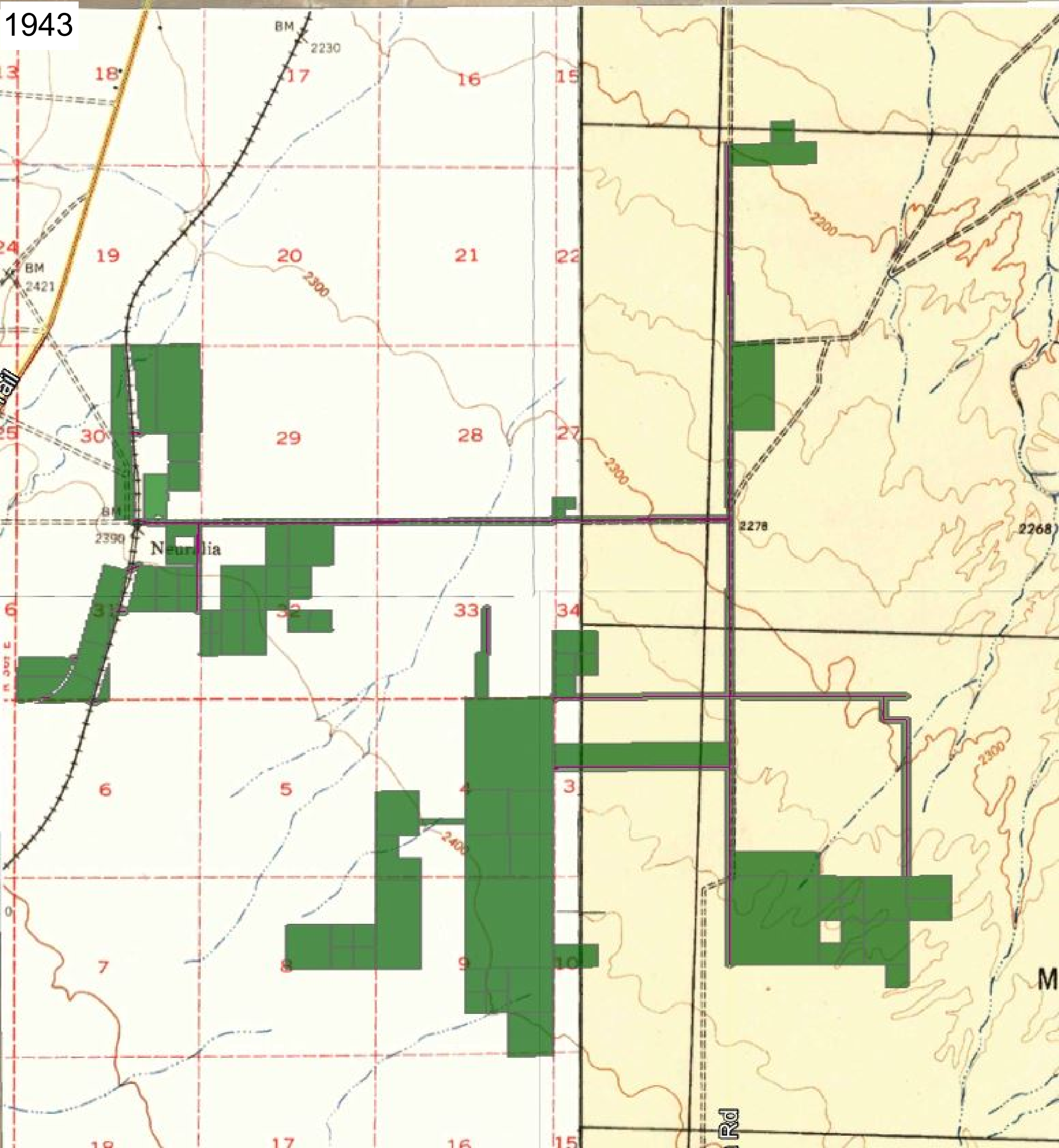
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1915 Source Sheets

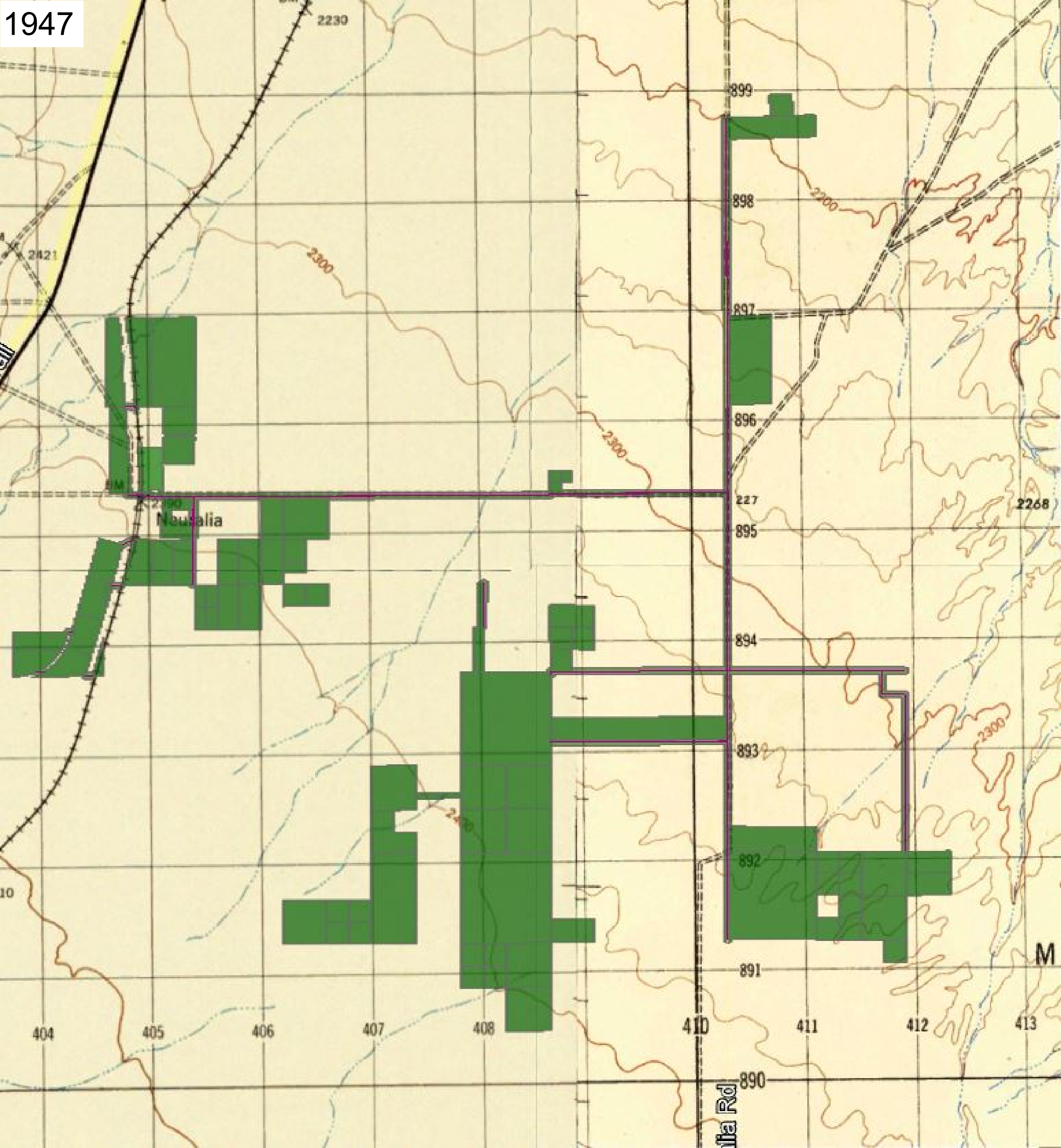
Mojave
1915
30-minute, 125000


1915 partial coverage
Midland Trail
BRANCH
Neuralia Rd

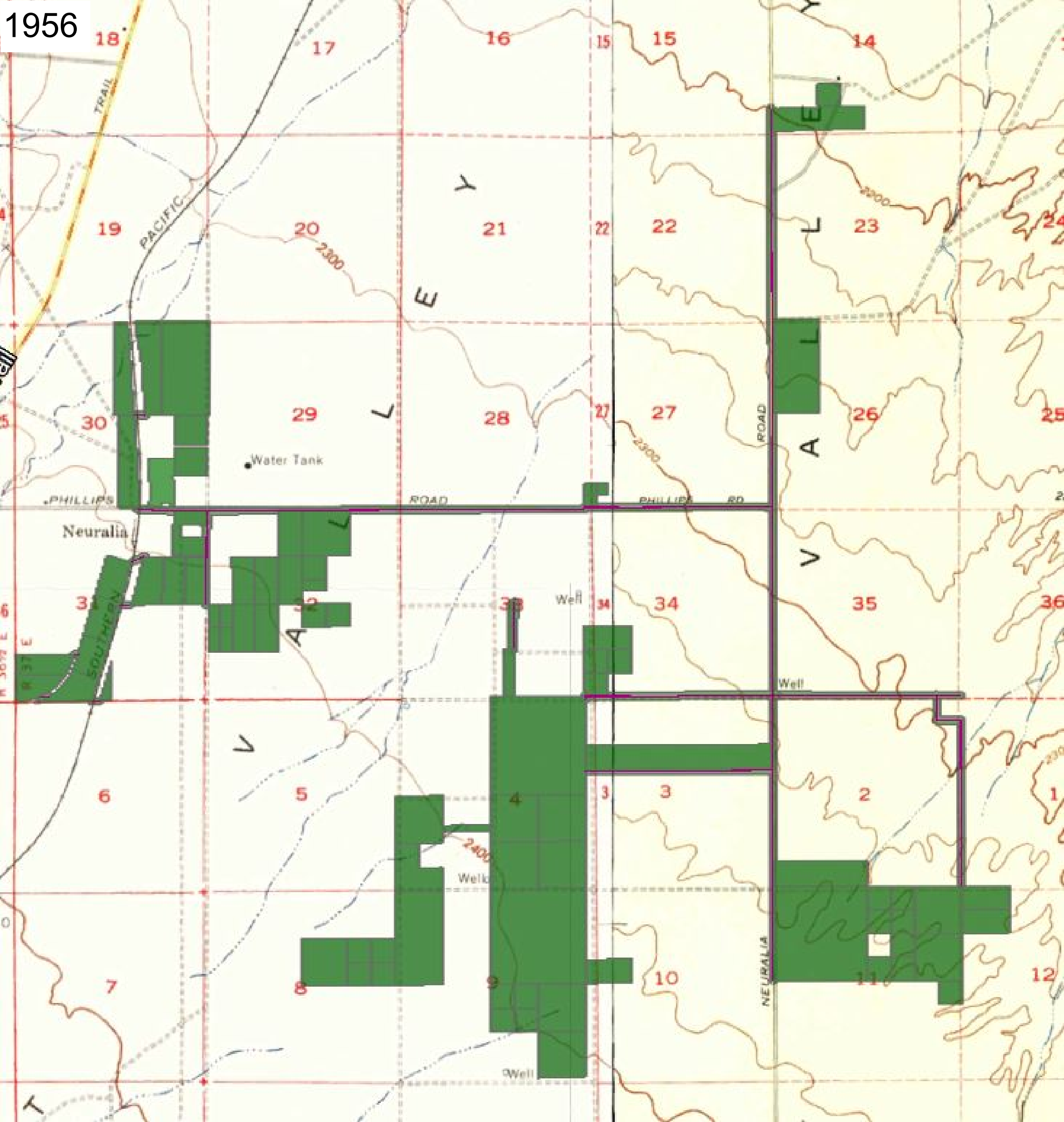
1943

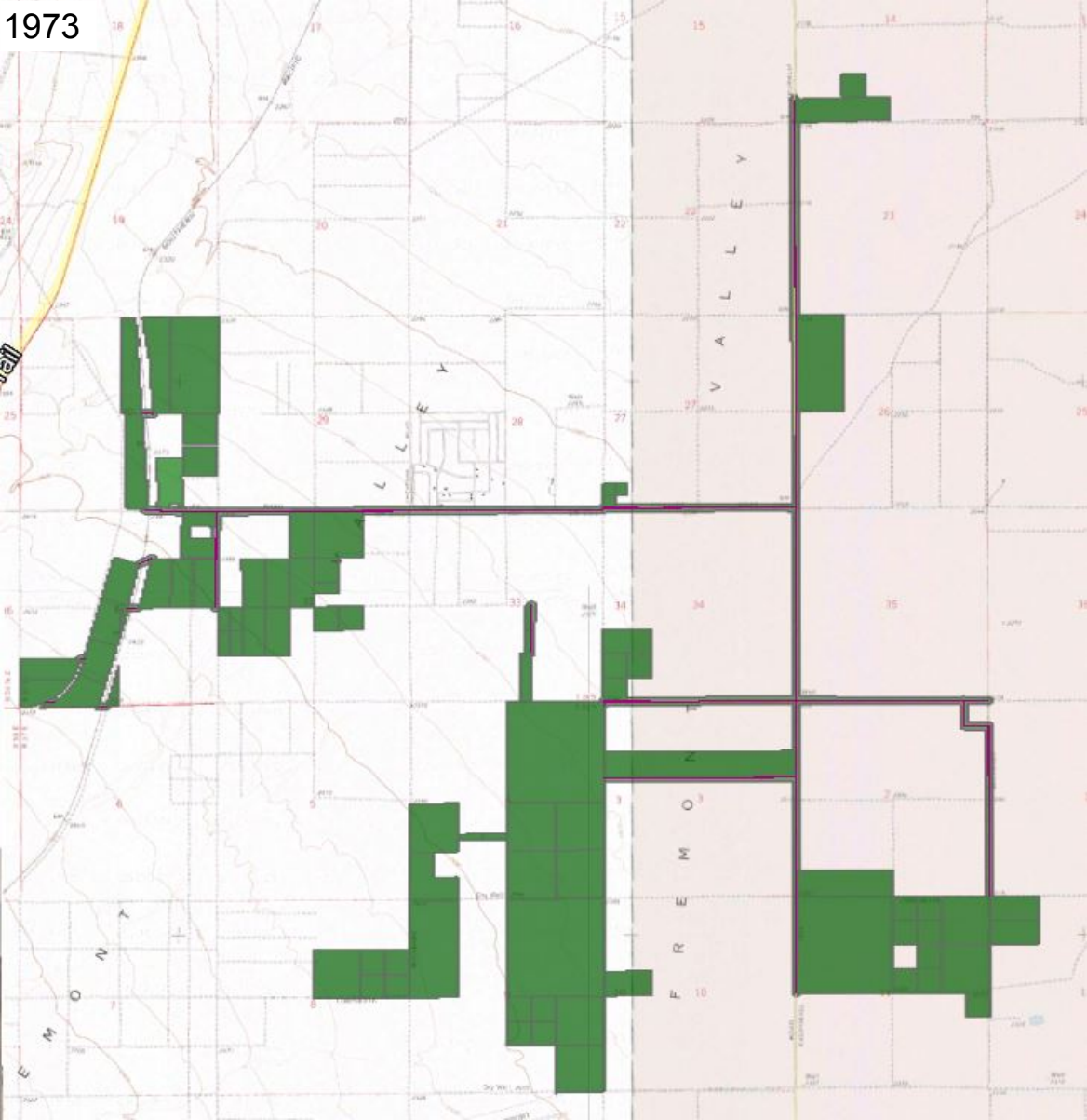


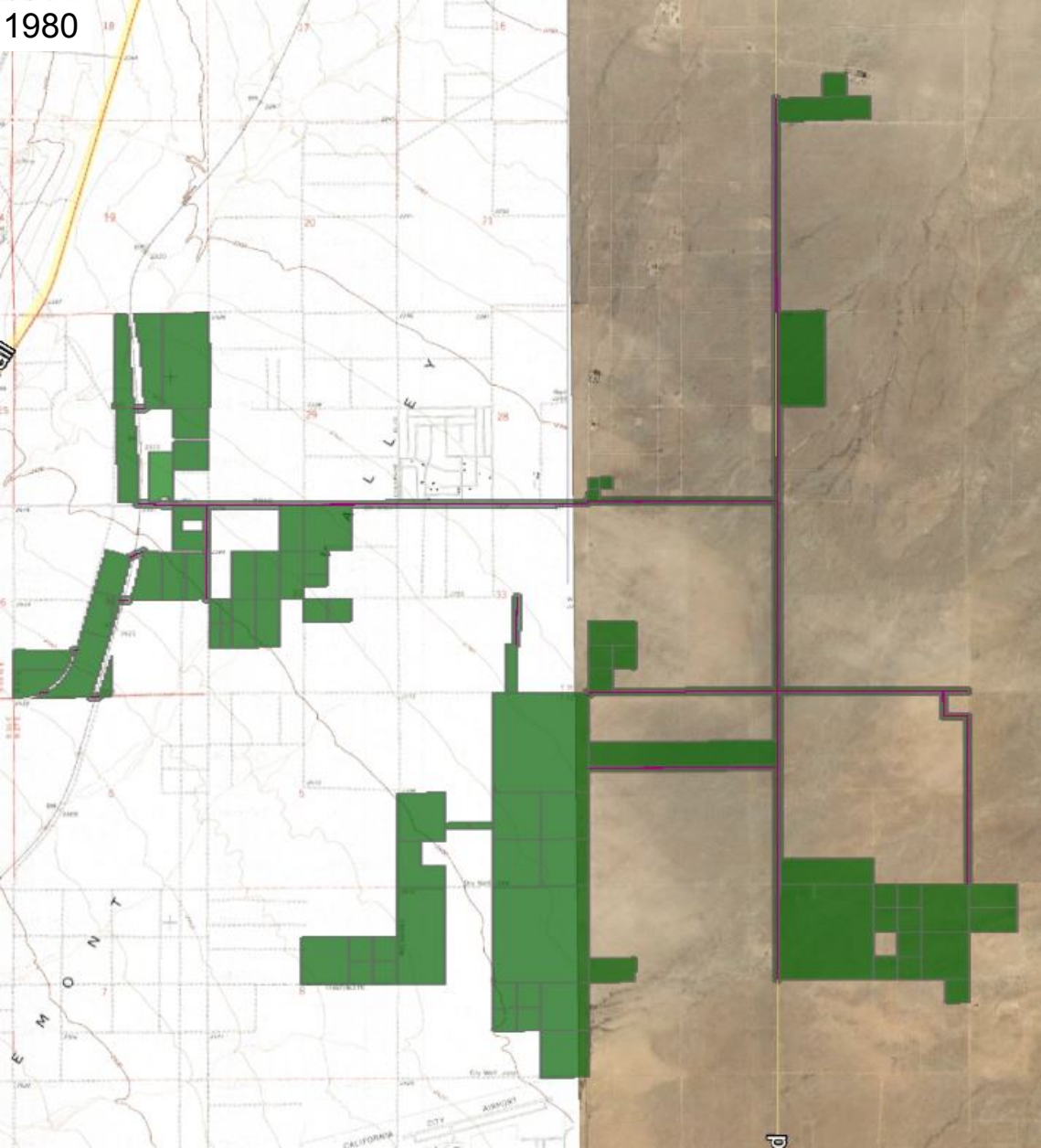
BM
2230
18
17
16
15
2200
24
BM
2421
19
20
21
22
2300
25
30
29
28
27
2300
BM
2390
Neuralia
2278
2268
6
31
32
33
34
6
5
4
3
2400
2300
7
8
9
10
M
18
17
16
15
Rd



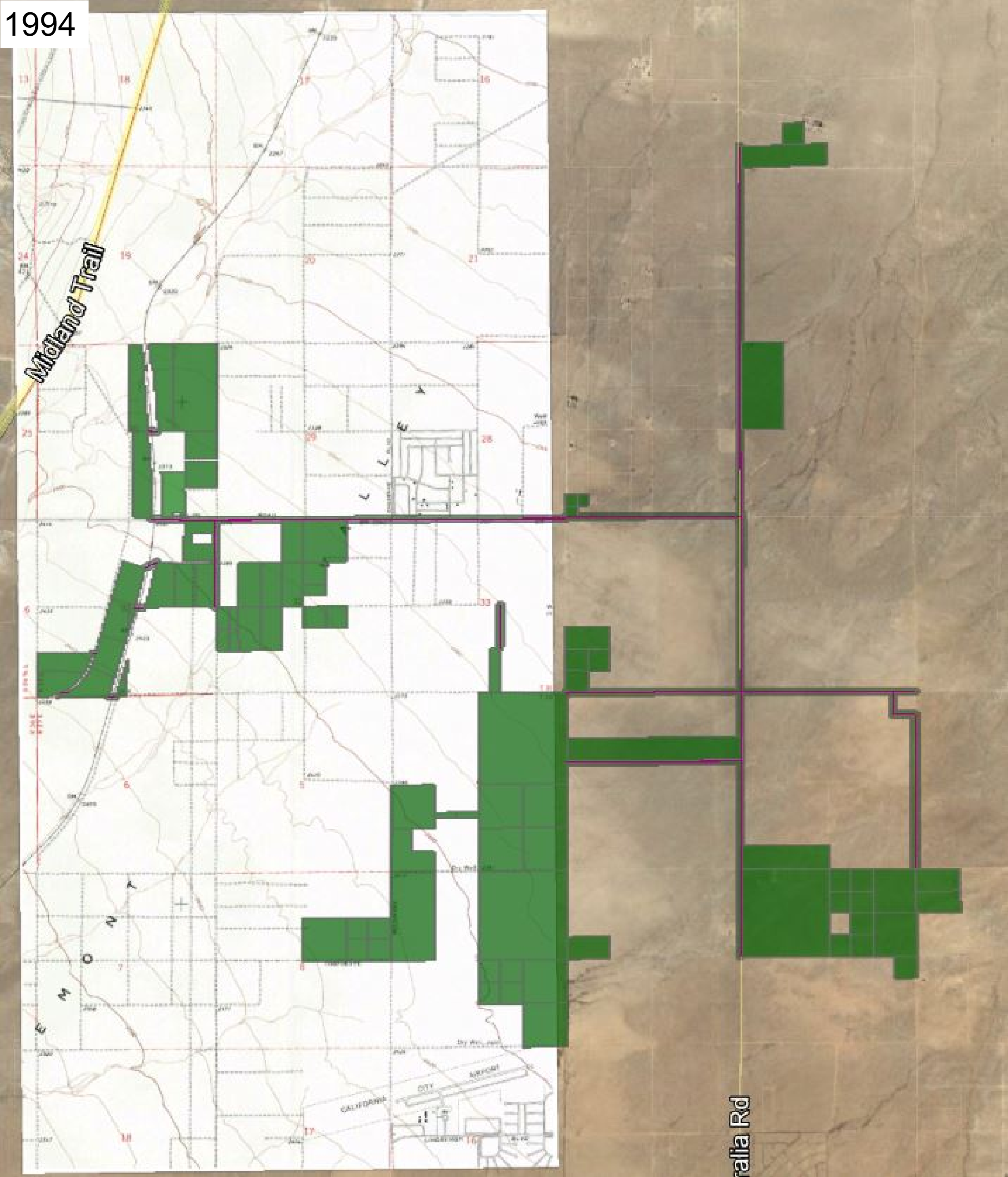
1947
2230
899
898
2200
2421
2300
897
896
2300
227
2268
895
894
893
2300
892
891
2400
404
405
406
407
408
410
411
412
413
M
890


1956
18
17
16
15
14
TRAIL
PACIFIC
19
20
21
22
23
2300
2200
30
29
28
27
26
25
Water Tank
PHILLIPS
ROAD
PHILLIPS RD
ROAD
Neuralia
31
32
33
34
35
36
Well
SOUTHERN
R 37 E
6
5
4
3
2
1
2400
7
8
9
10
11
12
NEURALIA

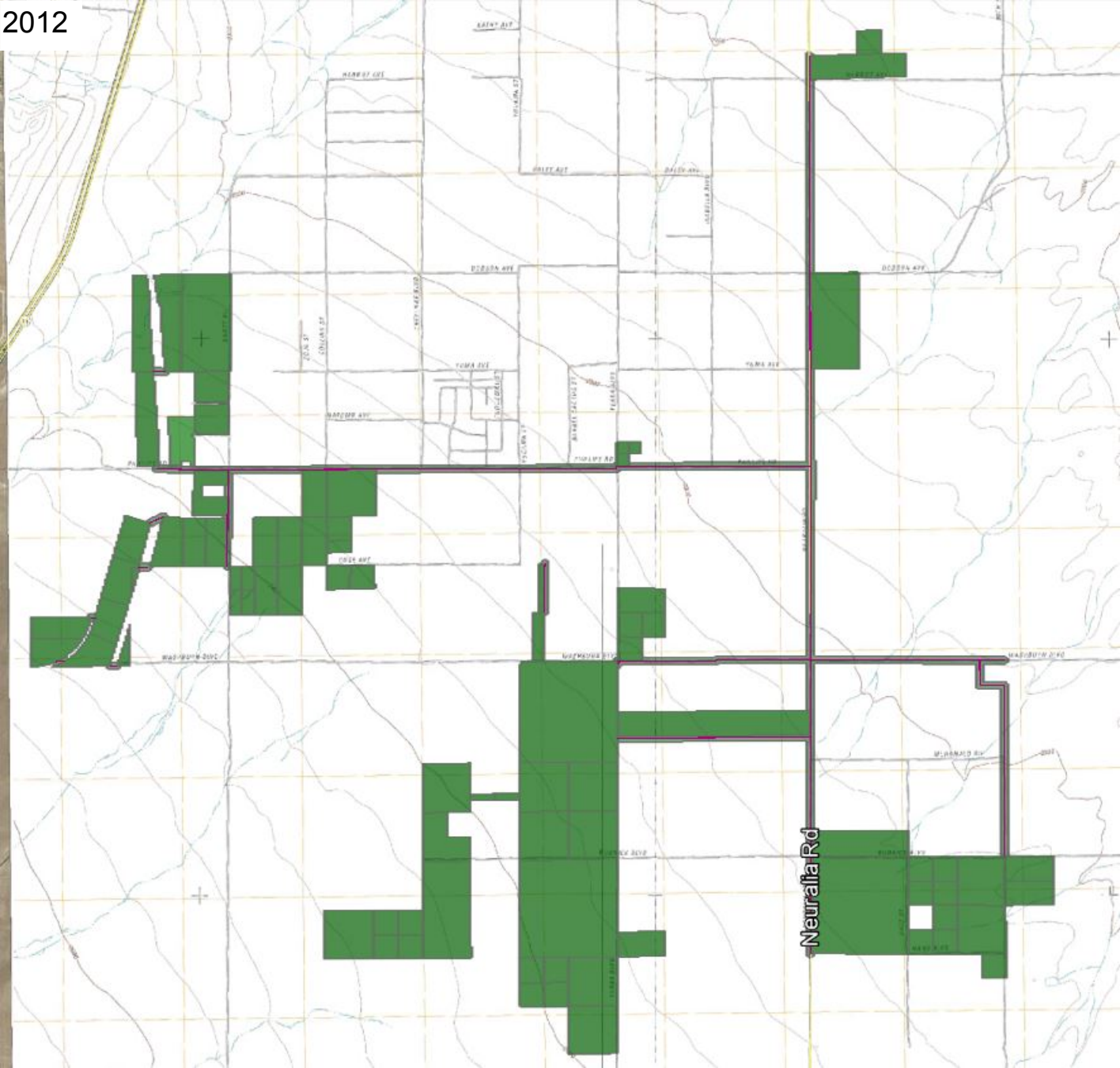

1973
VALLEY
FREMONT


1980
L L E Y
E M O N T

1994



2012



Kudo

Kudo

California City, CA 93505

Inquiry Number: 5759392.8

August 26, 2019

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Date EDR Searched Historical Sources:

Aerial Photography August 26, 2019

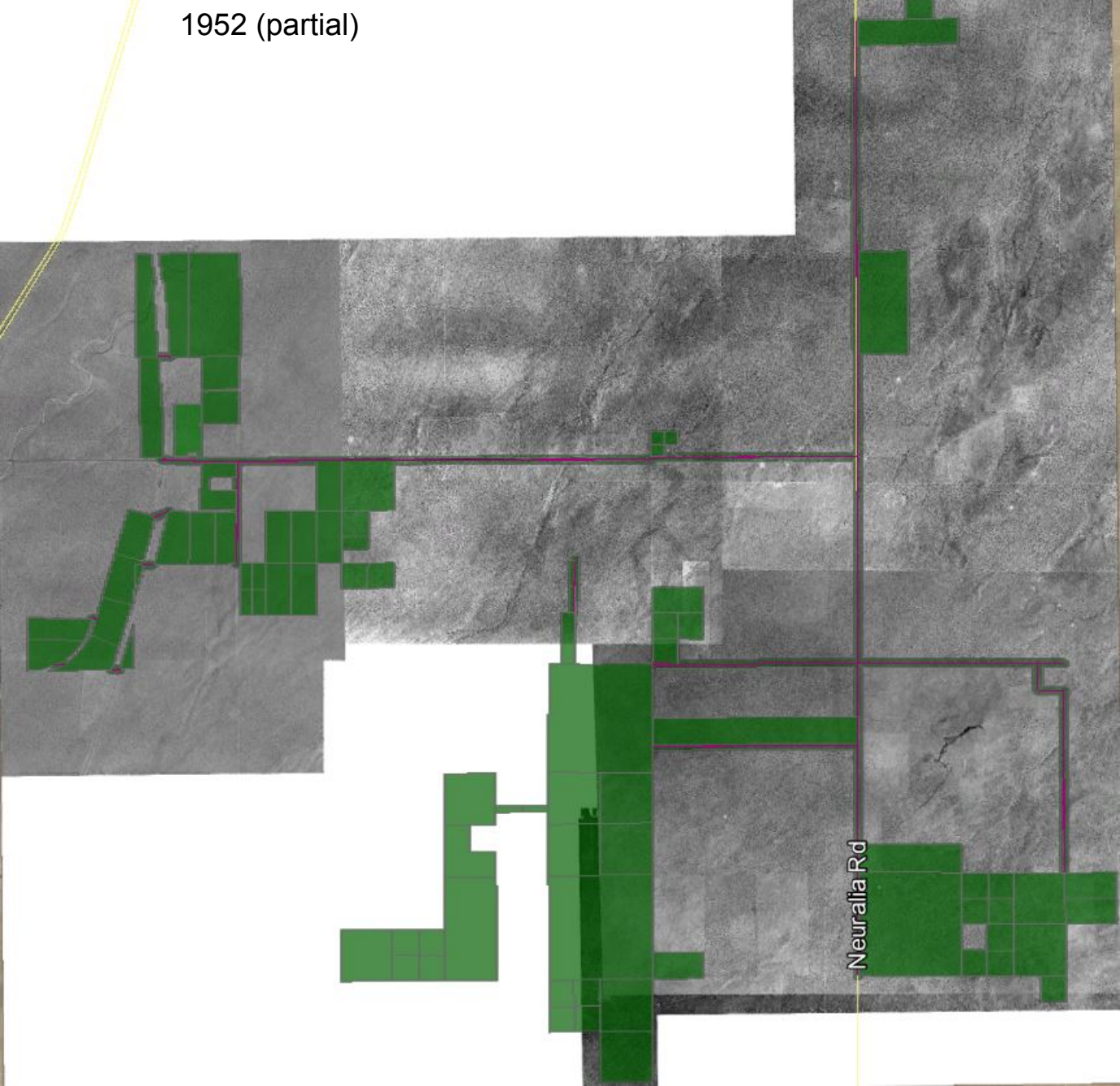
Target Property:

Kudo

California City, 93505

Year	***Scale***	***Details***	***Source***
1952	Aerial Photograph. Scale:	Flight Year: 1952	USDA
1972	Aerial Photograph. Scale:	Flight Year: 1972	USGS
1977	Aerial Photograph. Scale:	Flight Year: 1977	USGS
1985-1986	Aerial Photograph. Scale:	Flight Year: 1985-1986	USDA
1994	Aerial Photograph. Scale:	Flight Year: 1994	DOQQ_USGS
2005	Aerial Photograph. Scale:	Flight Year: 2005	NAIP_USGS
2009	Aerial Photograph. Scale:	Flight Year: 2009	NAIP_USGS
2012	Aerial Photograph. Scale:	Flight Year: 2012	NAIP_USGS
2016	Aerial Photograph. Scale:	Flight Year: 2016	NAIP_USGS

1952 (partial)



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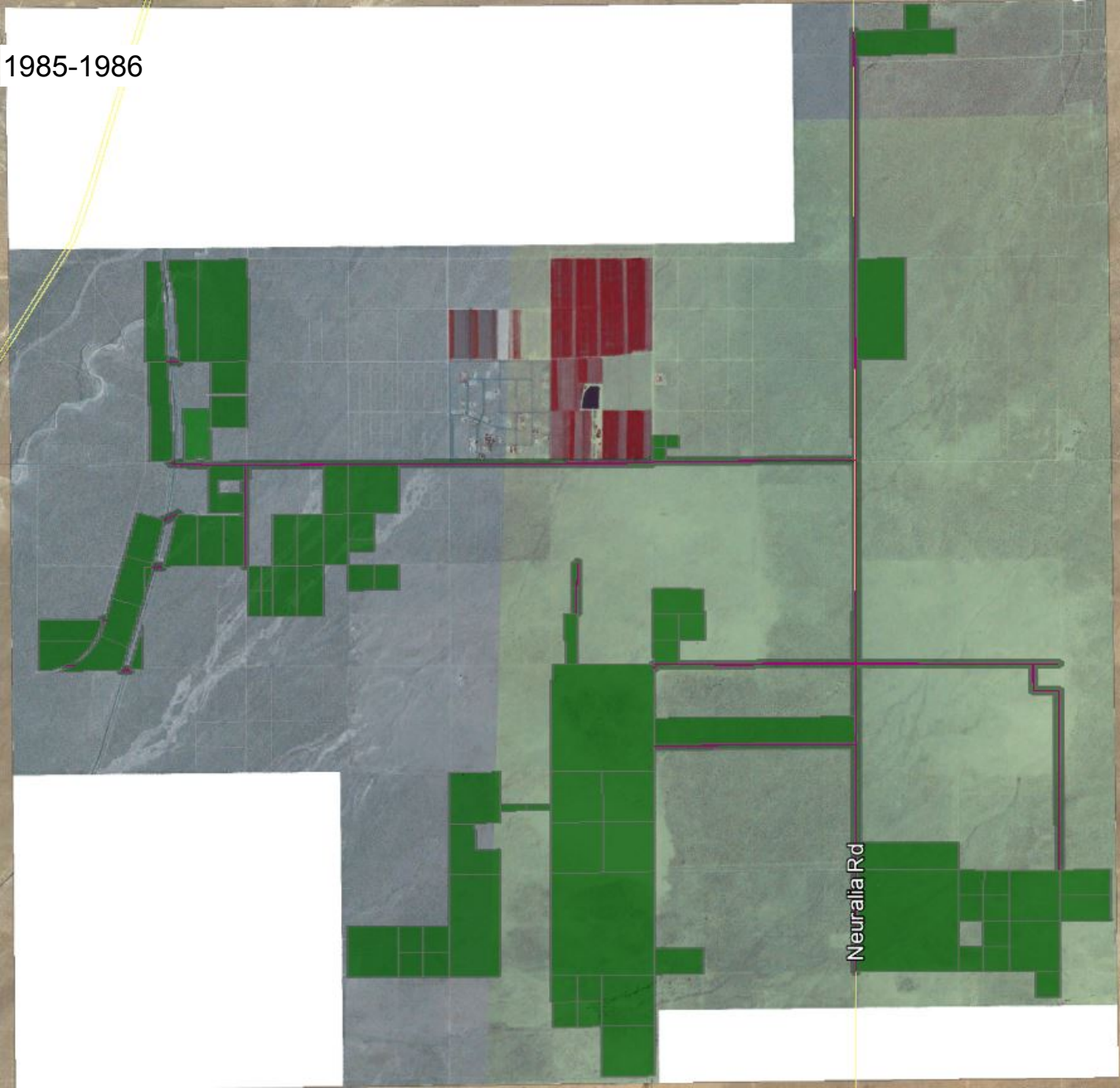
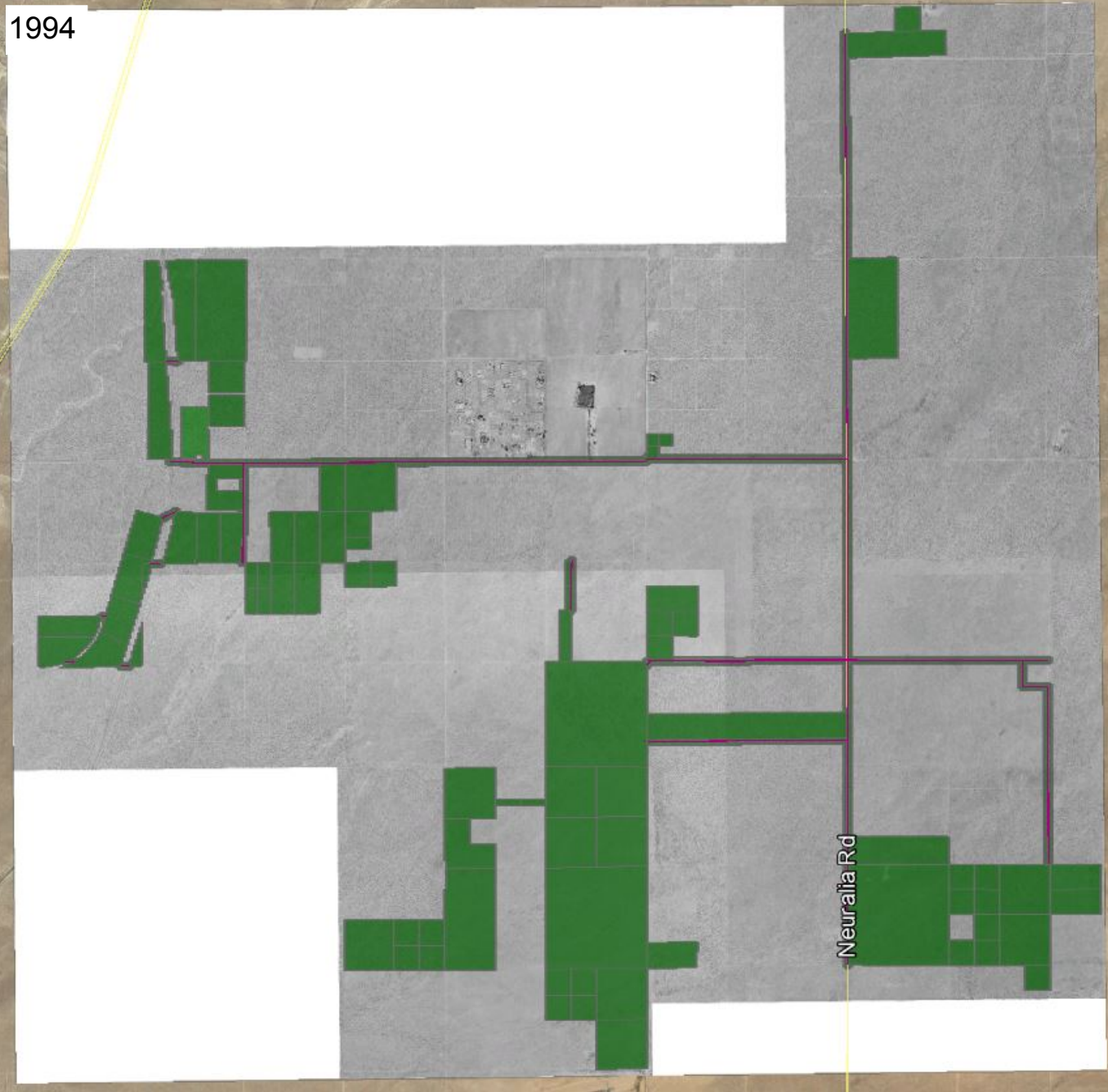
1977

1985-1986

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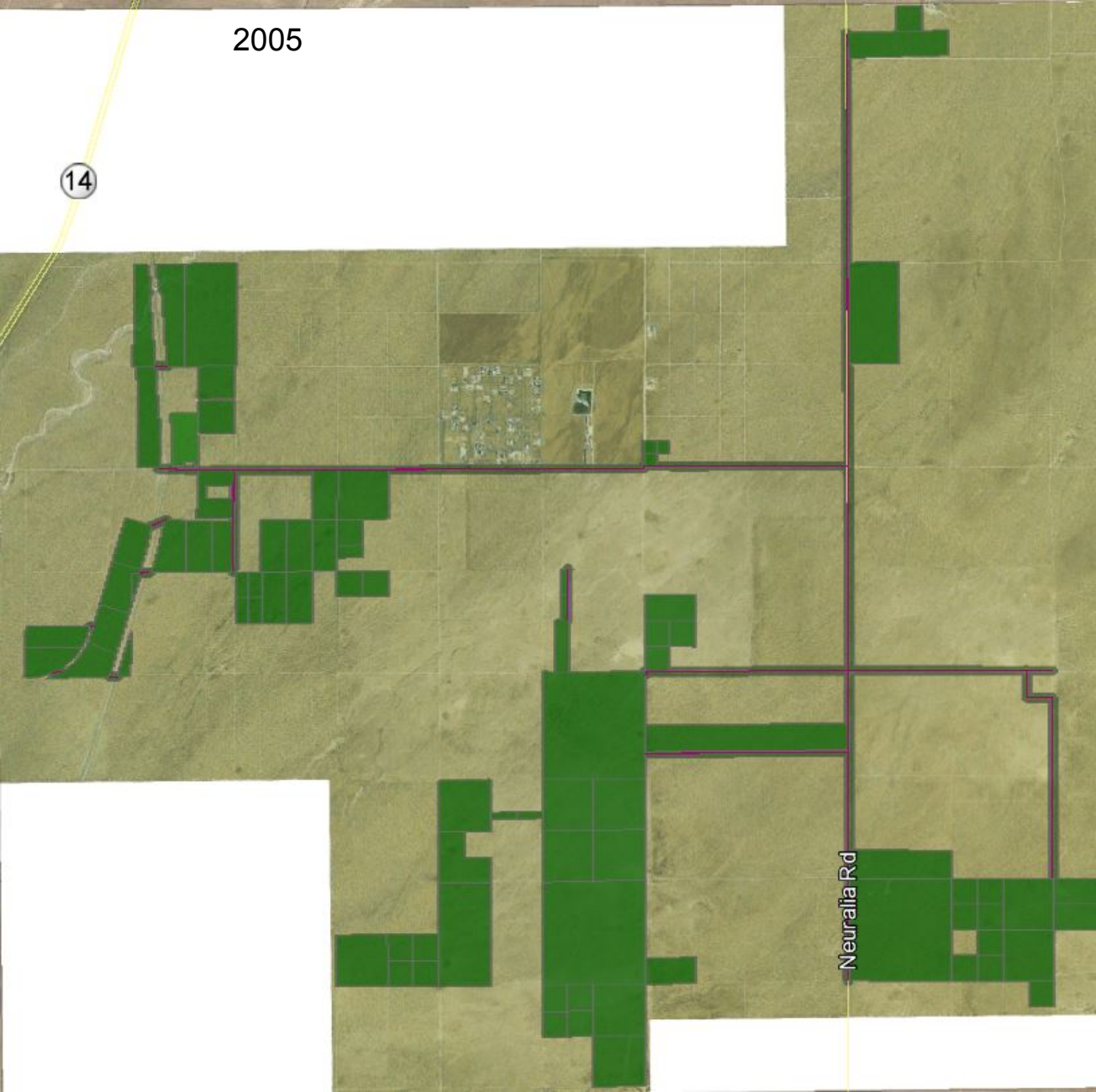
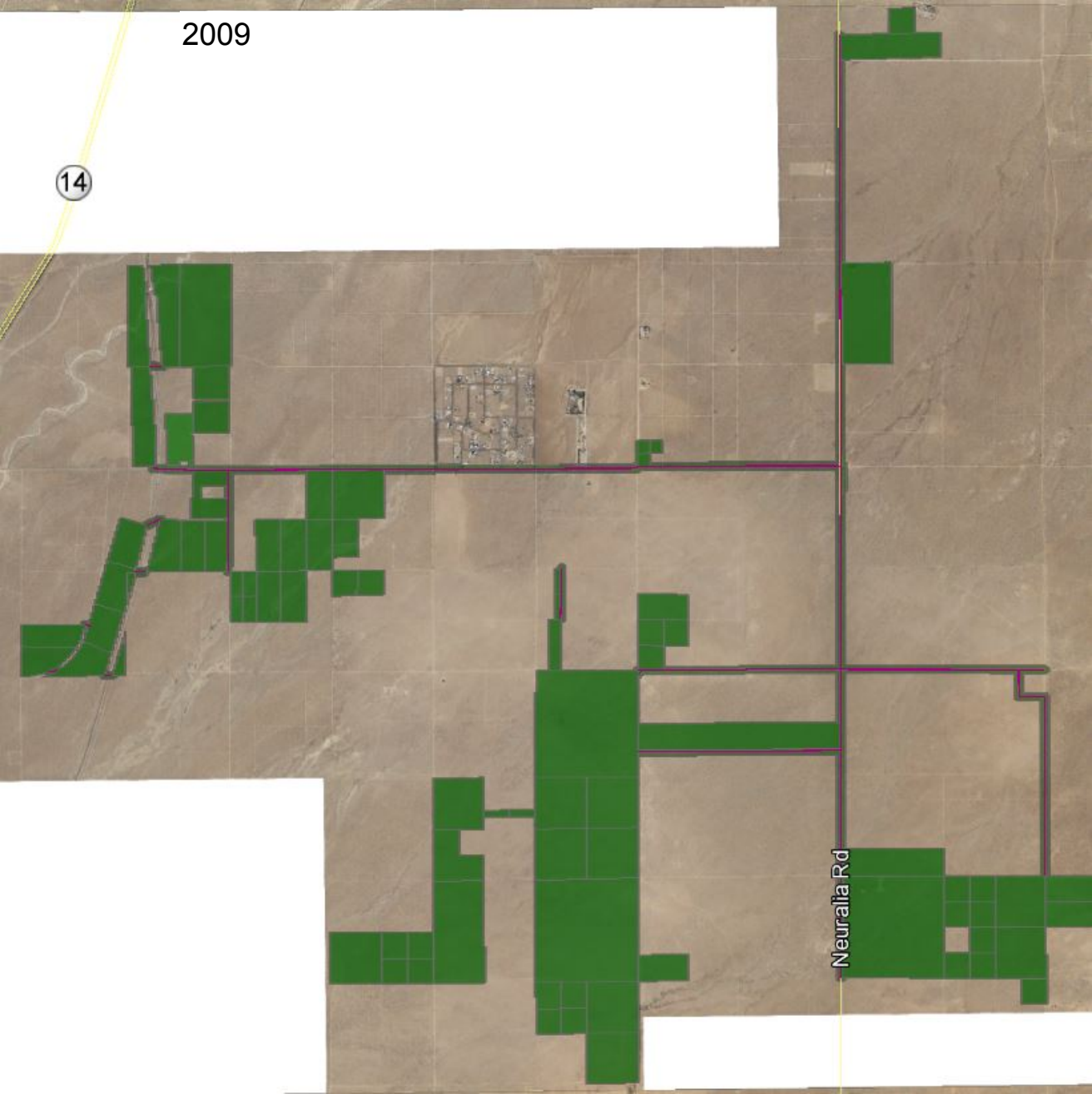
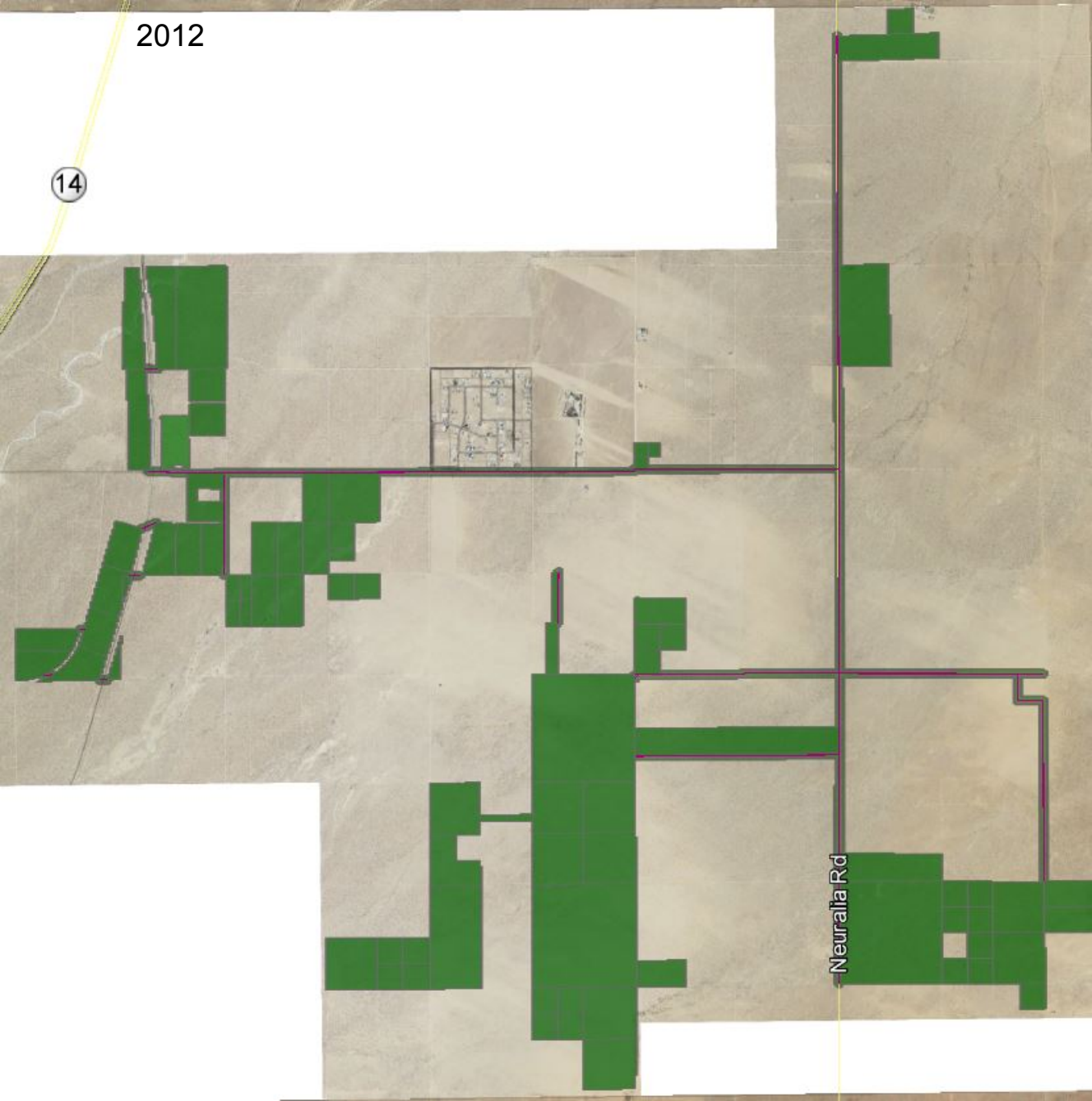
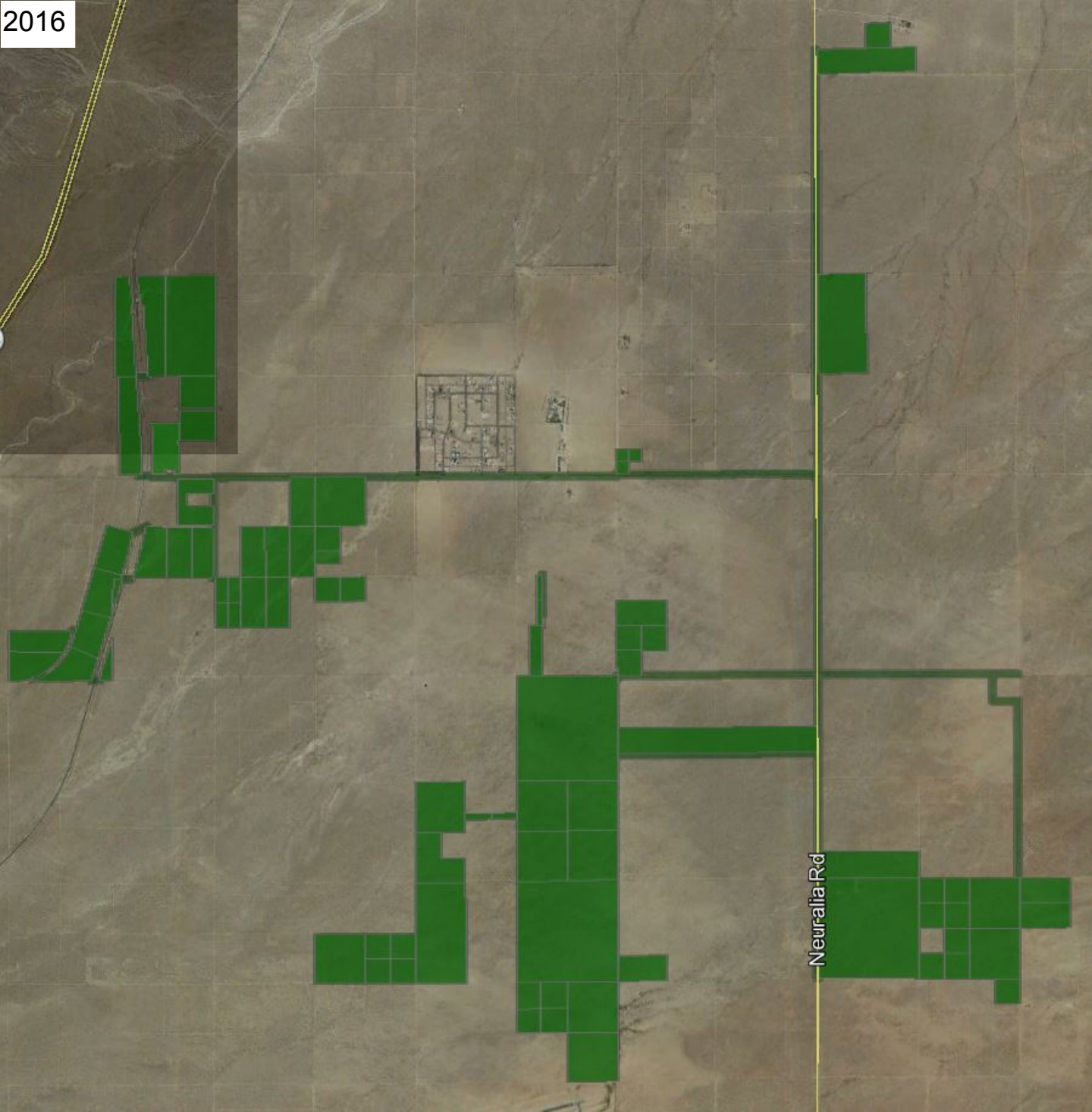
Neuralia Rd


2005
14
Neuralia Rd


2009
14
Neuralia Rd


2012
14
Neuralia Rd


2016
Neuralia Rd

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Appendix I
Hydrology Study

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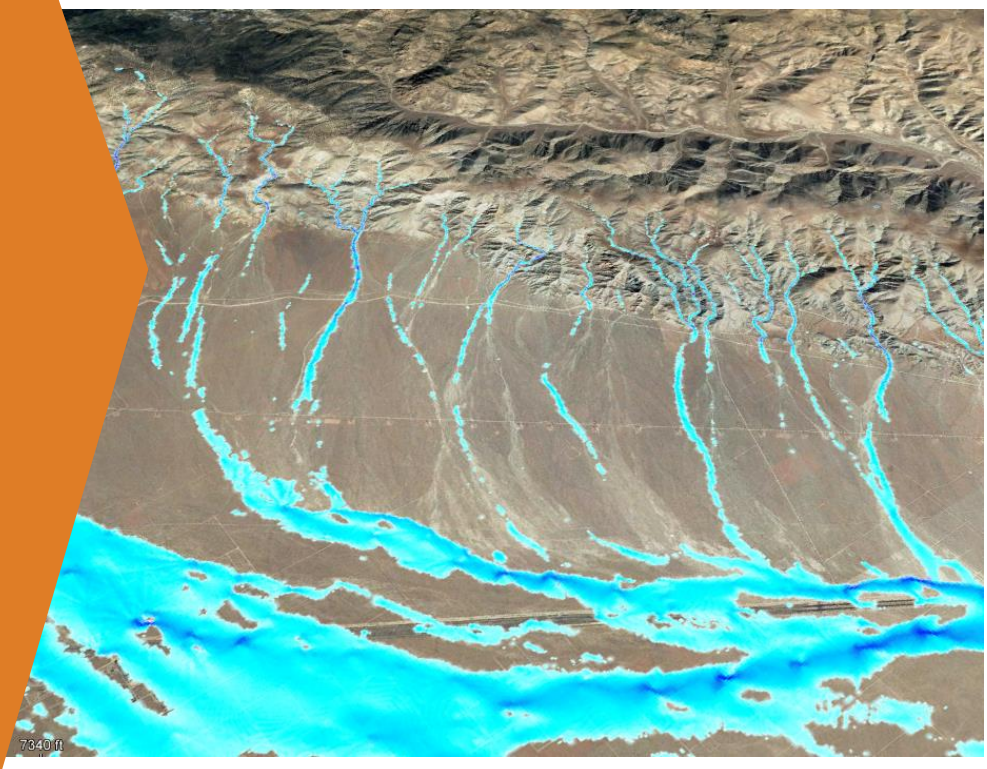
Westwood

Hydrology Study

Kudu Solar Project

Kern County, CA

August 2019 (*Revised August 2020)*



Prepared For:

MINUTE SOLAR ENERGY

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Westwood

Hydrology Study for

Kudu Solar Project

Prepared for:

8minutenergy Renewables, LLC
211 Sutter Street
San Francisco, CA 94108

Prepared by:

Chris Carda, PE
Westwood Professional Services
12701 Whitewater Drive, Suite 300
Minnetonka, MN 55343

Project Number: 0023948.00
Date: 8/27/2019 *(Revised 08/24/2020)*

CONTENTS

EXHIBITS

APPENDICES

OVERVIEW

The purpose of the study is to describe the hydrology of the proposed Kudu Solar Project ("the project") and any impacts that the hydrology may play in the design of the solar array and for use in Kern County permitting. The study is an expansion of the Eland Solar Project that was previously conducted. No new modeling was included in this study.

The project includes developing approximately 4,000acres in Kern County, CA in the area around California City, CA (Exhibit 1). The project consists of numerous parcels and landowners scattered throughout the area. The main area of parcels is between Highway 14 to the west, Phillips Rd to the north and Neuralia Rd to the east. At the time of this report, the project consists of solar panels, an inverter and an access road. Runoff generated from the solar panels will flow to the edge of the panels and be allowed to drip onto the existing pervious surface below and allowed to disperse and infiltrate below the panels across the site.

With the project being located within Kern County the stormwater requirements for Kern County were researched and applicable regulations were followed.

The project site generally slopes to the northeast. The watershed area encompasses approximately 407 square miles and is part of a watershed that commences southwest of the project. The project area is on a mild slope of around 1%.

The project area is within FEMA FIRM panels 06029C2925E, 06029C2930E, 06029C2920E, and 06029C2940E (Appendix H). A FEMA designated 1% annual chance flood hazard area for Zone A (undetermined flood depth) runs through a portion of the project area (Exhibit 2).

The hydrologic modeling in this report was created using FLO-2D modeling software. Because of the complex and distributary/alluvial nature of flow paths upstream and through the project site, FLO-2D hydrologic/hydraulic modeling software was utilized to determine flow depths and velocities throughout the site.

Overall, the analysis shows low water depths and velocities (Exhibits 6 and 7) across the majority of the site. During a 100 year storm the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1 foot/second. See Exhibits 6 and 7 for areas within the project with higher flood depths and velocities. Based on experience on other similar projects, the site is suitable for the planned development by avoiding areas of high flood depths and velocities in channelized flow areas.

The new solar array will require retention to mitigate the runoff from the new impervious surfaces. The design volume for the onsite retention basin is calculated per Section 408-1 of the Kern County Development Standards (KCDS). The calculation is based on an initial assumption of the impervious area added by the project. The runoff volume from the ISDD five-day storm is calculated at 10.67 acre-feet.

DATA SOURCES

The models and methods for this project utilize a combination of public and private data as shown in Table 1.

Table 1: Data Sources

Data Type	**Format**	**Source**	**Use**
Elevation	Photogrammetry	Westwood	Site FLO-2D Model Elevations
Elevation	10-Meter Digital Elevation Model	USGS 10-Meter National Elevation Dataset	Watershed FLO-2D Model Elevations
Crop Data	Shapefile	USDA 2013 Crop Data Layer	Landcover
Soils	Shapefile	USGS SSURGO Dataset	Curve Numbers
Precipitation	PDF File	NOAA Atlas 14 Website	Design storms
HUC-12 Drainage Boundary	Shapefile	USGS	Define Model Extents
Site Boundary	Shapefile	8minutenergy Renewables, LLC.	Define Model Extents
2015 Aerial Photography	ArcGIS Map Service	USDA FSA	Reference

PROJECT HYDROLOGY

The project area is located in the south-central California, in the area surrounding California City, CA. The project site generally slopes to the northeast. The previously modeled watershed area encompasses approximately 407 square miles and is part of a watershed that commences southwest of the project. The project area is on a mild slope of 1%. The potential hydrologic issues in this general landscape are flooding and erosive velocities.

Because of the complex and distributary/alluvial nature of flow paths upstream and through the project site, a FLO-2D model was utilized to determine flow depths and velocities throughout the site. This FLO-2D model was calibrated to the Kern County Hydrology Manual and used to model the site hydrology.

Kern County Hydrology (CivilD)

CivilD modeling software was used to calculate flow rates and confirm that the FLO-2D model was providing results consistent with the Kern County methods (Appendix D). A point (Exhibit 9) was selected to calibrate the results of the FLO-2D model. This location works reasonably well as a calibration point because it is similar to watersheds that contribute to the project site and is relatively concentrated. Inputs to CivilD were calculated following guidance in the KCHM and modeling inputs/outputs can be found in Appendix A. The peak flow rate for the calibration watershed using CivilD was 611.02 cfs. Table 2 below shows the inputs into the CivilD model.

Table 2: CivilD Calibration Watershed Inputs

Description	Equation	Unit	Value
Watershed Area	Calculated in GIS	Square Mi.	0.90
Watershed Area	Conversion	Acres	573
100-year Aerial Reduction	Figure E-4	Unitless	1.0
Watershed Area with Reduction	Aerial Reduction*Area	Acres	573
Equation	Lag=24n(l*lca/sqrt(s))^0.38	Hours	0.43
Basin Factor	KCHM Page 156 (n)	Unitless	.05
Longest Watercourse	Calculated in GIS (l)	Miles	1.98
Length to Centroid	Calculated in GIS (lca)	Miles	1.05
Upstream Elevation	From 10-m offsite DTM	Feet	5,633
Elevation at Concentration	From 10-m offsite DTM	Feet	3,729
Difference in Elevation	Upstream – Downstream (H)	Feet	1904
Slope along Watercourse	Slope (s)	FT/Mi.	962
Average CN for watershed (Appendix B)	CN=	Unitless	91.0

FLO-2D MODELING

FLO-2D is a physical process model that routes rainfall runoff and flood hydrographs over flow surfaces or in channels using the dynamic wave approximation to the momentum equation. FLO-2D offers advantages over 1-D models and unit hydrograph methods by allowing for breakout flows and visualization of flows across a potential site. This is particularly useful on a moderately sloped distributed area such as the project site. The primary inputs are a DTM (elevation data), curve numbers, and precipitation. A grid system is set up within the FLO-2D software and based upon the large watershed size the FLO-2D grid cells were optimized at 50'. Four inflow locations were input into the model to reduce the size, these inflows were based on the FEMA FIS and Streamstats with inflows of 8,060 cfs, 11,600 cfs, 8,000 cfs and 7,800 cfs respectively. Culverts were input into the model along the railroad.

Precipitation data downloaded from NOAA Atlas 14 (Appendix C) for the 100 year rain events in the project watershed were 3.71" of rainfall. By using the 100-year rainfall event for design purposes it allows

for the best initial analysis in order to determine the worst areas of flooding and erosion. The 100-year rainfall depth was distributed based on a nested distribution of Atlas-14 point precipitation estimates and input into FLO-2D.

There is a railroad located to the west of the project boundary. Due to this section of the model using 10-meter elevation data the railroad was not distinguishable in the elevation data. To account for any influence the railroad may have on the hydrology of the site, adjustments were made in the FLO-2D model. The elevation along a portion of the railroad was raised an elevation of 3 feet to account for the railroad berm based on anecdotal information from the client. Culverts were then input into the FLO-2D model in locations along the railroad determined from Google Earth (Exhibit 2). Culverts sizes were estimated based on Google Earth imagery. Prior to final design the railroad and culvert locations should be surveyed along with proper culvert dimensions determined.

The elevation data input into the FLO-2D model was 1-meter flown LiDAR data and USGS 10-meter elevation incorporated into the DTM using the export to xyz file function in Global Mapper. These XYZ files are read directly into FLO-2D.

USDA-NRCS SSURGO soil data provides soil types within the project boundary and full coverage of the contributing watershed. Soils in the area are primarily classified as hydrologic group A & B (Exhibit 3). Land cover was obtained from the Kern County Hydrology Manual. Exhibit 4 displays the Land Cover Classes for the entire watershed. The majority of land in this area is assumed to be chaparral, narrowleaf. With the majority of the land being undeveloped the soil conditions assumed in the model were poor soil in order to take the most conservative approach. This raises the curve number of the model because the soil conditions do not have as much plant growth on them. Curve numbers were applied to each grid cell in the FLO-2D model based on intersecting the grid with the fallow soil and land cover data (Exhibit 5). The majority of the project area has a curve number between 60 and 90. Areas with a higher curve number will have more runoff and areas with a lower curve number will have less runoff. This is based on the type of soils, “A” soils have the highest infiltration rates and “D” soils have the lowest infiltration rates, along with the landcover of the area, dense vegetation will have less runoff and fallow farm fields and impervious areas will have more runoff.

The FLO-2D model was calibrated to CivilD by increasing the Manning’s and curve number values of the FLO-2D model. The Manning’s values were applied to each grid cell in the FLO-2D model based on intersecting the grid with the soils. The peak flow model results from FLO-2D matched closely (<3%) the Kern County results providing assurances that the FLO-2D software was performing adequately (Table 3).

Table 3: Comparison of modeling methods at calibration point

	CivilD (Kern County)	FLO-2D
Volume (ac-ft)	134.75	163.46
Peak Flow (cfs)	611.02	599.06

ON-SITE RETENTION REQUIREMENTS

The proposed solar project development will require retention to mitigate the runoff from the new impervious surfaces, primarily piles. Due to the spacing of the piles and parcels, it is not feasible to direct runoff from all array locations to a common basin. Therefore the proposed basin will not retain runoff from the entire site, but will be located in a common discharge point for as many piles as possible and will include the required capacity to offset the increased runoff from all of the piles. Runoff generated from

the piles and access roads will be allowed to disperse and infiltrate across the site in existing flow patterns.

The site layout and facilities have not yet been finalized but future basins will be placed throughout the project to meet the retention volume required when design is finalized. Table 4 below summarizes the proposed impervious areas and retention volumes provided as of 08/27/2019 based on Kern County retention requirements (Appendix E). The added piles to the site were assumed be 1% impervious cover of the site, however the onsite requirements and imperviousness will be updated during final design to ensure that it meets all the storage requirements. Additionally, pre-post State Water Balance Calculation sheets have been provided in Appendix F. The State Water Balance Calculator showsthe need for permanent drainage facilities but since the Kern County storage requirements are greater, the kern County method will be used for basin sizing.

Table 4: Proposed Impervious Areas and Kern County Retention Calculations

Site	10-yr, 5-day Rainfall Depth (in)	Impervious Cover (%)*	Drainage Area (ac)**	Retention Volume Required (ac-ft)	Retention Volume Provided (ac-ft)
Solar Project Development	3.20	1.00	4,000	10.67	TBD during Final Design
Total			4,000	10.67	TBD

*The impervious cover calculations are the added impervious piles at the panel locations.
**The drainage area is the area that is within the total temporary disturbance of the project.

The design volume for the retention basins is calculated Engineering Bulletin 11-02 of the Kern County Development Standards (KCDS). The runoff volume form the ISDD five-day storm is calculated as:

Retention Basin Volume (ac-ft) = $[(\mathbf{D_{10yr\text{-}5day}})/12](\mathbf{a\ i})(\mathbf{Area}) = 10.67$ ac-ft

Where,
$\mathbf{D_{10}}$ =10-yr, 5-day depth of rainfall (in) = 3.20 inches
a i=average percentage of impervious area = 1%
Area= Drainage area of total development = 4,000 acres

RESULTS AND DESIGN INFORMATION

Overall, the analysis shows low water depths and velocities (Exhibits 6 and 7) across the majority of the site (with the exception of the channelized flows throughout the center of project boundary). Due to the moderately sloped landscape in the area many channelized areas have depths over 1' and velocities >1fps. These areas of the site should be avoided. During a 100 year storm the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1 foot/second. Also due to the moderate slopes adjacent to the streams there are areas with erosion and velocity issues which should also be avoided. FEMA has completed a study to determine flood hazard for the selected location; therefore, a flood map has been published. There are FEMA flood hazards that affect the project area. The flood hazards should be avoided during final site placement and cover approximately 315 acres.

The Kern County requirements had to be met for the modeling criteria. The State of CA requires the state water balance calculator to be completed. The Kern County requirements are controlling.

Based on experience on other similar projects, the overall site is suitable for the planned development by avoiding areas of high flood depths and velocities.

NEXT STEPS

1. Final design should account for flood depths, velocities, and scour presented in Exhibits 6, 7 and 8 to protect infrastructure and meets Kern County Development Standards for construction in floodplains.

2. Crossing types (low water crossing or culvert) should be determined for each crossing location as determined based on field conditions.

3. The retention basin(s) should be located on the downstream sides of the properties and be no more than 18" deep to ensure that the basin infiltrates in 72 hours. If the basin is deeper than 18", freeboard and fencing requirements will be triggered. (408-3, 408-4 KCDS) Chapter VIII of the KCDS should be reviewed prior to final design to ensure that all construction criteria are being met.

4. The proposed project is not expected to cause more than 1 foot of water surface rise and discharges the 100-year storm in a manner similar to the existing flow pattern. (404-1 KCDS).

5. All electrical equipment will be set at least 2 feet above grade.

6. Scour calculations are shown on Exhibit 8 and are applicable for a W6x9 pile. If pile size is different from the assumed, scour should be recalculated.

7. The railroad though the FLO-2D boundary should be surveyed for accurate embankment height, along with accurate culvert sizes, locations, and elevations. This assumption has a large impact on the flooding on site and needs to be revised prior to final design.

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Exhibits

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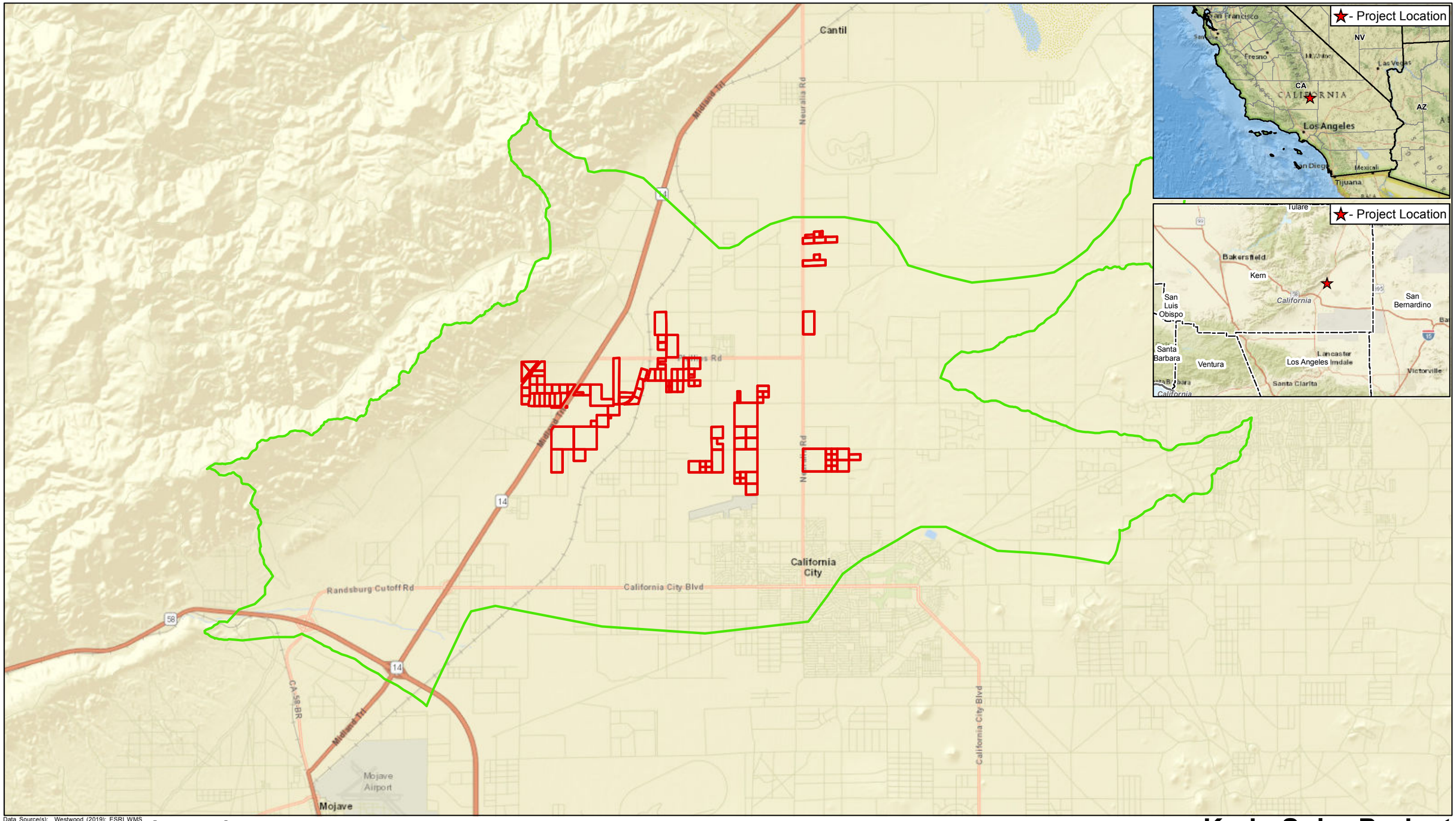

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary

Westwood
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N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 1: Location Map

August 27, 2019

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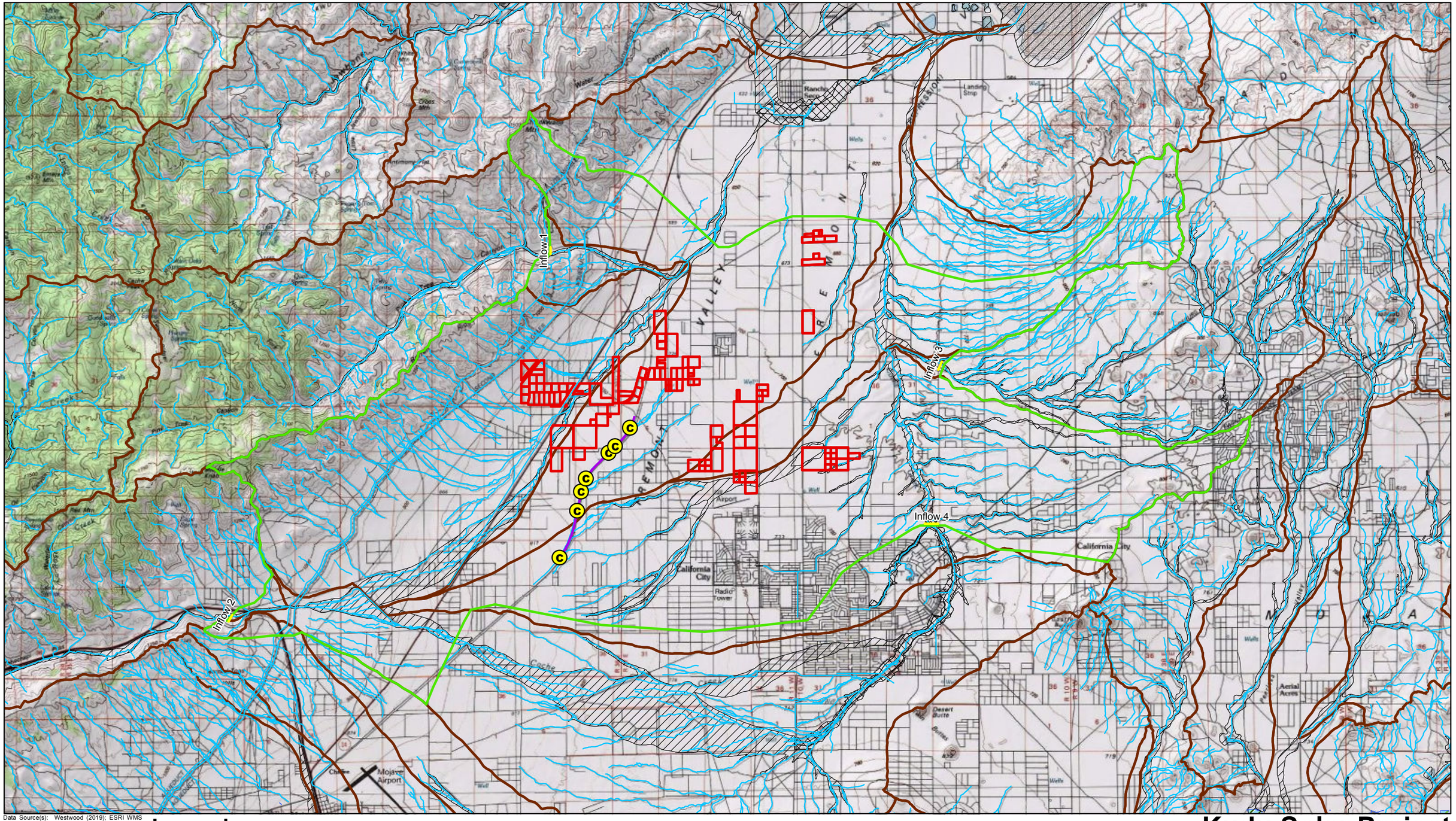

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- FEMA Zone A
- FEMA Zone AE
- CA DWR Awareness Floodplain
- NWI Wetlands
- HUC 12 Boundary
- NHD Flowline
- Inflow Location
- Elevation Adjusted due to Railroad
- Crossing Location

N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 2: Base Map

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Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- NHD Flowline

Hydrologic Soils Group

- A
- B
- C
- D

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N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 3: Soils Map

August 27, 2019

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX3SoilsMap.mxd 8/27/2019 10:06:53 AM mshildreth

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Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- NHD Flowline

Landcover

- Barren
- Chaparral, Narrowleaf
- Urban
- Woodland

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N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 4: Landcover Map

August 27, 2019

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX4Landcover Map.mxd 8/27/2019 10:07:12 AM mshildreth

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Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- 1-Foot Elevation Data Extents
- 10-Meter Elevation Data Extents
- HUC 12 Boundary
- NHD Flowline

Curve Number

- 60 - 69
- 70 - 79
- 80 - 89
- 90 - 99

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N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 5: Curve Number and Topographic Source Map

August 27, 2019

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Inflow 1

Inflow 8,060 cfs

Inflow 3

Inflow 8,000 cfs

Inflow 7,800 cfs

Inflow 4

Inflow 2

Inflow 11,600 cfs

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline
- Inflow Location

Peak Flow Depth (ft)

0.50 - 1.00 | 1.01 - 1.50 | 1.51 - 2.00 | 2.01 - 2.50 | 2.51 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00 | 5.01 - 6.00 | 6.01+

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N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 6: 100-Year Max Water Depth Map

August 24, 2020

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX6_100yrMaxFlowDepthMap.mxd 8/24/2020 1:02:06 PM mshildreth

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Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline

Peak Flow Depth (ft)

0.50 - 1.00 | 1.01 - 1.50 | 1.51 - 2.00 | 2.01 - 2.50 | 2.51 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00 | 5.01 - 6.00 | 6.01+

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N

0 Miles 0.75

Kudu Solar Project

Kern County, California

Exhibit 6A: 100-Year Max Water Depth Map Project Area

August 27, 2019

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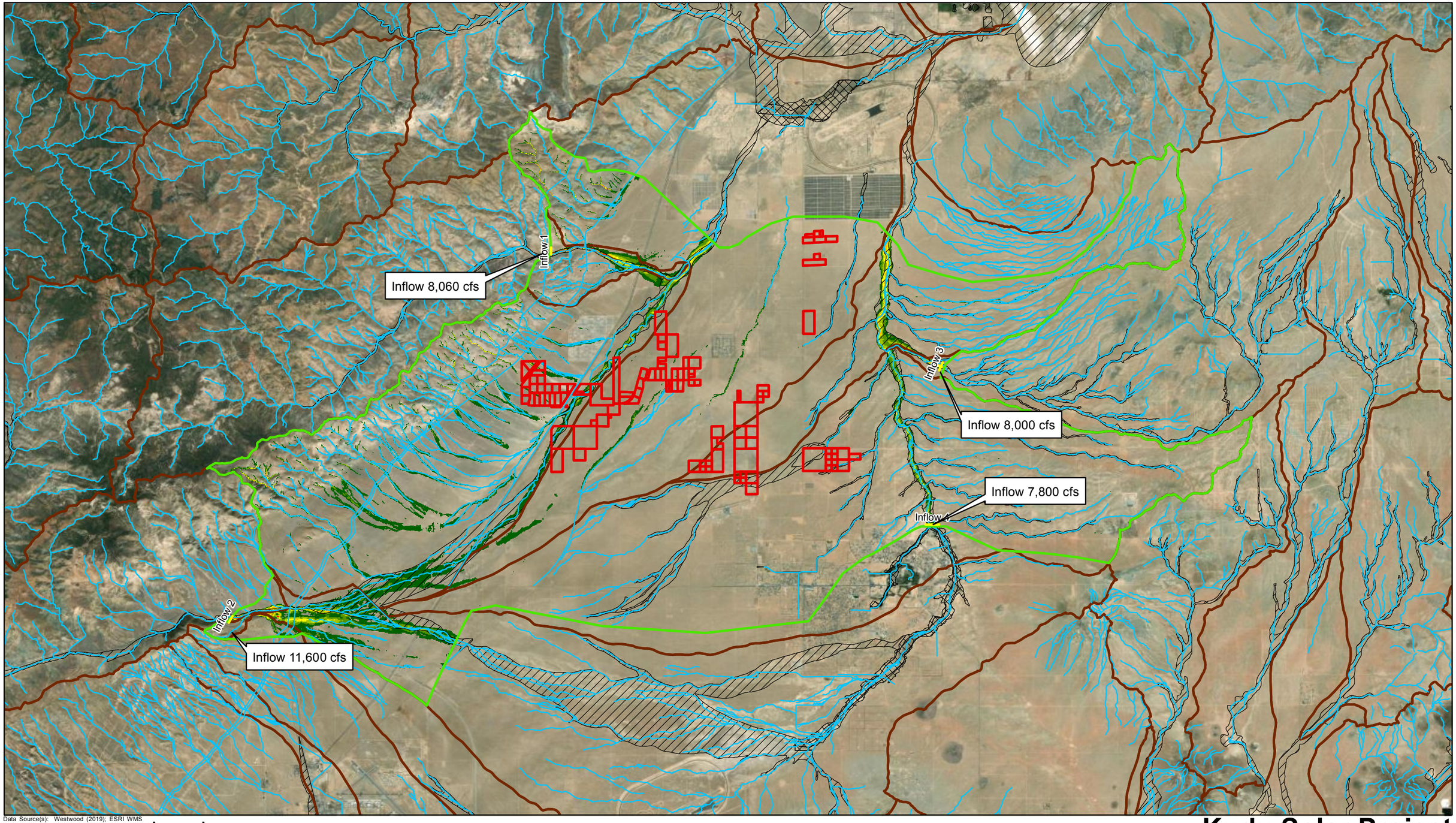

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline
- Inflow Location

Peak Velocity (fps)

1.00 - 1.50 | 1.51 - 2.00 | 2.01 - 2.50 | 2.51 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00 | 5.01+

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N

0 2 Miles

Kudu Solar Project

Kern County, California

Exhibit 7: 100-Year Peak Velocity Map

August 24, 2020

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX7_100yrPeakVelocityMap.mxd 8/24/2020 1:01:41 PM mshldreth

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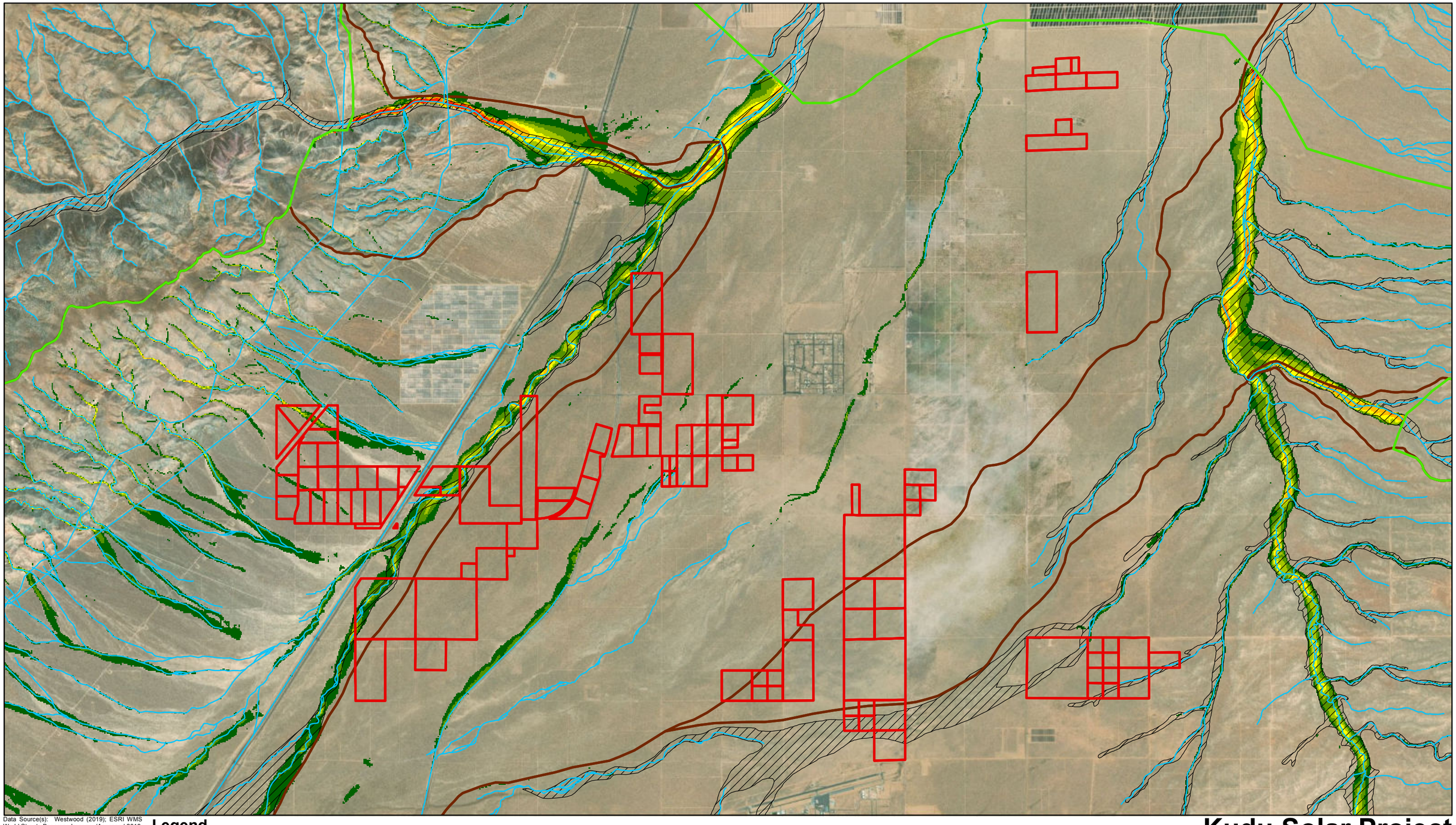

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline

Peak Velocity (fps)

1.00 - 1.50 | 1.51 - 2.00 | 2.01 - 2.50 | 2.51 - 3.00 | 3.01 - 4.00 | 4.01 - 5.00 | 5.01+

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

N

0 Miles 0.75

Kudu Solar Project

Kern County, California

Exhibit 7A: 100-Year Peak Velocity Map Project Area

August 27, 2019

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX7A_ 100yrPeakVelocityMap.mxd 8/27/2019 10:28:50 AM mshildreth

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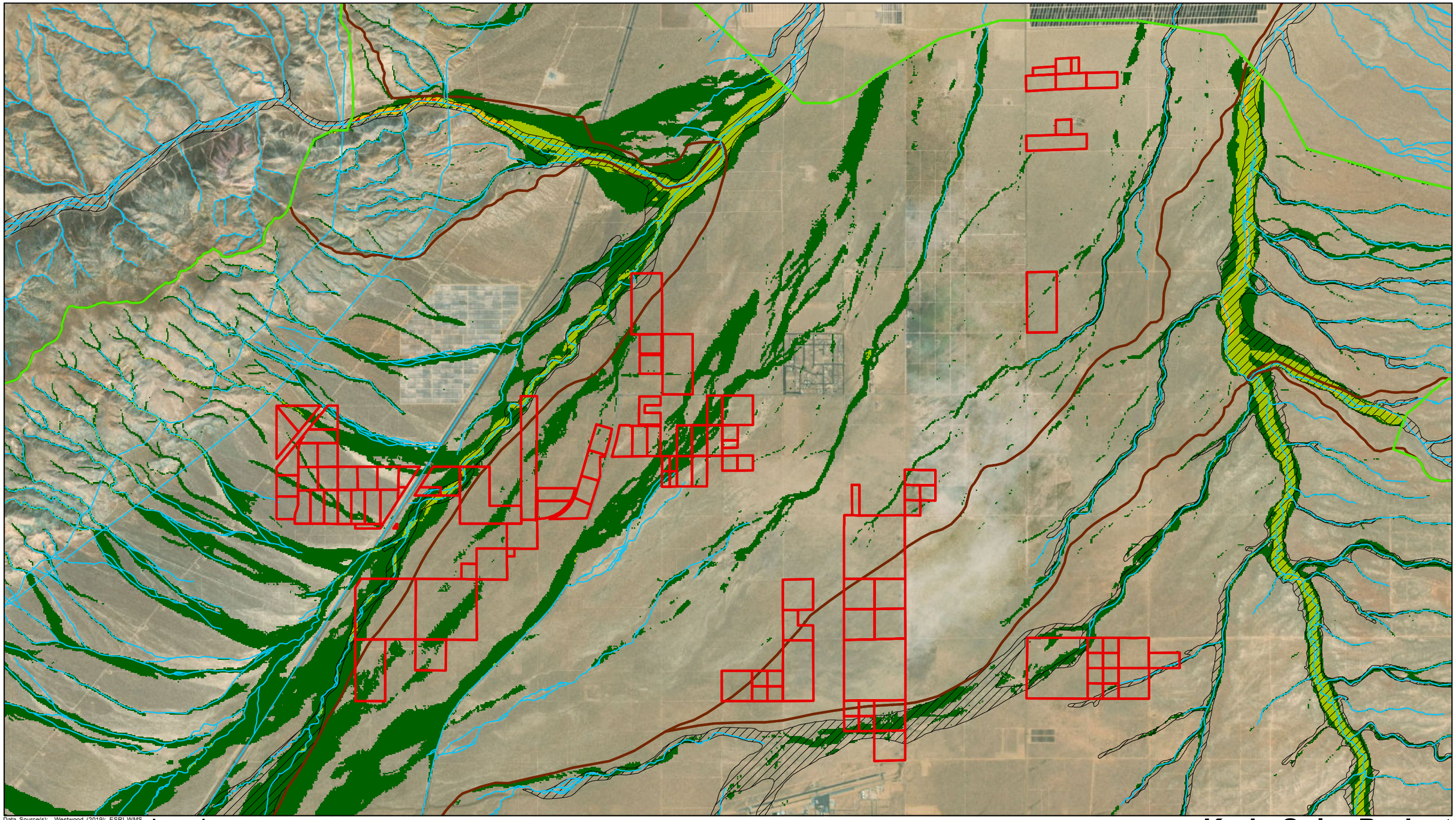

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline

Scour (ft)

- 0.50 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01+

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

N

0 Miles 0.75

Kudu Solar Project

Kern County, California

Exhibit 8: 100-Year Max Scour Depth Map Project Area

August 27, 2019

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX8_100yrScourMap.mxd 8/27/2019 11:05:30 AM mshildreth

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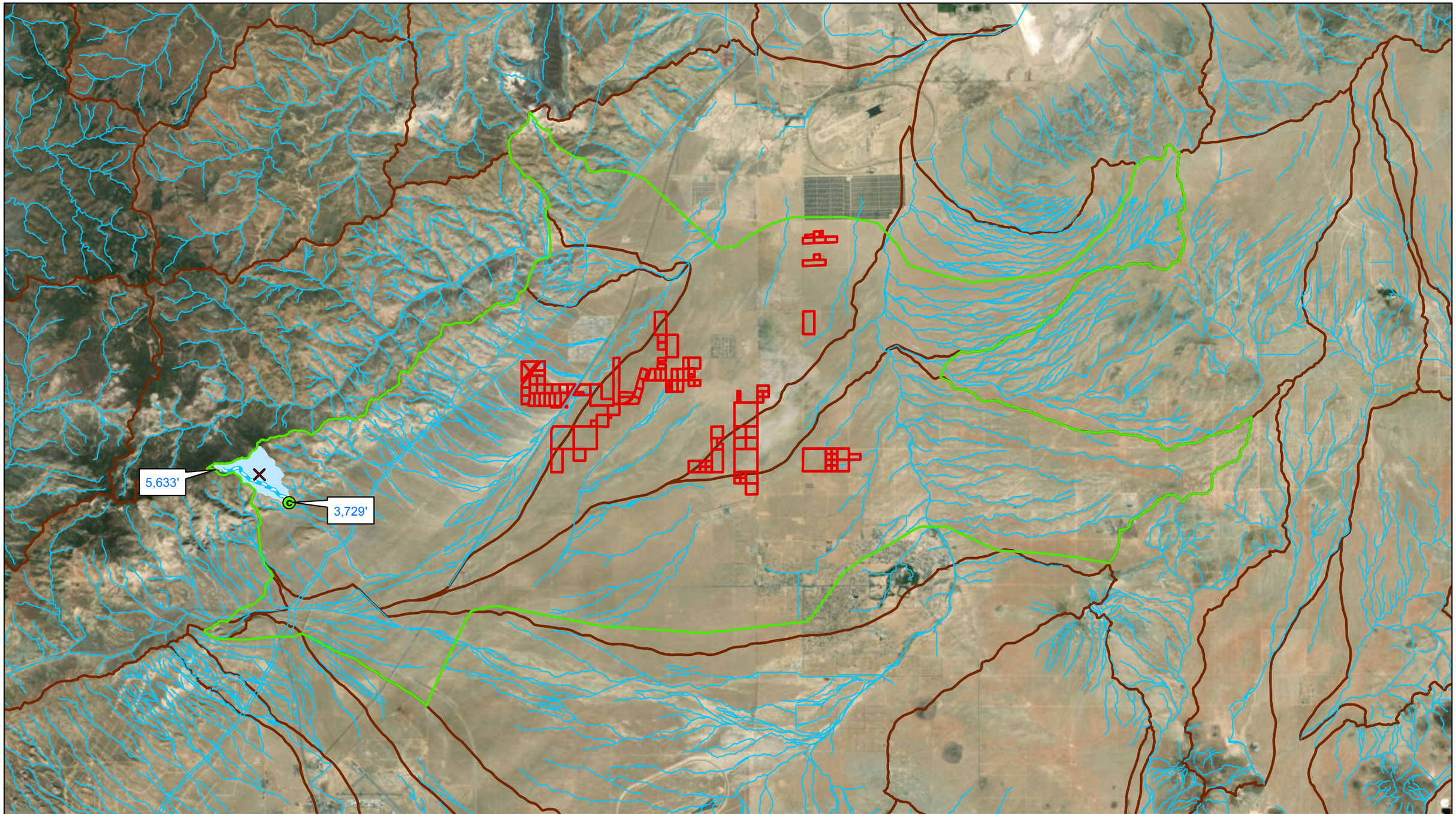

Data Source(s): Westwood (2019); ESRI WMS World Streets Basemap Imagery (Accessed 2019.

Legend

- FLO-2D Model Boundary
- Project Boundary
- County Boundary
- HUC 12 Boundary
- NHD Flowline
- Calibration Point
- Calibration Watershed Centroid
- Longest Watercourse
- Kern County Hydrology Calibration Watershed

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

N

0 Miles 2

Kudu Solar Project

Kern County, California

Exhibit 9: Kern County Hydrology Map

August 27, 2019

Map Document: N:\0023948.00\GIS\Hydro Exhibits\2019-08-27_Kudu_EX9KernCountyMap.mxd 8/27/2019 10:25:17 AM mshildreth

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Appendix A

CivilD Printouts (Kern County Hydrology Manual)

U n i t H y d r o g r a p h A n a l y s i s

Study date 04/18/19

++

Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6236

Kudu Solar

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.600

Zone Designation: Desert Region Latitude = 35.21

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	573.00	6	0.75
Rainfall data for year 2	573.00	24	1.27
Rainfall data for year 100	573.00	6	2.00
Rainfall data for year 100	573.00	24	3.71

```
      ----------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
      DESERT REGION area of study
      Log-Log Rainfall Intensity Slope =  0.60
      ----------------------------------------------------------------
--

      ******** Area-averaged max loss rate, Fm ********


      SCS curve     Area       Area       Fp      Ap        Fm
      Number         (Ac.)    Fraction   (In/Hr)  (dec.)   (In/Hr)
       91.0        573.00      1.000     0.180    1.000    0.180

      Area-averaged adjusted loss rate Fm (In/Hr) =  0.180

      ********* Area-Averaged low loss rate fraction, Yb **********

      Area       Area          SCS CN        S     Pervious
       (Ac.)      Fract         (AMC2)             Yield Fr
         573.00   1.000          91.0         0.99     0.739

      Area-averaged catchment yield fraction, Y =  0.739
      Area-averaged low loss fraction, Yb =  0.261
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
      Watercourse length =   10454.00(Ft.)
      Length from concentration point to centroid =    5544.00(Ft.)
      Elevation difference along watercourse =    1904.00(Ft.)
      Mannings friction factor along watercourse =  0.050
      Watershed area =     573.00(Ac.)
      Catchment Lag time =   0.430 hours
      Unit interval =   5.000 minutes
      Unit interval percentage of lag time = 19.3924
      Hydrograph baseflow =     0.00(CFS)
      Average maximum watershed loss rate(Fm) =  0.180(In/Hr)
      Average low loss rate fraction (Yb) = 0.261 (decimal)
      DESERT S-Graph Selected
      Computed peak 5-minute rainfall =  0.434(In)
      Computed peak 30-minute rainfall =  0.889(In)
      Specified peak 1-hour rainfall =  1.173(In)
      Computed peak 3-hour rainfall =  1.627(In)
      Specified peak 6-hour rainfall =  2.000(In)
      Specified peak 24-hour rainfall =  3.710(In)


      Note: User specified rainfall values used.
      Computed peak 5-minute rainfall =  0.290(In)
      Computed peak 30-minute rainfall =  0.691(In)
      Specified peak 1-hour rainfall =  0.960(In)
      Computed peak 3-hour rainfall =  1.520(In)
      Specified peak 6-hour rainfall =  2.000(In)
      Specified peak 24-hour rainfall =  3.710(In)


      Rainfall depth area reduction factors:
      Using a total area of     573.00(Ac.) (Ref: fig. E-4)
```

5-minute factor = 0.974 Adjusted rainfall = 0.283(In)
30-minute factor = 0.974 Adjusted rainfall = 0.673(In)
1-hour factor = 0.974 Adjusted rainfall = 0.935(In)
3-hour factor = 0.996 Adjusted rainfall = 1.514(In)
6-hour factor = 0.998 Adjusted rainfall = 1.996(In)
24-hour factor = 0.999 Adjusted rainfall = 3.706(In)

U n i t H y d r o g r a p h

+++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 6929.72 (CFS))		
1	1.081	74.903
2	4.191	215.541
3	10.407	430.752
4	23.999	941.878
5	42.270	1266.132
6	53.241	760.224
7	61.480	570.933
8	67.344	406.400
9	71.911	316.462
10	75.632	257.893
11	78.653	209.299
12	81.322	184.996
13	83.581	156.532
14	85.433	128.305
15	87.055	112.434
16	88.504	100.395
17	89.786	88.812
18	90.909	77.870
19	91.966	73.213
20	92.891	64.100
21	93.782	61.755
22	94.467	47.456
23	95.073	41.995
24	95.679	41.995
25	96.160	33.329
26	96.500	23.584
27	96.840	23.576
28	97.181	23.576
29	97.521	23.576
30	97.860	23.534
31	98.115	17.623
32	98.309	13.438
33	98.503	13.438
34	98.696	13.438
35	98.890	13.438
36	99.084	13.438
37	99.278	13.438
38	99.472	13.438
39	99.666	13.438
40	100.000	23.139

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	3.48	0.29	0.28	0.283
2	2.43	0.41	0.40	0.113
3	1.98	0.49	0.48	0.086
4	1.70	0.57	0.55	0.072
5	1.52	0.63	0.62	0.063
6	1.38	0.69	0.67	0.057
7	1.27	0.74	0.72	0.051
8	1.19	0.79	0.77	0.047
9	1.12	0.84	0.82	0.044
10	1.06	0.88	0.86	0.042
11	1.00	0.92	0.90	0.040
12	0.96	0.96	0.94	0.038
13	0.92	0.99	0.97	0.033
14	0.88	1.02	1.00	0.032
15	0.84	1.05	1.03	0.031
16	0.81	1.08	1.06	0.030
17	0.78	1.11	1.09	0.029
18	0.76	1.14	1.12	0.028
19	0.73	1.16	1.14	0.027
20	0.71	1.19	1.17	0.026
21	0.69	1.21	1.20	0.025
22	0.67	1.24	1.22	0.025
23	0.66	1.26	1.24	0.024
24	0.64	1.28	1.27	0.023
25	0.63	1.30	1.29	0.023
26	0.61	1.33	1.31	0.022
27	0.60	1.35	1.33	0.022
28	0.59	1.37	1.36	0.021
29	0.57	1.39	1.38	0.021
30	0.56	1.41	1.40	0.021
31	0.55	1.43	1.42	0.020
32	0.54	1.45	1.44	0.020
33	0.53	1.47	1.46	0.020
34	0.52	1.48	1.48	0.019
35	0.52	1.50	1.50	0.019
36	0.51	1.52	1.51	0.019
37	0.50	1.54	1.53	0.017
38	0.49	1.55	1.55	0.016
39	0.48	1.57	1.56	0.016
40	0.48	1.58	1.58	0.016
41	0.47	1.60	1.59	0.016
42	0.46	1.62	1.61	0.015
43	0.46	1.63	1.63	0.015
44	0.45	1.65	1.64	0.015
45	0.44	1.66	1.66	0.015
46	0.44	1.67	1.67	0.015
47	0.43	1.69	1.68	0.014
48	0.43	1.70	1.70	0.014
49	0.42	1.72	1.71	0.014
50	0.42	1.73	1.73	0.014
51	0.41	1.74	1.74	0.014
52	0.41	1.76	1.75	0.014
53	0.40	1.77	1.77	0.013
54	0.40	1.78	1.78	0.013
55	0.39	1.80	1.79	0.013
56	0.39	1.81	1.81	0.013
57	0.38	1.82	1.82	0.013

58	0.38	1.84	1.83	0.013
59	0.38	1.85	1.84	0.013
60	0.37	1.86	1.86	0.012
61	0.37	1.87	1.87	0.012
62	0.36	1.89	1.88	0.012
63	0.36	1.90	1.89	0.012
64	0.36	1.91	1.90	0.012
65	0.35	1.92	1.92	0.012
66	0.35	1.93	1.93	0.012
67	0.35	1.94	1.94	0.012
68	0.35	1.96	1.95	0.011
69	0.34	1.97	1.96	0.011
70	0.34	1.98	1.97	0.011
71	0.34	1.99	1.99	0.011
72	0.33	2.00	2.00	0.011
73	0.33	2.01	2.01	0.012
74	0.33	2.02	2.02	0.012
75	0.33	2.03	2.03	0.012
76	0.32	2.05	2.04	0.012
77	0.32	2.06	2.06	0.012
78	0.32	2.07	2.07	0.012
79	0.32	2.08	2.08	0.012
80	0.31	2.09	2.09	0.012
81	0.31	2.11	2.10	0.012
82	0.31	2.12	2.12	0.012
83	0.31	2.13	2.13	0.011
84	0.31	2.14	2.14	0.011
85	0.30	2.15	2.15	0.011
86	0.30	2.16	2.16	0.011
87	0.30	2.17	2.17	0.011
88	0.30	2.18	2.18	0.011
89	0.30	2.20	2.19	0.011
90	0.29	2.21	2.21	0.011
91	0.29	2.22	2.22	0.011
92	0.29	2.23	2.23	0.011
93	0.29	2.24	2.24	0.011
94	0.29	2.25	2.25	0.011
95	0.29	2.26	2.26	0.011
96	0.28	2.27	2.27	0.011
97	0.28	2.28	2.28	0.011
98	0.28	2.29	2.29	0.010
99	0.28	2.30	2.30	0.010
100	0.28	2.31	2.31	0.010
101	0.28	2.32	2.32	0.010
102	0.27	2.33	2.33	0.010
103	0.27	2.34	2.34	0.010
104	0.27	2.35	2.35	0.010
105	0.27	2.36	2.36	0.010
106	0.27	2.37	2.37	0.010
107	0.27	2.38	2.38	0.010
108	0.27	2.39	2.39	0.010
109	0.26	2.40	2.40	0.010
110	0.26	2.41	2.41	0.010
111	0.26	2.42	2.42	0.010
112	0.26	2.43	2.43	0.010
113	0.26	2.44	2.44	0.010
114	0.26	2.45	2.45	0.010
115	0.26	2.46	2.46	0.010
116	0.26	2.47	2.47	0.010
117	0.25	2.48	2.48	0.009

118	0.25	2.49	2.49	0.009
119	0.25	2.50	2.50	0.009
120	0.25	2.51	2.51	0.009
121	0.25	2.52	2.52	0.009
122	0.25	2.53	2.53	0.009
123	0.25	2.54	2.54	0.009
124	0.25	2.55	2.54	0.009
125	0.25	2.55	2.55	0.009
126	0.24	2.56	2.56	0.009
127	0.24	2.57	2.57	0.009
128	0.24	2.58	2.58	0.009
129	0.24	2.59	2.59	0.009
130	0.24	2.60	2.60	0.009
131	0.24	2.61	2.61	0.009
132	0.24	2.62	2.62	0.009
133	0.24	2.63	2.63	0.009
134	0.24	2.64	2.63	0.009
135	0.24	2.64	2.64	0.009
136	0.23	2.65	2.65	0.009
137	0.23	2.66	2.66	0.009
138	0.23	2.67	2.67	0.009
139	0.23	2.68	2.68	0.009
140	0.23	2.69	2.69	0.009
141	0.23	2.70	2.69	0.009
142	0.23	2.70	2.70	0.009
143	0.23	2.71	2.71	0.008
144	0.23	2.72	2.72	0.008
145	0.23	2.73	2.73	0.008
146	0.23	2.74	2.74	0.008
147	0.22	2.75	2.74	0.008
148	0.22	2.75	2.75	0.008
149	0.22	2.76	2.76	0.008
150	0.22	2.77	2.77	0.008
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152	0.22	2.79	2.79	0.008
153	0.22	2.80	2.79	0.008
154	0.22	2.80	2.80	0.008
155	0.22	2.81	2.81	0.008
156	0.22	2.82	2.82	0.008
157	0.22	2.83	2.83	0.008
158	0.22	2.84	2.83	0.008
159	0.21	2.84	2.84	0.008
160	0.21	2.85	2.85	0.008
161	0.21	2.86	2.86	0.008
162	0.21	2.87	2.87	0.008
163	0.21	2.88	2.87	0.008
164	0.21	2.88	2.88	0.008
165	0.21	2.89	2.89	0.008
166	0.21	2.90	2.90	0.008
167	0.21	2.91	2.91	0.008
168	0.21	2.91	2.91	0.008
169	0.21	2.92	2.92	0.008
170	0.21	2.93	2.93	0.008
171	0.21	2.94	2.94	0.008
172	0.21	2.95	2.94	0.008
173	0.20	2.95	2.95	0.008
174	0.20	2.96	2.96	0.008
175	0.20	2.97	2.97	0.008
176	0.20	2.98	2.97	0.008
177	0.20	2.98	2.98	0.008

178	0.20	2.99	2.99	0.008
179	0.20	3.00	3.00	0.007
180	0.20	3.01	3.00	0.007
181	0.20	3.01	3.01	0.007
182	0.20	3.02	3.02	0.007
183	0.20	3.03	3.03	0.007
184	0.20	3.04	3.03	0.007
185	0.20	3.04	3.04	0.007
186	0.20	3.05	3.05	0.007
187	0.20	3.06	3.06	0.007
188	0.20	3.06	3.06	0.007
189	0.20	3.07	3.07	0.007
190	0.19	3.08	3.08	0.007
191	0.19	3.09	3.09	0.007
192	0.19	3.09	3.09	0.007
193	0.19	3.10	3.10	0.007
194	0.19	3.11	3.11	0.007
195	0.19	3.12	3.11	0.007
196	0.19	3.12	3.12	0.007
197	0.19	3.13	3.13	0.007
198	0.19	3.14	3.14	0.007
199	0.19	3.14	3.14	0.007
200	0.19	3.15	3.15	0.007
201	0.19	3.16	3.16	0.007
202	0.19	3.16	3.16	0.007
203	0.19	3.17	3.17	0.007
204	0.19	3.18	3.18	0.007
205	0.19	3.19	3.18	0.007
206	0.19	3.19	3.19	0.007
207	0.19	3.20	3.20	0.007
208	0.18	3.21	3.20	0.007
209	0.18	3.21	3.21	0.007
210	0.18	3.22	3.22	0.007
211	0.18	3.23	3.23	0.007
212	0.18	3.23	3.23	0.007
213	0.18	3.24	3.24	0.007
214	0.18	3.25	3.25	0.007
215	0.18	3.25	3.25	0.007
216	0.18	3.26	3.26	0.007
217	0.18	3.27	3.27	0.007
218	0.18	3.27	3.27	0.007
219	0.18	3.28	3.28	0.007
220	0.18	3.29	3.29	0.007
221	0.18	3.29	3.29	0.007
222	0.18	3.30	3.30	0.007
223	0.18	3.31	3.31	0.007
224	0.18	3.31	3.31	0.007
225	0.18	3.32	3.32	0.007
226	0.18	3.33	3.33	0.007
227	0.18	3.33	3.33	0.007
228	0.18	3.34	3.34	0.007
229	0.18	3.35	3.35	0.007
230	0.17	3.35	3.35	0.007
231	0.17	3.36	3.36	0.006
232	0.17	3.37	3.36	0.006
233	0.17	3.37	3.37	0.006
234	0.17	3.38	3.38	0.006
235	0.17	3.39	3.38	0.006
236	0.17	3.39	3.39	0.006
237	0.17	3.40	3.40	0.006

238	0.17	3.40	3.40	0.006
239	0.17	3.41	3.41	0.006
240	0.17	3.42	3.42	0.006
241	0.17	3.42	3.42	0.006
242	0.17	3.43	3.43	0.006
243	0.17	3.44	3.44	0.006
244	0.17	3.44	3.44	0.006
245	0.17	3.45	3.45	0.006
246	0.17	3.45	3.45	0.006
247	0.17	3.46	3.46	0.006
248	0.17	3.47	3.47	0.006
249	0.17	3.47	3.47	0.006
250	0.17	3.48	3.48	0.006
251	0.17	3.49	3.49	0.006
252	0.17	3.49	3.49	0.006
253	0.17	3.50	3.50	0.006
254	0.17	3.50	3.50	0.006
255	0.17	3.51	3.51	0.006
256	0.16	3.52	3.52	0.006
257	0.16	3.52	3.52	0.006
258	0.16	3.53	3.53	0.006
259	0.16	3.54	3.53	0.006
260	0.16	3.54	3.54	0.006
261	0.16	3.55	3.55	0.006
262	0.16	3.55	3.55	0.006
263	0.16	3.56	3.56	0.006
264	0.16	3.57	3.56	0.006
265	0.16	3.57	3.57	0.006
266	0.16	3.58	3.58	0.006
267	0.16	3.58	3.58	0.006
268	0.16	3.59	3.59	0.006
269	0.16	3.60	3.59	0.006
270	0.16	3.60	3.60	0.006
271	0.16	3.61	3.61	0.006
272	0.16	3.61	3.61	0.006
273	0.16	3.62	3.62	0.006
274	0.16	3.62	3.62	0.006
275	0.16	3.63	3.63	0.006
276	0.16	3.64	3.64	0.006
277	0.16	3.64	3.64	0.006
278	0.16	3.65	3.65	0.006
279	0.16	3.65	3.65	0.006
280	0.16	3.66	3.66	0.006
281	0.16	3.67	3.67	0.006
282	0.16	3.67	3.67	0.006
283	0.16	3.68	3.68	0.006
284	0.16	3.68	3.68	0.006
285	0.16	3.69	3.69	0.006
286	0.16	3.69	3.69	0.006
287	0.15	3.70	3.70	0.006
288	0.15	3.71	3.71	0.006

Time = 24.00 Hours Total unit rainfall = 3.71(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0057	0.0015	0.0042

2	0.0058	0.0015	0.0043
3	0.0058	0.0015	0.0043
4	0.0058	0.0015	0.0043
5	0.0058	0.0015	0.0043
6	0.0058	0.0015	0.0043
7	0.0058	0.0015	0.0043
8	0.0059	0.0015	0.0043
9	0.0059	0.0015	0.0043
10	0.0059	0.0015	0.0044
11	0.0059	0.0015	0.0044
12	0.0059	0.0016	0.0044
13	0.0060	0.0016	0.0044
14	0.0060	0.0016	0.0044
15	0.0060	0.0016	0.0044
16	0.0060	0.0016	0.0044
17	0.0060	0.0016	0.0045
18	0.0060	0.0016	0.0045
19	0.0061	0.0016	0.0045
20	0.0061	0.0016	0.0045
21	0.0061	0.0016	0.0045
22	0.0061	0.0016	0.0045
23	0.0061	0.0016	0.0045
24	0.0062	0.0016	0.0046
25	0.0062	0.0016	0.0046
26	0.0062	0.0016	0.0046
27	0.0062	0.0016	0.0046
28	0.0062	0.0016	0.0046
29	0.0063	0.0016	0.0046
30	0.0063	0.0016	0.0046
31	0.0063	0.0017	0.0047
32	0.0063	0.0017	0.0047
33	0.0064	0.0017	0.0047
34	0.0064	0.0017	0.0047
35	0.0064	0.0017	0.0047
36	0.0064	0.0017	0.0047
37	0.0064	0.0017	0.0048
38	0.0065	0.0017	0.0048
39	0.0065	0.0017	0.0048
40	0.0065	0.0017	0.0048
41	0.0065	0.0017	0.0048
42	0.0066	0.0017	0.0048
43	0.0066	0.0017	0.0049
44	0.0066	0.0017	0.0049
45	0.0066	0.0017	0.0049
46	0.0067	0.0017	0.0049
47	0.0067	0.0017	0.0049
48	0.0067	0.0018	0.0050
49	0.0067	0.0018	0.0050
50	0.0068	0.0018	0.0050
51	0.0068	0.0018	0.0050
52	0.0068	0.0018	0.0050
53	0.0068	0.0018	0.0051
54	0.0069	0.0018	0.0051
55	0.0069	0.0018	0.0051
56	0.0069	0.0018	0.0051
57	0.0070	0.0018	0.0051
58	0.0070	0.0018	0.0052
59	0.0070	0.0018	0.0052
60	0.0070	0.0018	0.0052
61	0.0071	0.0018	0.0052

62	0.0071	0.0019	0.0052
63	0.0071	0.0019	0.0053
64	0.0072	0.0019	0.0053
65	0.0072	0.0019	0.0053
66	0.0072	0.0019	0.0053
67	0.0073	0.0019	0.0054
68	0.0073	0.0019	0.0054
69	0.0073	0.0019	0.0054
70	0.0073	0.0019	0.0054
71	0.0074	0.0019	0.0055
72	0.0074	0.0019	0.0055
73	0.0075	0.0019	0.0055
74	0.0075	0.0020	0.0055
75	0.0075	0.0020	0.0056
76	0.0076	0.0020	0.0056
77	0.0076	0.0020	0.0056
78	0.0076	0.0020	0.0056
79	0.0077	0.0020	0.0057
80	0.0077	0.0020	0.0057
81	0.0078	0.0020	0.0057
82	0.0078	0.0020	0.0057
83	0.0078	0.0020	0.0058
84	0.0079	0.0021	0.0058
85	0.0079	0.0021	0.0058
86	0.0079	0.0021	0.0059
87	0.0080	0.0021	0.0059
88	0.0080	0.0021	0.0059
89	0.0081	0.0021	0.0060
90	0.0081	0.0021	0.0060
91	0.0082	0.0021	0.0060
92	0.0082	0.0021	0.0061
93	0.0083	0.0022	0.0061
94	0.0083	0.0022	0.0061
95	0.0083	0.0022	0.0062
96	0.0084	0.0022	0.0062
97	0.0084	0.0022	0.0062
98	0.0085	0.0022	0.0063
99	0.0085	0.0022	0.0063
100	0.0086	0.0022	0.0063
101	0.0086	0.0023	0.0064
102	0.0087	0.0023	0.0064
103	0.0088	0.0023	0.0065
104	0.0088	0.0023	0.0065
105	0.0089	0.0023	0.0065
106	0.0089	0.0023	0.0066
107	0.0090	0.0023	0.0066
108	0.0090	0.0024	0.0067
109	0.0091	0.0024	0.0067
110	0.0091	0.0024	0.0067
111	0.0092	0.0024	0.0068
112	0.0093	0.0024	0.0068
113	0.0093	0.0024	0.0069
114	0.0094	0.0025	0.0069
115	0.0095	0.0025	0.0070
116	0.0095	0.0025	0.0070
117	0.0096	0.0025	0.0071
118	0.0097	0.0025	0.0071
119	0.0098	0.0026	0.0072
120	0.0098	0.0026	0.0072
121	0.0099	0.0026	0.0073

122	0.0100	0.0026	0.0074
123	0.0101	0.0026	0.0074
124	0.0101	0.0026	0.0075
125	0.0102	0.0027	0.0076
126	0.0103	0.0027	0.0076
127	0.0104	0.0027	0.0077
128	0.0105	0.0027	0.0077
129	0.0106	0.0028	0.0078
130	0.0106	0.0028	0.0079
131	0.0108	0.0028	0.0080
132	0.0108	0.0028	0.0080
133	0.0110	0.0029	0.0081
134	0.0110	0.0029	0.0082
135	0.0112	0.0029	0.0083
136	0.0112	0.0029	0.0083
137	0.0114	0.0030	0.0084
138	0.0115	0.0030	0.0085
139	0.0116	0.0030	0.0086
140	0.0117	0.0031	0.0087
141	0.0119	0.0031	0.0088
142	0.0120	0.0031	0.0088
143	0.0121	0.0032	0.0090
144	0.0122	0.0032	0.0090
145	0.0111	0.0029	0.0082
146	0.0112	0.0029	0.0083
147	0.0114	0.0030	0.0084
148	0.0115	0.0030	0.0085
149	0.0117	0.0031	0.0086
150	0.0118	0.0031	0.0087
151	0.0120	0.0031	0.0089
152	0.0122	0.0032	0.0090
153	0.0124	0.0032	0.0092
154	0.0125	0.0033	0.0093
155	0.0128	0.0033	0.0094
156	0.0129	0.0034	0.0095
157	0.0132	0.0035	0.0098
158	0.0134	0.0035	0.0099
159	0.0137	0.0036	0.0101
160	0.0138	0.0036	0.0102
161	0.0142	0.0037	0.0105
162	0.0144	0.0038	0.0106
163	0.0148	0.0039	0.0109
164	0.0150	0.0039	0.0111
165	0.0154	0.0040	0.0114
166	0.0156	0.0041	0.0115
167	0.0161	0.0042	0.0119
168	0.0164	0.0043	0.0121
169	0.0186	0.0049	0.0137
170	0.0189	0.0049	0.0139
171	0.0195	0.0051	0.0144
172	0.0199	0.0052	0.0147
173	0.0206	0.0054	0.0152
174	0.0210	0.0055	0.0155
175	0.0219	0.0057	0.0162
176	0.0224	0.0058	0.0165
177	0.0234	0.0061	0.0173
178	0.0240	0.0063	0.0177
179	0.0253	0.0066	0.0187
180	0.0260	0.0068	0.0192
181	0.0277	0.0072	0.0204

182	0.0286	0.0075	0.0211
183	0.0307	0.0080	0.0227
184	0.0320	0.0084	0.0236
185	0.0378	0.0099	0.0279
186	0.0397	0.0104	0.0293
187	0.0443	0.0116	0.0328
188	0.0474	0.0124	0.0350
189	0.0569	0.0149	0.0421
190	0.0632	0.0150*	0.0482
191	0.0858	0.0150*	0.0708
192	0.1128	0.0150*	0.0978
193	0.2826	0.0150*	0.2676
194	0.0720	0.0150*	0.0570
195	0.0511	0.0133	0.0377
196	0.0418	0.0109	0.0309
197	0.0334	0.0087	0.0247
198	0.0296	0.0077	0.0219
199	0.0268	0.0070	0.0198
200	0.0246	0.0064	0.0182
201	0.0229	0.0060	0.0169
202	0.0215	0.0056	0.0158
203	0.0202	0.0053	0.0149
204	0.0192	0.0050	0.0142
205	0.0166	0.0043	0.0123
206	0.0159	0.0041	0.0117
207	0.0152	0.0040	0.0112
208	0.0146	0.0038	0.0108
209	0.0140	0.0037	0.0104
210	0.0135	0.0035	0.0100
211	0.0131	0.0034	0.0097
212	0.0127	0.0033	0.0093
213	0.0123	0.0032	0.0091
214	0.0119	0.0031	0.0088
215	0.0116	0.0030	0.0086
216	0.0113	0.0030	0.0083
217	0.0123	0.0032	0.0091
218	0.0121	0.0031	0.0089
219	0.0118	0.0031	0.0087
220	0.0116	0.0030	0.0085
221	0.0113	0.0030	0.0084
222	0.0111	0.0029	0.0082
223	0.0109	0.0028	0.0081
224	0.0107	0.0028	0.0079
225	0.0105	0.0027	0.0078
226	0.0103	0.0027	0.0076
227	0.0102	0.0027	0.0075
228	0.0100	0.0026	0.0074
229	0.0099	0.0026	0.0073
230	0.0097	0.0025	0.0072
231	0.0096	0.0025	0.0071
232	0.0094	0.0025	0.0070
233	0.0093	0.0024	0.0069
234	0.0092	0.0024	0.0068
235	0.0091	0.0024	0.0067
236	0.0089	0.0023	0.0066
237	0.0088	0.0023	0.0065
238	0.0087	0.0023	0.0064
239	0.0086	0.0023	0.0064
240	0.0085	0.0022	0.0063
241	0.0084	0.0022	0.0062

242	0.0083	0.0022	0.0061
243	0.0082	0.0021	0.0061
244	0.0081	0.0021	0.0060
245	0.0080	0.0021	0.0059
246	0.0080	0.0021	0.0059
247	0.0079	0.0021	0.0058
248	0.0078	0.0020	0.0058
249	0.0077	0.0020	0.0057
250	0.0077	0.0020	0.0057
251	0.0076	0.0020	0.0056
252	0.0075	0.0020	0.0055
253	0.0074	0.0019	0.0055
254	0.0074	0.0019	0.0054
255	0.0073	0.0019	0.0054
256	0.0072	0.0019	0.0053
257	0.0072	0.0019	0.0053
258	0.0071	0.0019	0.0053
259	0.0071	0.0018	0.0052
260	0.0070	0.0018	0.0052
261	0.0069	0.0018	0.0051
262	0.0069	0.0018	0.0051
263	0.0068	0.0018	0.0050
264	0.0068	0.0018	0.0050
265	0.0067	0.0018	0.0050
266	0.0067	0.0017	0.0049
267	0.0066	0.0017	0.0049
268	0.0066	0.0017	0.0049
269	0.0065	0.0017	0.0048
270	0.0065	0.0017	0.0048
271	0.0064	0.0017	0.0048
272	0.0064	0.0017	0.0047
273	0.0063	0.0017	0.0047
274	0.0063	0.0016	0.0047
275	0.0063	0.0016	0.0046
276	0.0062	0.0016	0.0046
277	0.0062	0.0016	0.0046
278	0.0061	0.0016	0.0045
279	0.0061	0.0016	0.0045
280	0.0061	0.0016	0.0045
281	0.0060	0.0016	0.0044
282	0.0060	0.0016	0.0044
283	0.0059	0.0016	0.0044
284	0.0059	0.0015	0.0044
285	0.0059	0.0015	0.0043
286	0.0058	0.0015	0.0043
287	0.0058	0.0015	0.0043
288	0.0058	0.0015	0.0043
	3.7057	0.8823	2.8234

Total soil rain loss = 0.88(In)
Total effective rainfall = 2.82(In)
Peak flow rate in flood hydrograph = 611.02(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	175.0	350.0	525.0	700.0
0+ 5	0.0022	0.32	Q				
0+10	0.0107	1.23	Q				
0+15	0.0318	3.07	Q				
0+20	0.0805	7.07	Q				
0+25	0.1664	12.47	Q				
0+30	0.2747	15.73	Q				
0+35	0.4000	18.20	VQ				
0+40	0.5376	19.97	VQ				
0+45	0.6848	21.38	VQ				
0+50	0.8400	22.53	VQ				
0+55	1.0017	23.49	VQ				
1+ 0	1.1694	24.34	VQ				
1+ 5	1.3421	25.08	VQ				
1+10	1.5191	25.70	VQ				
1+15	1.6999	26.26	VQ				
1+20	1.8842	26.76	VQ				
1+25	2.0717	27.22	VQ				
1+30	2.2620	27.63	VQ				
1+35	2.4550	28.03	VQ				
1+40	2.6505	28.39	VQ				
1+45	2.8484	28.74	VQ				
1+50	3.0484	29.03	VQ				
1+55	3.2501	29.30	VQ				
2+ 0	3.4538	29.57	|Q				

2+ 5	3.6591	29.80	|Q	|	|	|
2+10	3.8657	30.00	|Q	|	|	|
2+15	4.0736	30.20	|Q	|	|	|
2+20	4.2829	30.39	|Q	|	|	|
2+25	4.4936	30.59	|Q	|	|	|
2+30	4.7057	30.79	|Q	|	|	|
2+35	4.9190	30.97	|Q	|	|	|
2+40	5.1333	31.13	|Q	|	|	|
2+45	5.3488	31.29	|Q	|	|	|
2+50	5.5654	31.45	|Q	|	|	|
2+55	5.7831	31.61	|Q	|	|	|
3+ 0	6.0019	31.77	|Q	|	|	|
3+ 5	6.2219	31.94	|Q	|	|	|
3+10	6.4430	32.10	|Q	|	|	|
3+15	6.6652	32.27	|Q	|	|	|
3+20	6.8889	32.48	|QV	|	|	|
3+25	7.1134	32.60	|QV	|	|	|
3+30	7.3387	32.71	|QV	|	|	|
3+35	7.5648	32.82	|QV	|	|	|
3+40	7.7916	32.94	|QV	|	|	|
3+45	8.0193	33.06	|QV	|	|	|
3+50	8.2478	33.18	|QV	|	|	|
3+55	8.4771	33.30	|QV	|	|	|
4+ 0	8.7072	33.42	|QV	|	|	|
4+ 5	8.9382	33.54	|QV	|	|	|
4+10	9.1701	33.66	|QV	|	|	|
4+15	9.4028	33.79	|QV	|	|	|
4+20	9.6363	33.91	|QV	|	|	|
4+25	9.8708	34.04	|QV	|	|	|
4+30	10.1061	34.17	|QV	|	|	|

4+35	10.3424	34.30	|Q V	|	|	|
4+40	10.5795	34.43	|Q V	|	|	|
4+45	10.8175	34.57	|Q V	|	|	|
4+50	11.0565	34.70	|Q V	|	|	|
4+55	11.2964	34.84	|Q V	|	|	|
5+ 0	11.5373	34.97	|Q V	|	|	|
5+ 5	11.7791	35.11	| QV	|	|	|
5+10	12.0219	35.25	| QV	|	|	|
5+15	12.2657	35.40	| QV	|	|	|
5+20	12.5104	35.54	| QV	|	|	|
5+25	12.7562	35.69	| QV	|	|	|
5+30	13.0030	35.83	| QV	|	|	|
5+35	13.2508	35.98	| QV	|	|	|
5+40	13.4996	36.13	| Q V	|	|	|
5+45	13.7495	36.28	| Q V	|	|	|
5+50	14.0005	36.44	| Q V	|	|	|
5+55	14.2525	36.60	| Q V	|	|	|
6+ 0	14.5056	36.75	| Q V	|	|	|
6+ 5	14.7598	36.91	| Q V	|	|	|
6+10	15.0152	37.07	| Q V	|	|	|
6+15	15.2716	37.24	| Q V	|	|	|
6+20	15.5292	37.40	| Q V	|	|	|
6+25	15.7880	37.57	| Q V	|	|	|
6+30	16.0479	37.74	| Q V	|	|	|
6+35	16.3090	37.92	| Q V	|	|	|
6+40	16.5714	38.09	| Q V	|	|	|
6+45	16.8349	38.27	| Q V	|	|	|
6+50	17.0997	38.44	| Q V	|	|	|
6+55	17.3657	38.63	| Q V	|	|	|
7+ 0	17.6330	38.81	| Q V	|	|	|

7+ 5	17.9016	39.00	Q V			
7+10	18.1715	39.19	Q V			
7+15	18.4427	39.38	Q V			
7+20	18.7152	39.57	Q V			
7+25	18.9891	39.77	Q V			
7+30	19.2644	39.97	Q V			
7+35	19.5411	40.17	Q V			
7+40	19.8192	40.38	Q V			
7+45	20.0987	40.59	Q V			
7+50	20.3797	40.80	Q V			
7+55	20.6622	41.01	Q V			
8+ 0	20.9461	41.23	Q V			
8+ 5	21.2316	41.45	Q V			
8+10	21.5186	41.68	Q V			
8+15	21.8073	41.91	Q V			
8+20	22.0975	42.14	Q V			
8+25	22.3893	42.37	Q V			
8+30	22.6828	42.61	Q V			
8+35	22.9779	42.86	Q V			
8+40	23.2748	43.10	Q V			
8+45	23.5734	43.35	Q V			
8+50	23.8737	43.61	Q V			
8+55	24.1758	43.87	Q V			
9+ 0	24.4797	44.13	Q V			
9+ 5	24.7855	44.40	Q V			
9+10	25.0932	44.67	Q V			
9+15	25.4028	44.95	Q V			
9+20	25.7143	45.23	Q V			
9+25	26.0278	45.52	Q V			
9+30	26.3433	45.81	Q V			

9+35	26.6609	46.11	Q V		
9+40	26.9806	46.42	Q V		
9+45	27.3024	46.73	Q V		
9+50	27.6264	47.04	Q V		
9+55	27.9526	47.37	Q V		
10+ 0	28.2810	47.69	Q V		
10+ 5	28.6118	48.03	Q V		
10+10	28.9449	48.37	Q V		
10+15	29.2804	48.72	Q V		
10+20	29.6184	49.07	Q V		
10+25	29.9588	49.43	Q V		
10+30	30.3018	49.80	Q V		
10+35	30.6474	50.18	Q V		
10+40	30.9956	50.57	Q V		
10+45	31.3466	50.96	Q V		
10+50	31.7004	51.36	Q V		
10+55	32.0570	51.78	Q V		
11+ 0	32.4165	52.20	Q V		
11+ 5	32.7790	52.64	Q V		
11+10	33.1445	53.07	Q V		
11+15	33.5132	53.53	Q V		
11+20	33.8850	53.99	Q V		
11+25	34.2602	54.47	Q V		
11+30	34.6386	54.95	Q V		
11+35	35.0206	55.46	Q V		
11+40	35.4060	55.97	Q V		
11+45	35.7952	56.50	Q V		
11+50	36.1880	57.04	Q V		
11+55	36.5847	57.60	Q V		
12+ 0	36.9852	58.16	Q V		

12+ 5	37.3894	58.69	Q	V		
12+10	37.7963	59.08	Q	V		
12+15	38.2046	59.28	Q	V		
12+20	38.6109	59.00	Q	V		
12+25	39.0133	58.43	Q	V		
12+30	39.4152	58.36	Q	V		
12+35	39.8181	58.50	Q	V		
12+40	40.2232	58.81	Q	V		
12+45	40.6313	59.25	Q	V		
12+50	41.0428	59.76	Q	V		
12+55	41.4585	60.35	Q	V		
13+ 0	41.8785	60.98	Q	V		
13+ 5	42.3033	61.69	Q	V		
13+10	42.7333	62.44	Q	V		
13+15	43.1689	63.25	Q	V		
13+20	43.6104	64.10	Q	V		
13+25	44.0582	65.02	Q	V		
13+30	44.5126	65.97	Q	V		
13+35	44.9740	67.00	Q	V		
13+40	45.4427	68.06	Q	V		
13+45	45.9192	69.19	Q	V		
13+50	46.4039	70.38	Q	V		
13+55	46.8975	71.66	Q	V		
14+ 0	47.4001	72.98	Q	V		
14+ 5	47.9132	74.51	Q	V		
14+10	48.4385	76.27	Q	V		
14+15	48.9786	78.42	Q	V		
14+20	49.5383	81.27	Q	V		
14+25	50.1214	84.67	Q	V		
14+30	50.7243	87.54	Q	V		

14+35	51.3466	90.36	Q	V			
14+40	51.9877	93.10	Q	V			
14+45	52.6485	95.94	Q	V			
14+50	53.3293	98.85	Q	V			
14+55	54.0316	101.98	Q	V			
15+ 0	54.7567	105.27	Q	V			
15+ 5	55.5065	108.88	Q	V			
15+10	56.2829	112.73	Q	V			
15+15	57.0889	117.03	Q	V			
15+20	57.9271	121.70	Q	V			
15+25	58.8032	127.21	Q	V			
15+30	59.7234	133.62	Q	V			
15+35	60.6979	141.50	Q	V			
15+40	61.7411	151.48	Q	V			
15+45	62.8705	163.98	Q	V			
15+50	64.0946	177.74	Q	V			
15+55	65.4432	195.82	Q	V			
16+ 0	66.9701	221.71	Q	V			
16+ 5	68.8417	271.75	Q	V			
16+10	71.2117	344.12	Q	V			
16+15	74.2250	437.54	V	Q			
16+20	78.1054	563.43	V	Q			
16+25	82.3135	611.02	V	Q			
16+30	85.6317	481.80	V	Q			
16+35	88.4404	407.83	Q	V			
16+40	90.8136	344.59	Q	V			
16+45	92.8821	300.34	Q	V			
16+50	94.7257	267.69	Q	V			
16+55	96.3845	240.86	Q	V			
17+ 0	97.9075	221.14	Q	V			

17+ 5	99.3020	202.48	| Q |	|	V|
17+10	100.5794	185.48	| Q |	|	V|
17+15	101.7649	172.13	| Q|	|	V
17+20	102.8673	160.07	| Q|	|	V
17+25	103.8909	148.63	| Q |	|	V
17+30	104.8467	138.78	| Q |	|	|V
17+35	105.7486	130.96	| Q |	|	|V
17+40	106.5956	122.98	| Q |	|	|V
17+45	107.3982	116.54	| Q |	|	|V
17+50	108.1454	108.49	| Q |	|	| V
17+55	108.8523	102.65	| Q |	|	| V
18+ 0	109.5278	98.07	| Q |	|	| V
18+ 5	110.1629	92.23	| Q |	|	| V
18+10	110.7621	86.99	| Q |	|	| V
18+15	111.3429	84.34	| Q |	|	| V
18+20	111.9114	82.54	| Q |	|	| V
18+25	112.4702	81.14	| Q |	|	| V
18+30	113.0155	79.18	| Q |	|	| V
18+35	113.5392	76.05	| Q |	|	| V
18+40	114.0449	73.43	| Q |	|	| V
18+45	114.5390	71.74	| Q |	|	| V
18+50	115.0227	70.22	| Q |	|	| V
18+55	115.4961	68.74	| Q |	|	| V
19+ 0	115.9600	67.36	| Q |	|	| V
19+ 5	116.4142	65.95	| Q |	|	| V
19+10	116.8595	64.66	| Q |	|	| V
19+15	117.2945	63.16	| Q |	|	| V
19+20	117.7265	62.73	| Q |	|	| V
19+25	118.1147	56.36	| Q |	|	| V
19+30	118.4915	54.71	| Q |	|	| V

19+35	118.8598	53.48	Q				V
19+40	119.2206	52.39	Q				V
19+45	119.5749	51.44	Q				V
19+50	119.9230	50.55	Q				V
19+55	120.2655	49.72	Q				V
20+ 0	120.6026	48.94	Q				V
20+ 5	120.9345	48.20	Q				V
20+10	121.2616	47.48	Q				V
20+15	121.5839	46.80	Q				V
20+20	121.9017	46.14	Q				V
20+25	122.2153	45.54	Q				V
20+30	122.5250	44.96	Q				V
20+35	122.8308	44.40	Q				V
20+40	123.1328	43.86	Q				V
20+45	123.4313	43.34	Q				V
20+50	123.7263	42.83	Q				V
20+55	124.0179	42.35	Q				V
21+ 0	124.3064	41.88	Q				V
21+ 5	124.5917	41.43	Q				V
21+10	124.8740	40.99	Q				V
21+15	125.1534	40.57	Q				V
21+20	125.4301	40.17	Q				V
21+25	125.7039	39.76	Q				V
21+30	125.9750	39.36	Q				V
21+35	126.2434	38.97	Q				V
21+40	126.5092	38.60	Q				V
21+45	126.7725	38.23	Q				V
21+50	127.0334	37.88	Q				V
21+55	127.2918	37.53	Q				V
22+ 0	127.5480	37.19	Q				V

|
| 22+ 5 | 127.8019 | 36.86 | Q | | | | V |
|
| 22+10 | 128.0535 | 36.54 | Q | | | | V |
|
| 22+15 | 128.3030 | 36.23 | Q | | | | V |
|
| 22+20 | 128.5504 | 35.92 | Q | | | | V |
|
| 22+25 | 128.7958 | 35.63 | Q | | | | V |
|
| 22+30 | 129.0391 | 35.33 | Q | | | | V |
|
| 22+35 | 129.2805 | 35.05 | Q | | | | V |
|
| 22+40 | 129.5200 | 34.77 | Q | | | | V |
|
| 22+45 | 129.7576 | 34.50 | Q | | | | V |
|
| 22+50 | 129.9934 | 34.23 | Q | | | | V |
|
| 22+55 | 130.2274 | 33.97 | Q | | | | V |
|
| 23+ 0 | 130.4596 | 33.72 | Q | | | | V |
|
| 23+ 5 | 130.6901 | 33.47 | Q | | | | V |
|
| 23+10 | 130.9190 | 33.23 | Q | | | | V |
|
| 23+15 | 131.1462 | 32.99 | Q | | | | V |
|
| 23+20 | 131.3718 | 32.75 | Q | | | | V |
|
| 23+25 | 131.5958 | 32.53 | Q | | | | |
V|
| 23+30 | 131.8182 | 32.30 | Q | | | | |
V|
| 23+35 | 132.0392 | 32.08 | Q | | | | |
V|
| 23+40 | 132.2586 | 31.86 | Q | | | | |
V|
| 23+45 | 132.4766 | 31.65 | Q | | | | |
V|
| 23+50 | 132.6931 | 31.44 | Q | | | | |
V|
| 23+55 | 132.9083 | 31.24 | Q | | | | |
V|
| 24+ 0 | 133.1220 | 31.04 | Q | | | | |
V|
| 24+ 5 | 133.3323 | 30.52 | Q | | | | |
V|
| 24+10 | 133.5349 | 29.42 | Q | | | | |
V|
| 24+15 | 133.7236 | 27.41 | Q | | | | |
V|
| 24+20 | 133.8838 | 23.25 | Q | | | | |
V|
| 24+25 | 134.0059 | 17.74 | Q | | | | |
V|
| 24+30 | 134.1052 | 14.41 | Q | | | | |

24+35	134.1871	11.90	Q			
24+40	134.2567	10.10	Q			
24+45	134.3166	8.70	Q			
24+50	134.3686	7.55	Q			
24+55	134.4141	6.61	Q			
25+ 0	134.4540	5.79	Q			
25+ 5	134.4890	5.09	Q			
25+10	134.5201	4.51	Q			
25+15	134.5477	4.01	Q			
25+20	134.5722	3.56	Q			
25+25	134.5939	3.16	Q			
25+30	134.6133	2.81	Q			
25+35	134.6304	2.48	Q			
25+40	134.6455	2.19	Q			
25+45	134.6587	1.92	Q			
25+50	134.6704	1.70	Q			
25+55	134.6809	1.52	Q			
26+ 0	134.6900	1.33	Q			
26+ 5	134.6981	1.18	Q			
26+10	134.7055	1.07	Q			
26+15	134.7122	0.97	Q			
26+20	134.7181	0.86	Q			
26+25	134.7233	0.75	Q			
26+30	134.7278	0.65	Q			
26+35	134.7317	0.57	Q			
26+40	134.7352	0.51	Q			
26+45	134.7383	0.45	Q			
26+50	134.7410	0.39	Q			
26+55	134.7433	0.33	Q			
27+ 0	134.7452	0.27	Q			

```
V|
   27+ 5     134.7467      0.21  Q         |         |         |
V|
   27+10     134.7477      0.16  Q         |         |         |
V|
   27+15     134.7484      0.10  Q         |         |         |
V
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```

Appendix B

Kern County Curve Number Table

Residential Landscaping (Lawn, Shrubs, etc.) - The pervious portions of commercial establishments, single and multiple family dwellings, trailer parks and schools where the predominant land cover is lawn, shrubbery and trees.

Row Crops - Lettuce, tomatoes, beets, tulips or any field crop planted in rows far enough apart that most of the soil surface is exposed to rainfall impact throughout the growing season. At plowing, planting and harvest times it is equivalent to fallow.

Small Grain - Wheat, oats, barley, flax, etc. planted in rows close enough that the soil surface is not exposed except during planting and shortly thereafter.

Legumes - Alfalfa, sweetclover, timothy, etc. and combinations are either planted in close rows or broadcast.

Fallow - Fallow land is land plowed but not yet seeded or tilled.

Woodland - grass - Areas with an open cover of broadleaf or coniferous trees usually live oak and pines, with the intervening ground space occupied by annual grasses or weeds. The trees may occur singly or in small clumps. Canopy density, the amount of ground surface shaded at high noon, is from 20 to 50 percent.

Woodland - Areas on which coniferous or broadleaf trees predominate. The canopy density is at least 50 percent. Open areas may have a cover of annual or perennial grasses or of brush. Herbaceous plant cover under the trees is usually sparse because of leaf or needle litter accumulation.

Chaparral - Land on which the principal vegetation consists of evergreen shrubs with broad, hard, stiff leaves such as manzonita, ceanothus and scrub oak. The brush cover is usually dense or moderately dense. Diffusely branched evergreen shrubs with fine needle-like leaves, such as chamise and redchank, with dense high growth are also included in this soil cover.

Annual Grass - Land on which the principal vegetation consists of annual grasses and weeds such as annual bromes, wild barley, soft chess, ryegrass and filaree.

Irrigated Pasture - Irrigated land planted to perennial grasses and legumes for production of forage and which is cultivated only to establish or renew the stand of plants. Dry land pasture is considered as annual grass.

Meadow - Land areas with seasonally high water table, locally called cienegas. Principal vegetation consists of sod-forming grasses interspersed with other plants.

Orchard (Deciduous) - Land planted to such deciduous trees as apples, apricots, pears, walnuts, and almonds.

Orchard (Evergreen) - Land planted to evergreen trees which include citrus and avocados and coniferous plantings.

Turf - Golf courses, parks and similar lands where the predominant cover is irrigated mowed close-grown turf grass. Parks in which trees are dense may be classified as woodland.

KERN COUNTY

HYDROLOGY MANUAL

SCS
COVER TYPE
DESCRIPTIONS

FIGURE C-1

Curve[1] Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		77	86	91	94
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and Redskank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadows or Cienagas (Areas with seasonally high water table, principal vegatation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs-buckwheat,sage,etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (4) (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawns, shrubs, etc.)	Good	39	61	74	80
Turf (Irrigated and mowed grass)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80

KERN COUNTY
Hydrology Manual

CURVE NUMBERS FOR PERVIOUS AREAS

Curve[1] Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS -					
Fallow (Bare Soil)		77	86	91	94
Close Seeded (alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Evergreen (Citrus, avacodos, etc.)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Pasture (Grassland or range, continuos forage for grazing)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Row Crops (Straight row, non-contoured)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Straight row, non-contoured)	Poor	65	76	84	88
	Good	63	75	83	87

Notes:

1. Average runoff condition, Ia = 0.2(S)

2. Poor: Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

   Fair: Moderate cover with 50 percent to 75 percent of the ground surface protected. In wooded areas the woods are grazed but not burned, and some forest litter covers the soil.

   Good: Heavy or dense cover with more than 75 percent of the ground surface protected. In wooded areas the woods are protected from grazing, litter and brush adequately cover soil.

3. See Figure C-1 for definition of cover types.

KERN COUNTY
Hydrology Manual

CURVE NUMBERS FOR PERVIOUS AREAS

Appendix C

Atlas 14 Rainfall Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Mojave, California, USA*
Latitude: 35.2017°, Longitude: -118.0103°
Elevation: 2317.59 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.071 (0.058-0.088)	0.096 (0.079-0.119)	0.131 (0.107-0.163)	0.162 (0.131-0.203)	0.209 (0.164-0.269)	0.247 (0.190-0.325)	0.290 (0.218-0.391)	0.338 (0.247-0.467)	0.409 (0.287-0.589)	0.472 (0.320-0.703)
10-min	0.102 (0.084-0.126)	0.138 (0.113-0.170)	0.188 (0.154-0.233)	0.233 (0.188-0.290)	0.299 (0.234-0.385)	0.355 (0.273-0.466)	0.416 (0.312-0.560)	0.484 (0.354-0.669)	0.587 (0.412-0.844)	0.677 (0.459-1.01)
15-min	0.124 (0.101-0.153)	0.166 (0.136-0.206)	0.228 (0.186-0.282)	0.282 (0.228-0.351)	0.362 (0.283-0.466)	0.429 (0.330-0.564)	0.503 (0.377-0.677)	0.585 (0.428-0.810)	0.709 (0.498-1.02)	0.818 (0.555-1.22)
30-min	0.170 (0.139-0.210)	0.229 (0.187-0.282)	0.313 (0.255-0.387)	0.387 (0.313-0.483)	0.497 (0.390-0.640)	0.589 (0.453-0.775)	0.691 (0.519-0.930)	0.804 (0.588-1.11)	0.975 (0.684-1.40)	1.13 (0.763-1.67)
60-min	0.236 (0.194-0.291)	0.318 (0.260-0.392)	0.435 (0.355-0.538)	0.537 (0.435-0.670)	0.690 (0.541-0.889)	0.819 (0.629-1.08)	0.960 (0.720-1.29)	1.12 (0.816-1.55)	1.35 (0.950-1.95)	1.56 (1.06-2.32)
2-hr	0.350 (0.286-0.431)	0.460 (0.376-0.568)	0.615 (0.502-0.761)	0.749 (0.606-0.934)	0.944 (0.740-1.22)	1.10 (0.848-1.45)	1.28 (0.958-1.72)	1.46 (1.07-2.02)	1.73 (1.22-2.50)	1.96 (1.33-2.92)
3-hr	0.428 (0.350-0.527)	0.560 (0.458-0.692)	0.745 (0.608-0.922)	0.903 (0.731-1.13)	1.13 (0.887-1.46)	1.32 (1.01-1.73)	1.52 (1.14-2.04)	1.73 (1.26-2.39)	2.03 (1.43-2.93)	2.28 (1.55-3.40)
6-hr	0.571 (0.467-0.704)	0.752 (0.615-0.929)	1.00 (0.816-1.24)	1.21 (0.981-1.51)	1.51 (1.18-1.95)	1.75 (1.35-2.30)	2.00 (1.50-2.70)	2.27 (1.66-3.14)	2.65 (1.86-3.82)	2.96 (2.01-4.40)
12-hr	0.706 (0.578-0.870)	0.964 (0.789-1.19)	1.31 (1.07-1.63)	1.61 (1.30-2.00)	2.01 (1.58-2.59)	2.34 (1.79-3.07)	2.67 (2.00-3.59)	3.02 (2.21-4.18)	3.51 (2.46-5.05)	3.90 (2.65-5.80)
24-hr	0.895 (0.795-1.03)	1.27 (1.13-1.46)	1.78 (1.57-2.05)	2.20 (1.93-2.56)	2.78 (2.36-3.35)	3.24 (2.69-3.98)	3.71 (3.00-4.67)	4.20 (3.31-5.45)	4.89 (3.69-6.61)	5.42 (3.95-7.60)
2-day	1.06 (0.938-1.21)	1.51 (1.34-1.74)	2.14 (1.89-2.47)	2.66 (2.33-3.09)	3.38 (2.87-4.07)	3.96 (3.28-4.86)	4.55 (3.69-5.74)	5.18 (4.08-6.72)	6.06 (4.57-8.20)	6.75 (4.92-9.46)
3-day	1.15 (1.02-1.32)	1.65 (1.46-1.90)	2.34 (2.07-2.69)	2.91 (2.55-3.39)	3.72 (3.15-4.47)	4.36 (3.62-5.35)	5.02 (4.07-6.33)	5.73 (4.51-7.43)	6.72 (5.07-9.09)	7.52 (5.48-10.5)
4-day	1.22 (1.08-1.40)	1.75 (1.55-2.01)	2.48 (2.19-2.86)	3.09 (2.71-3.60)	3.95 (3.35-4.75)	4.63 (3.84-5.69)	5.34 (4.32-6.73)	6.09 (4.79-7.90)	7.14 (5.39-9.66)	7.98 (5.81-11.2)
7-day	1.34 (1.19-1.54)	1.92 (1.70-2.21)	2.72 (2.40-3.14)	3.38 (2.97-3.93)	4.31 (3.65-5.18)	5.03 (4.18-6.19)	5.78 (4.68-7.28)	6.56 (5.16-8.51)	7.64 (5.76-10.3)	8.48 (6.18-11.9)
10-day	1.39 (1.23-1.59)	1.99 (1.77-2.29)	2.82 (2.50-3.26)	3.51 (3.08-4.09)	4.47 (3.79-5.38)	5.22 (4.33-6.42)	5.99 (4.85-7.55)	6.79 (5.34-8.80)	7.89 (5.95-10.7)	8.74 (6.36-12.2)
20-day	1.61 (1.43-1.84)	2.34 (2.07-2.69)	3.34 (2.96-3.86)	4.19 (3.67-4.87)	5.38 (4.56-6.47)	6.31 (5.24-7.76)	7.27 (5.89-9.16)	8.27 (6.50-10.7)	9.61 (7.25-13.0)	10.7 (7.76-14.9)
30-day	1.81 (1.61-2.08)	2.65 (2.35-3.05)	3.82 (3.38-4.41)	4.81 (4.22-5.60)	6.23 (5.28-7.50)	7.35 (6.10-9.03)	8.49 (6.88-10.7)	9.69 (7.63-12.6)	11.3 (8.54-15.3)	12.6 (9.15-17.6)
45-day	2.10 (1.87-2.42)	3.09 (2.74-3.56)	4.49 (3.97-5.18)	5.69 (4.99-6.62)	7.42 (6.29-8.93)	8.82 (7.32-10.8)	10.3 (8.30-12.9)	11.8 (9.25-15.2)	13.8 (10.4-18.7)	15.4 (11.2-21.6)
60-day	2.32 (2.06-2.66)	3.41 (3.02-3.92)	4.97 (4.39-5.73)	6.33 (5.55-7.36)	8.29 (7.03-9.98)	9.89 (8.21-12.2)	11.6 (9.36-14.6)	13.3 (10.5-17.2)	15.7 (11.8-21.2)	17.5 (12.8-24.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at low er and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) w ill be greater than the upper bound (or less than the low er bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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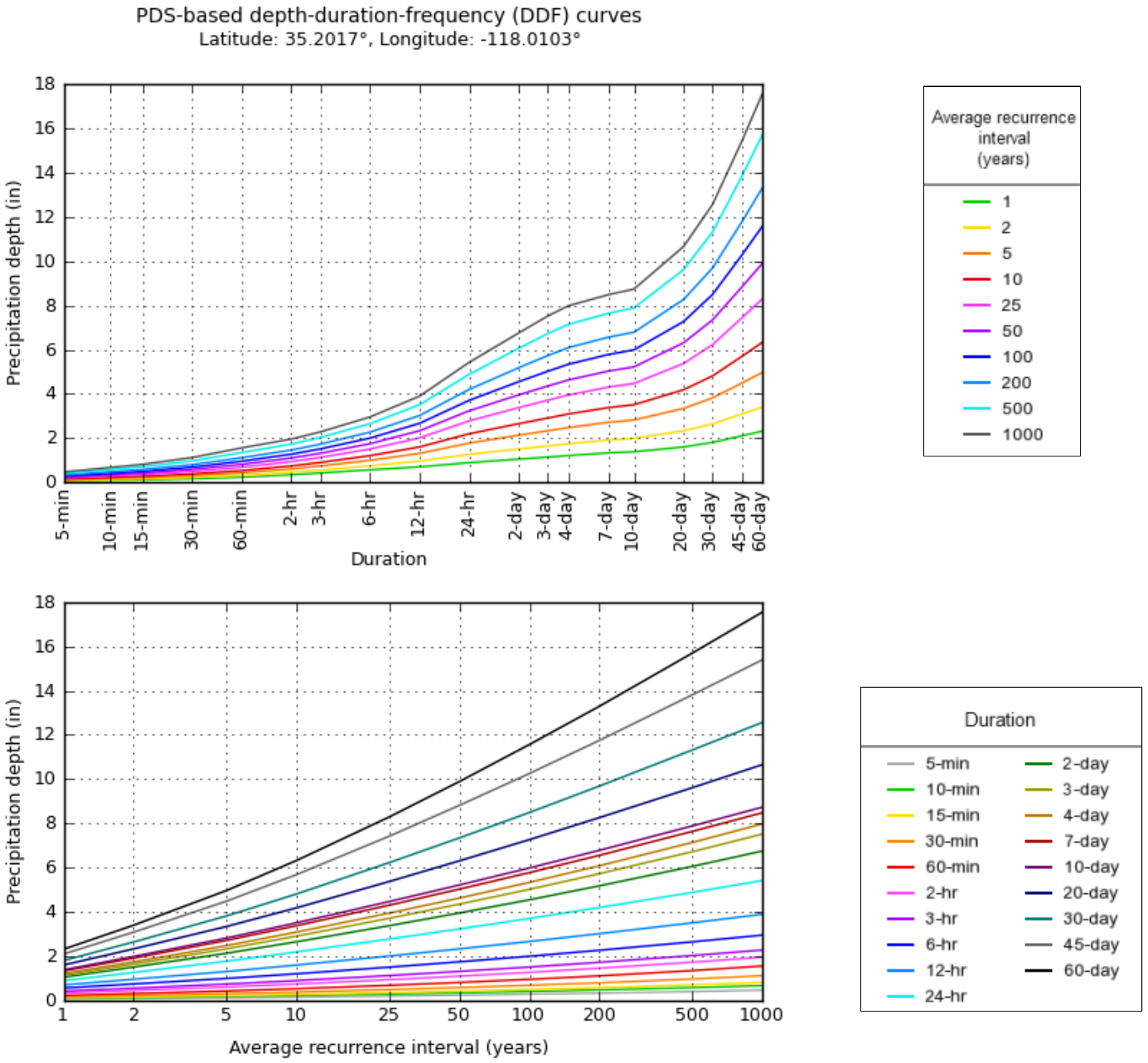
PF graphical



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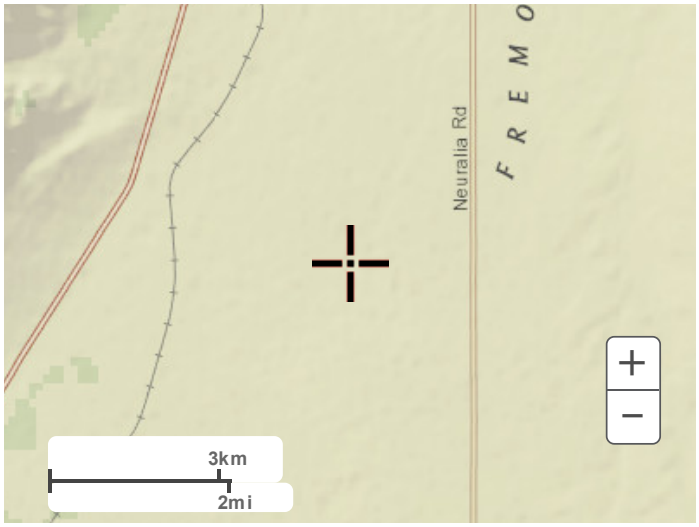
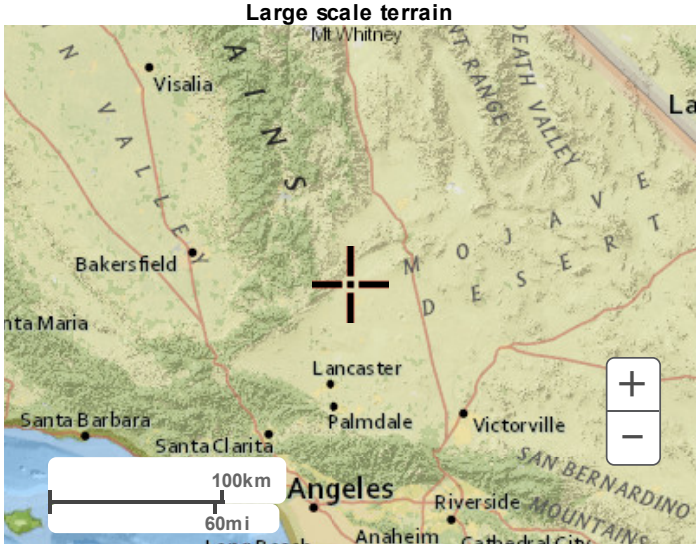
Maps & aerials

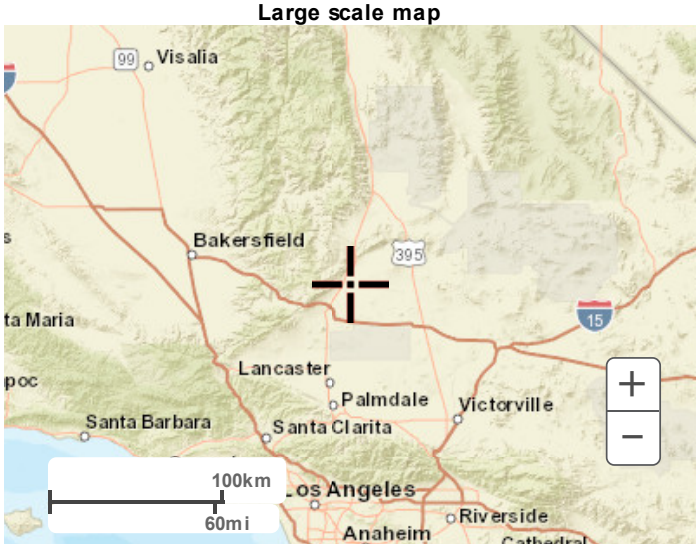
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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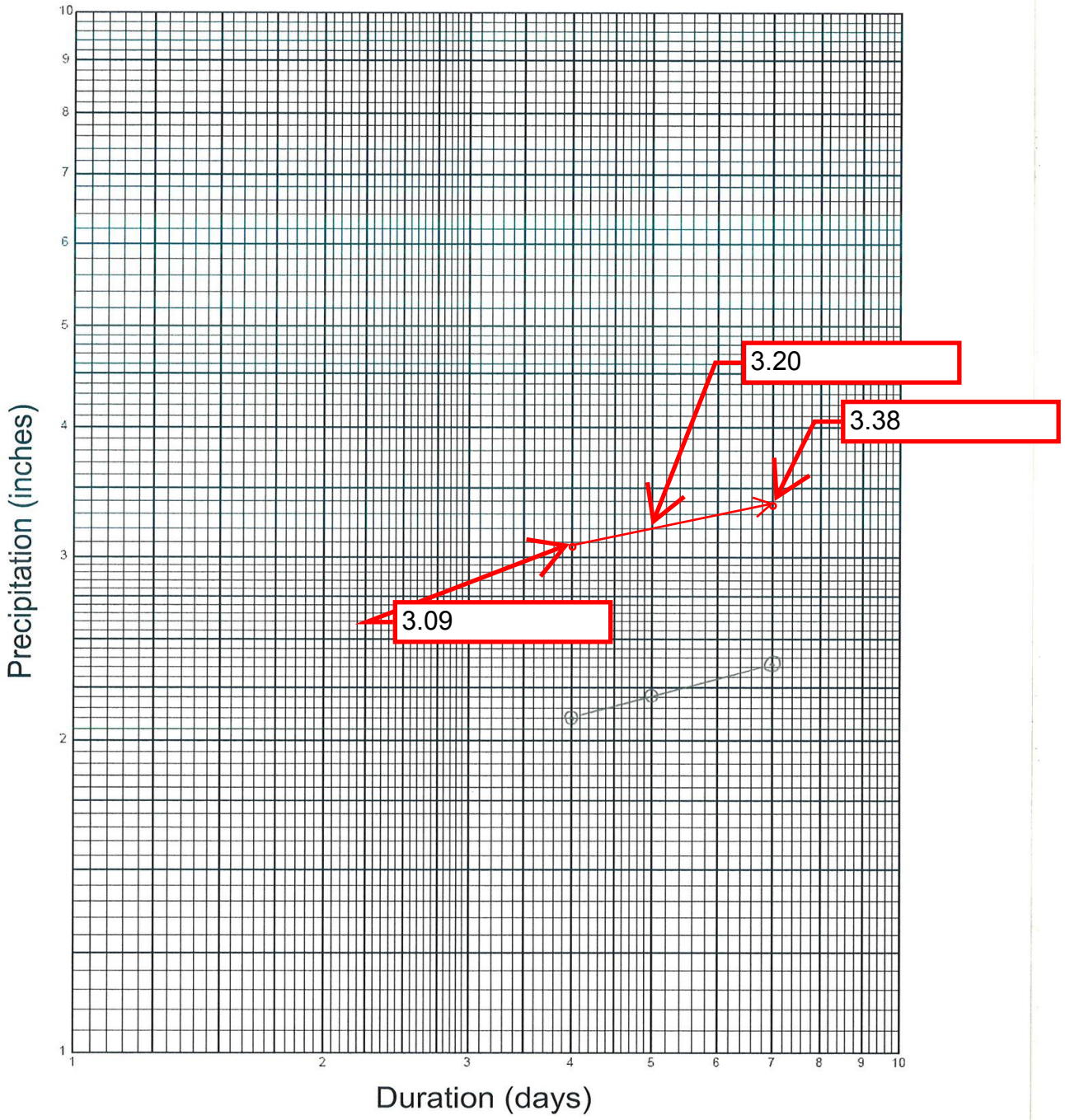
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

6) Select 10yr 4day rainfall depth – **2.10** and 10yr 7 day rainfall depth – **2.36**
7) Plot points on log–log graph paper.



8) Read the solution for the 10 yr 5 day depth of rainfall– **2.20 inches**

Appendix D

Kern County Hydrology Manual Excerpts

Residential Landscaping (Lawn, Shrubs, etc.) - The pervious portions of commercial establishments, single and multiple family dwellings, trailer parks and schools where the predominant land cover is lawn, shrubbery and trees.

Row Crops - Lettuce, tomatoes, beets, tulips or any field crop planted in rows far enough apart that most of the soil surface is exposed to rainfall impact throughout the growing season. At plowing, planting and harvest times it is equivalent to fallow.

Small Grain - Wheat, oats, barley, flax, etc. planted in rows close enough that the soil surface is not exposed except during planting and shortly thereafter.

Legumes - Alfalfa, sweetclover, timothy, etc. and combinations are either planted in close rows or broadcast.

Fallow - Fallow land is land plowed but not yet seeded or tilled.

Woodland - grass - Areas with an open cover of broadleaf or coniferous trees usually live oak and pines, with the intervening ground space occupied by annual grasses or weeds. The trees may occur singly or in small clumps. Canopy density, the amount of ground surface shaded at high noon, is from 20 to 50 percent.

Woodland - Areas on which coniferous or broadleaf trees predominate. The canopy density is at least 50 percent. Open areas may have a cover of annual or perennial grasses or of brush. Herbaceous plant cover under the trees is usually sparse because of leaf or needle litter accumulation.

Chaparral - Land on which the principal vegetation consists of evergreen shrubs with broad, hard, stiff leaves such as manzonita, ceanothus and scrub oak. The brush cover is usually dense or moderately dense. Diffusely branched evergreen shrubs with fine needle-like leaves, such as chamise and redchank, with dense high growth are also included in this soil cover.

Annual Grass - Land on which the principal vegetation consists of annual grasses and weeds such as annual bromes, wild barley, soft chess, ryegrass and filaree.

Irrigated Pasture - Irrigated land planted to perennial grasses and legumes for production of forage and which is cultivated only to establish or renew the stand of plants. Dry land pasture is considered as annual grass.

Meadow - Land areas with seasonally high water table, locally called cienegas. Principal vegetation consists of sod-forming grasses interspersed with other plants.

Orchard (Deciduous) - Land planted to such deciduous trees as apples, apricots, pears, walnuts, and almonds.

Orchard (Evergreen) - Land planted to evergreen trees which include citrus and avocados and coniferous plantings.

Turf - Golf courses, parks and similar lands where the predominant cover is irrigated mowed close-grown turf grass. Parks in which trees are dense may be classified as woodland.

KERN COUNTY

HYDROLOGY MANUAL

SCS
COVER TYPE
DESCRIPTIONS

FIGURE C-1

Curve[1] Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		77	86	91	94
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and Redskank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadows or Cienagas (Areas with seasonally high water table, principal vegatation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs-buckwheat,sage,etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (4) (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawns, shrubs, etc.)	Good	39	61	74	80
Turf (Irrigated and mowed grass)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80

KERN COUNTY
Hydrology Manual

CURVE NUMBERS FOR PERVIOUS AREAS

Curve[1] Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS -					
Fallow (Bare Soil)		77	86	91	94
Close Seeded (alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Evergreen (Citrus, avacodos, etc.)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Pasture (Grassland or range, continuos forage for grazing)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Row Crops (Straight row, non-contoured)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Straight row, non-contoured)	Poor	65	76	84	88
	Good	63	75	83	87

Notes:

1. Average runoff condition, Ia = 0.2(S)

2. Poor: Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

   Fair: Moderate cover with 50 percent to 75 percent of the ground surface protected. In wooded areas the woods are grazed but not burned, and some forest litter covers the soil.

   Good: Heavy or dense cover with more than 75 percent of the ground surface protected. In wooded areas the woods are protected from grazing, litter and brush adequately cover soil.

3. See Figure C-1 for definition of cover types.

KERN COUNTY
Hydrology Manual

CURVE NUMBERS FOR PERVIOUS AREAS

ACTUAL IMPERVIOUS COVER

Land Use	Range-Percent	Recommended Value For Average Conditions-Percent (1)
Natural or Agriculture	0 - 0	0
Public Park	10 - 25	15
School	30 - 50	40
Single Family Residential: (2)		
2.5 acre lots	5 - 15	10
1 acre lots	10 - 25	20
2-3 DU/acre	20 - 40	30
3-5 DU/acre	30 - 50	40
5-8 DU/acre	35 - 55	50
8-10 DU/acre	50 - 70	60
More than 10 DU/acre	65 - 90	80
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Parks	60 - 85	75
Commercial, Downtown Business or Industrial	80 - 100	90

Notes:

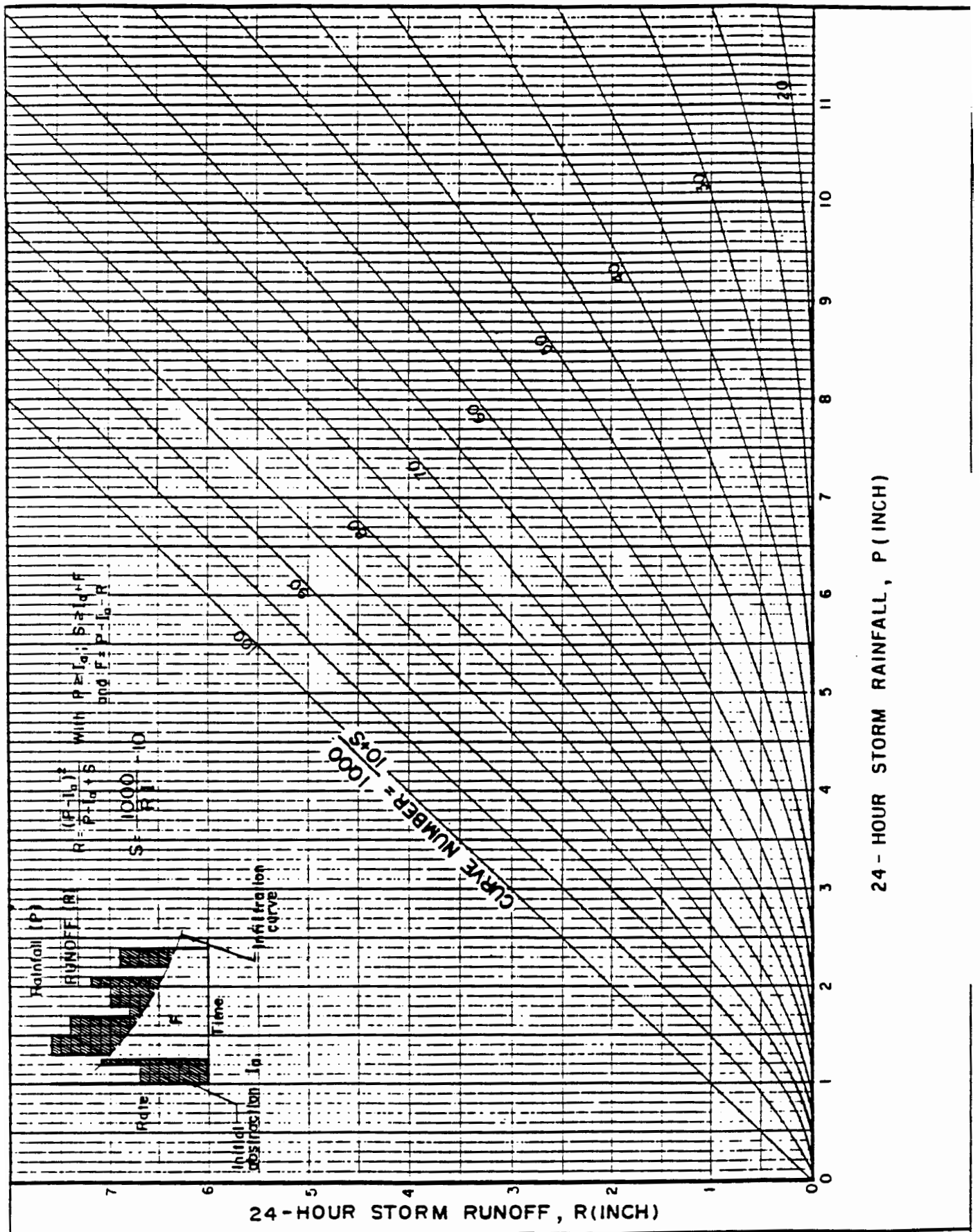
1) Recommended values are based on average conditions which may not apply to a particular study. The percentage impervious may vary greatly even on comparable study sized lots due to differences in in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area shall always be made, and a review of aerial photos, where available, may assist in estimating the percentage of impervious cover in developed areas.

2) For typical equestrian subdivisions increase impervious area 5% over the values recommended in the table above.

KERN COUNTY
Hydrology Manual

ACTUAL IMPERVIOUS COVER FOR DEVELOPED AREAS

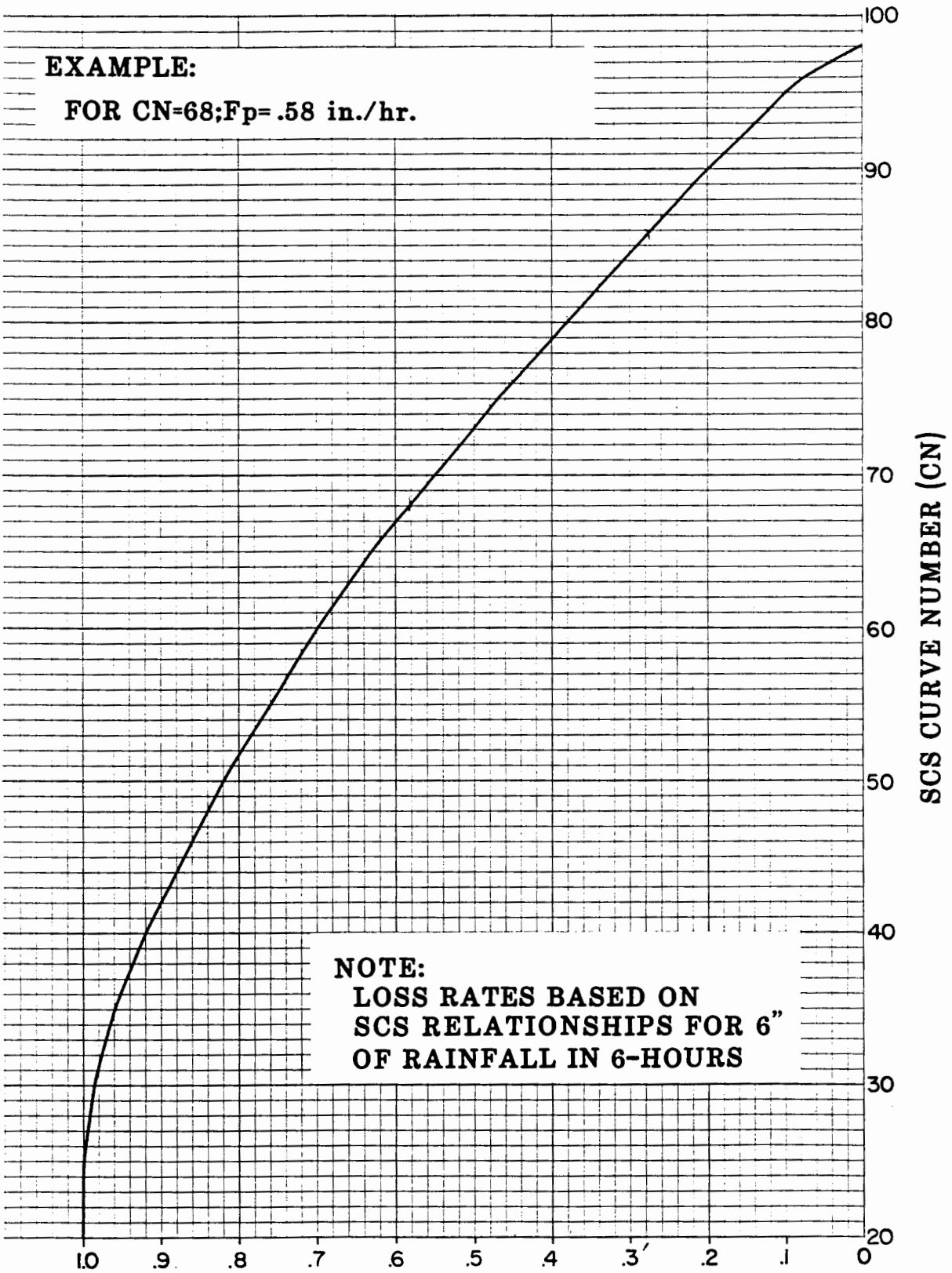
FIGURE C-3



KERN COUNTY
HYDROLOGY MANUAL

SCS 24 - HOUR STORM
RAINFALL - RUNOFF
RELATIONSHIPS

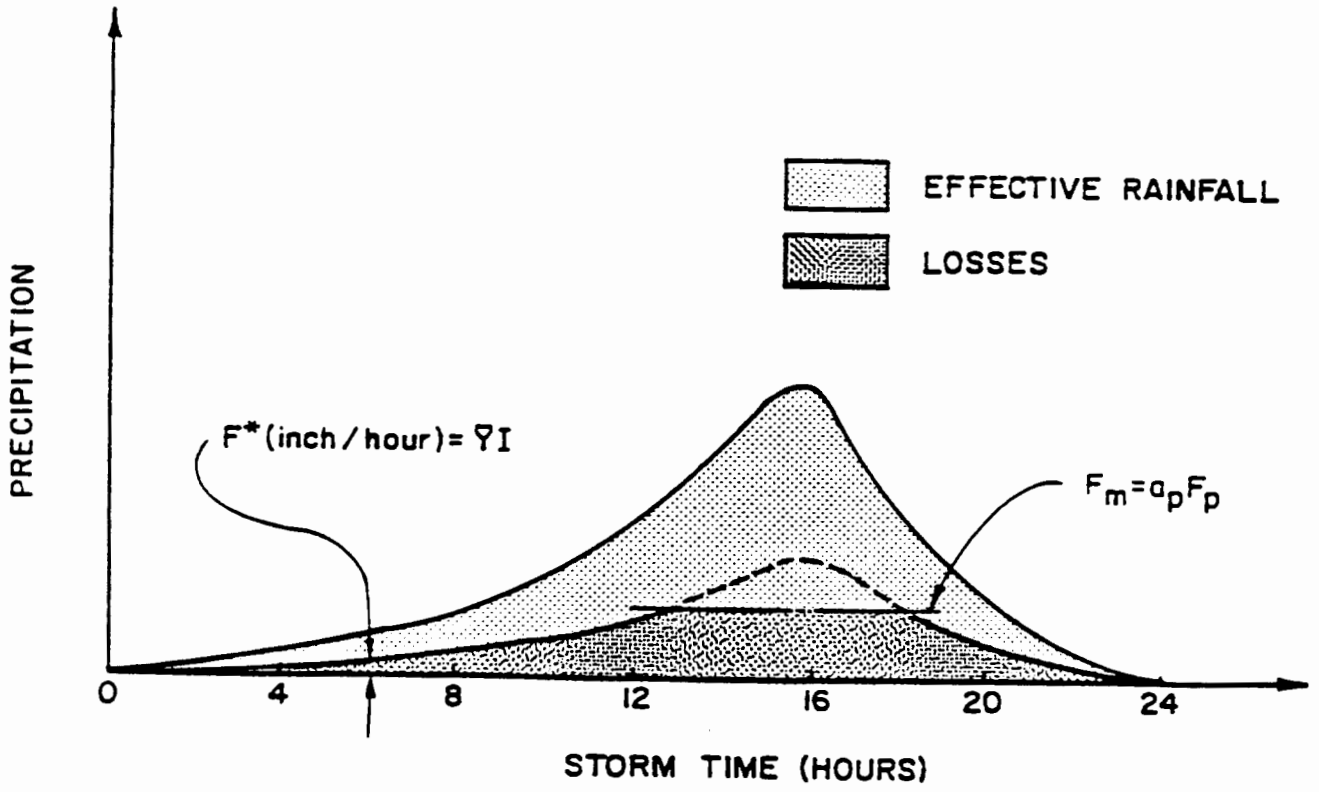
FIGURE C-4



KERN COUNTY
Hydrology Manual

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS SCS CURVE NUMBERS

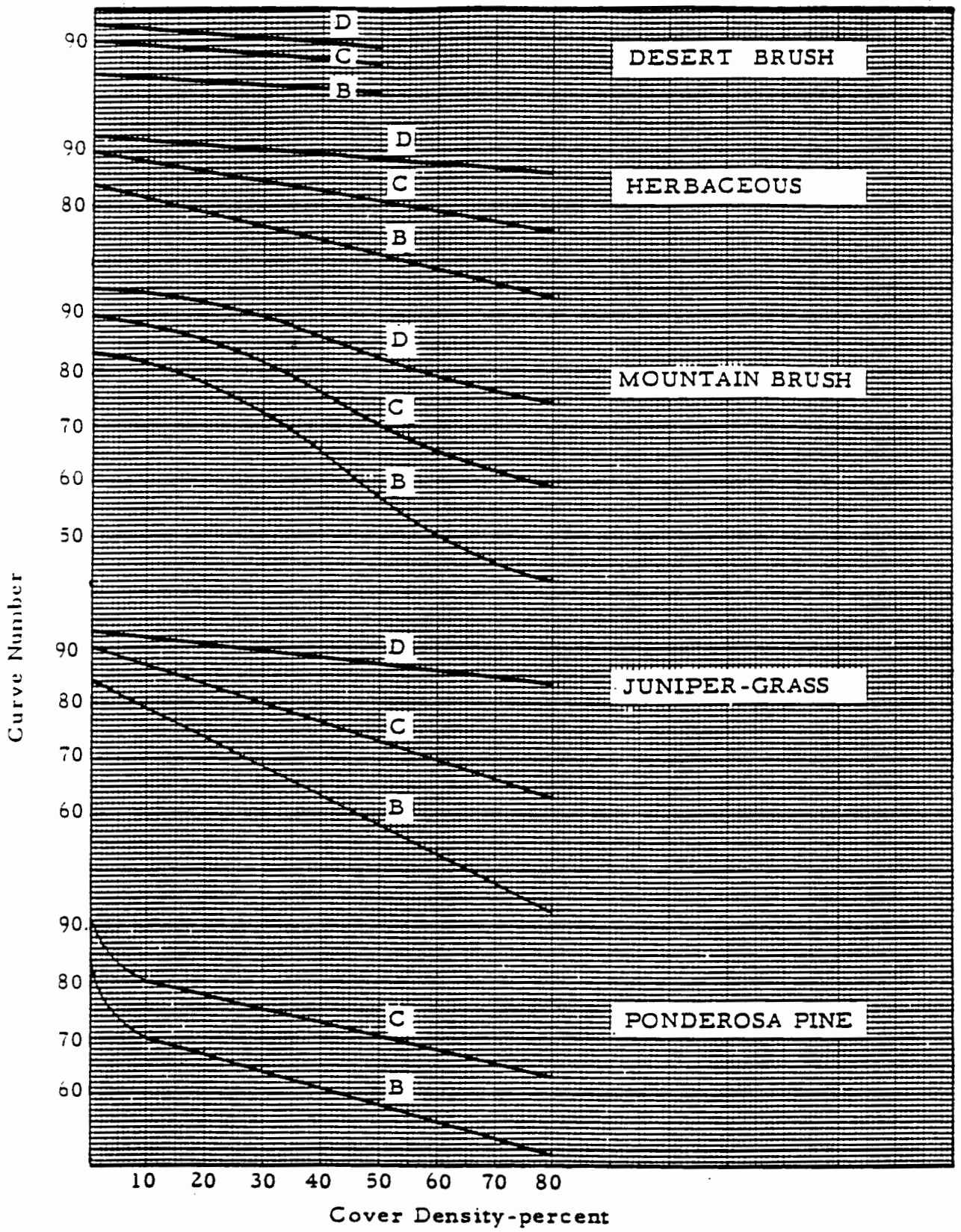
FIGURE C-5



KERN COUNTY
HYDROLOGY MANUAL

DESIGN STORM
LOSS FUNCTION

FIGURE C-6



KERN COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOIL COVER COMPLEXES AND ASSOCIATED CURVE NUMBERS

FIGURE C-7

Section C
Equations

List of Equations

Equation No.	Equation
C.1	$Ia = 0.2S$
C.2	$S = \frac{1000}{CN} - 10$
C.3	$Y_j = \frac{(P_{24} - Ia)^2}{(P_{24} - Ia + S)P_{24}}$
C.4	$Y = \frac{Y_1 A_1 + ... + Y_m A_m}{A_1 + A_2 + ... + A_m}$
C.5	$\overline{Y} = 1 - Y$
C.6	$F* = \overline{Y} \cdot I$
C.7	$Fm = a_p F_p$

Variables

Ia	Initial Abstraction (inches)
S	Estimate soil capacity
CN	Area Curve Number
Y_j	Yield fraction for 24-hour storm runoff
Y	Yield
$\overline{Y}$	Catchment low loss fraction

Appendix E

Kern County Development Standards: Standards for Drainage

DIVISION FOUR

STANDARDS FOR DRAINAGE

CHAPTER I. GENERAL

Sec. 401-1 General Purpose

401-1.01 It is the general purpose of these standards that waters generated by storms, springs, or other sources be mitigated so as to provide reasonable levels of protection for life and property, and the maintenance of necessary access to property or passage of the traveling public on the public highways.

401-1.02 To meet this general purpose, it is necessary that these standards reasonably protect life from the direct effects of flood waters, the indirect health effects associated with stagnating water, and the attractive nuisance provided by standing waters. It is necessary to reasonably protect property from the damaging effects of flood waters. Property access for the ingress and egress of emergency vehicles, or the general public should be reasonably provided. The passage of public vehicles on the public highways should also be reasonably ensured.

401-1.03 In general, the mitigation measures for the protection of life and property, and the maintenance of emergency vehicle access are based upon the Capital Storm Design Discharge (CSDD). The issues related to property access (by the public) and passage on public highways, and local drainage facility design are based upon the Intermediate Storm Design Discharge (ISDD).

401-1.04 The design standards in this section are to be deemed to be minimal, and shall not limit the design engineer from using higher standards based upon the engineer's assessment of the protection needs of the development. Alternatives are permissible which are determined by the Director to be of equal or higher quality.

401-1.05 The Director may allow such exceptions as he may find to be reasonably required by the specific circumstances, to be in the public interest and in conformity with the general objectives of these standards.

401-1.06 Special circumstances may exist that require additional mitigation above and beyond these standards as determined by the Director.

Sec. 401-2 Maintenance

401-2.01 All facilities intended for public maintenance shall be designed and constructed subject to the approval of the Director and the maintenance entity, or these standards, whichever is more conservative.

401-2.02 All drainage facilities intended for private maintenance shall provide a maintenance plan, subject to the approval of the Director. All such facility maintenance plans shall include, but not be limited to: (a) schedule of cleaning (or clearing), (b) mosquito and vector abatement measures (if applicable), (c) pump maintenance schedule (if applicable), (d) notarized statement by the owner(s) acknowledging his/her/their responsibility and intent to maintain the proposed facility in accordance with the approved maintenance schedule.

401-2.03 Subdivisions with privately maintained streets shall have the drainage facilities maintained by a homeowners association or other entity which has the ability to assess fees for maintenance.

CHAPTER II. DEFINITIONS

Sec. 402-1 Definitions:

402-1.01 **AGENCY**: refers to the Department of the County of Kern with jurisdiction.

402.1.02 **ALLUVIAL FAN**: is a landform originating at an apex and characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths.

402-1.03 **APEX**: means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

402-1.04 **CAPITAL STORM DESIGN DISCHARGE (CSDD)**: is that flow determined based upon a precipitation event having a one percent probability of being equaled or exceeded in any given year, commonly referred to as the 100 year storm.

402-1.05 **CLOSED CONDUIT**: is any system of underground drainage facilities, other than culverts.

402-1.06 **COMPREHENSIVE DRAINAGE PLAN**: refers to a storm water runoff mitigation plan for multi-phase developments. Such a plan need not be adopted by the County, but will be kept on file by the Director.

402-1.07 **CONSTRUCTED CHANNEL**: refers to the physical modification of natural channels or the construction of channels.

402-1.08 **CONTROL FACILITY**: are those hydraulic structures which mitigate the effects of surface runoff resulting from development, flow pattern modification, or flood flows.

402-1.09 **CULVERT**: is a hydraulically short conduit which conveys storm runoff flows through a roadway embankment or past some other type of flow obstruction.

402-1.10 **DESIGN PONDING DEPTH**: is the depth to which the design volume will pond in a storm water basin.

402-1.11 **DETENTION BASIN**: is a storm water facility designed to affect flood hydrograph peak attenuation.

402-1.12 **EMBANKMENT AREA**: is an area of compacted fill material.

402-1.13 **ENCROACHMENT:** refers to any change in land use that materially alters the lands flow conveyance potential.

402-1.14 **FLOOD CONTROL PLAN**: is a plan for the mitigation of flood flows originating from off-site watersheds, or resulting from on-site development.

402-1.15 **FLOOD FLOW**: shall be considered to be the CSDD for reference in these standards.

402-1.16 **FLOW PATTERN**: refers to any physical tracing resultant from the historic or existing runoff of water.

402-1.17 **INTERMEDIATE STORM DESIGN DISCHARGE (ISDD**): is that flow determined based upon a precipitation event having a ten percent probability of being equaled or exceeded in any given year, commonly referred to as the ten-year storm.

402-1.18 **LEVEE**: is an embankment whose primary purpose is to furnish drainage or flood protection from storm water runoff and which is, therefore, subject to water loading for periods of only a few days or weeks a year.

402-1.19 **MASTER DRAINAGE PLAN**: refers to a comprehensive drainage plan or flood control plan adopted by the County which includes adopted funding mechanisms.

402-1.20 **NATURAL CHANNEL**: is a flow pattern characterized by incised flow channelization with well defined banks and including the overbank flow areas.

402-1.21 **NUISANCE FLOW**: shall be considered as those waters originating from within, or adjacent to, the development not resulting from storm runoff.

402-1.22 **ONE PERCENT RISK FLOW**: is the flow on an alluvial fan based upon the joint probability of the flow distribution at the fan apex and the probability of occurring at the development site.

402-1.23 **REASONABLE:** in the context of this section refers to the balancing of the utility of the facilities or circumstances described against the gravity of the potential for harm.

402-1.24 **RETENTION BASIN**: is a terminal storm water facility for the storage of runoff. Commonly referred to as a sump.

402-1.25 **RETARDATION BASIN**: Synonymous with Detention Basin.

402-1.26 **SLOPE EASEMENT**: shall include the horizontal dimension from the top to toe of slope plus the setback requirements specified by the Grading Ordinance.

402-1.27 **SOILS ENGINEER (GEOTECHNICAL ENGINEER):** shall mean an engineer experienced and knowledgeable in the practice of soils engineering (geotechnical engineering).

402-1.28 **SOILS ENGINEERING (GEOTECHNICAL ENGINEERING):** shall mean the application of the principles of soil mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and the inspection and/or testing of the construction thereof.

402-1.29 **STRESS AREA**: refers to those locations where the erosion potential is greater than a straight, uniform channel reach, and includes junctions, transitions, and curves.

402-1-30 **WATERWAY**: refers to any natural channel, artificial channel or closed conduit, which provides a course for drainage water to flow.

Sec. 402-2 Off-Site Capital Storm Design Discharge (CSDD) Mitigation

The CSDD flow determined from the off-site watershed shall consider the total area of the off-site watershed. The watershed development condition may be considered in its existing condition at the time of the proposed development if no control facilities mitigating surface runoff exist, and as undeveloped if adequate control facilities mitigating surface runoff exist.

The design of all structures within the development shall be protected to a minimum of one (1) foot above the water surface associated with the CSDD.

The CSDD flow shall be received into the development without diversion onto adjacent property or causing more than one foot rise in pre-development water surface, and shall be discharged in a manner as similar as possible to the existing condition downstream of the development.

Sec. 402-3 Off-Site Intermediate Storm Design Discharge (ISDD) Mitigation

The ISDD flow shall be based upon the uncontrolled developed watershed proximate to the development when no defined flow pattern exists. When a flow pattern is defined, the ISDD flow determination shall include the total watershed contributing to the flow pattern.

The off-site ISDD shall be mitigated in conjunction with requirements for on-site ISDD flows.

Sec. 402-4 Hydrologic Flow Determinations

The CSDD and ISDD flows shall be calculated in accordance with the current Kern County Hydrology Manual.

CHAPTER III. DRAINAGE PLANS

Sec. 403-1 Authority

403-1.01 County Master Drainage Plans

The County administers master drainage plans (MDP) over some portions of the County. In these MDP areas, the design hydrology is governed by the assumption made and methodology used, in the development of the MDP or its most recent revision. Modifications to the MDP's assumed land uses may result in the requirement of additional permanent facilities being constructed to mitigate unanticipated runoff.

If MDP planned facilities have not been constructed at the time of site development, then temporary facilities will be required to be

constructed by the Developer. Such facilities may be abandoned upon completion of the MDP facilities intended to serve the site.

403-1.02 Special Districts

Special Districts, such as Community Service Districts, may prepare comprehensive drainage and/or flood control plans for areas under their jurisdiction. Such plans are subject to the review and approval of the County.

If the Special Districts planned facilities have not been constructed at the time of site development, then temporary facilities will be required to be constructed. Such facilities may be abandoned upon completion of the planned facilities intended to serve the site.

County Service Areas are typically required to be formed for the maintenance of drainage facilities in the absence of another maintenance entity.

403-1.03 Subdivisions

These standards shall apply to the drainage/floodplain management requirements specified for subdivisions improvements in the County's Land Division Ordinance.

If the subdivisions storm runoff mitigation measures are to be constructed as part of a comprehensive drainage plan, then each phase of the development shall be designed to function independently or in conjunction with completed development phases.

403-1.04 Mobile Home/Recreational Vehicle Parks

These standards shall apply to the drainage/floodplain management review of Mobile Home/Recreational Vehicle Parks specified in the County's Zoning Ordinance.

403-1.05 Site Development

These standards shall apply to the drainage/floodplain management requirements specified for site development in the County's Building Code, Grading Code, Floodplain Management Ordinance, and all other pertinent County Ordinances.

CHAPTER IV. ALLUVIAL FAN DEVELOPMENT

Sec. 404-1 Development Policy

Development upon an alluvial fan shall mitigate the effects of the flow at the site of development, which has a one-percent risk of being equaled or exceeded in any given year. Such mitigation shall ensure that the one-percent risk flow will be received into the development site, without causing more than one foot of water surface rise resulting from encroachment at the development site, and discharge the one percent risk flow in a manner, as close as possible, to the flow pattern existing prior to development of the site.

Sec. 404-2 Flood Control Facility Requirements

The design of structural flood control measures on alluvial fans shall demonstrate that the measures will effectively eliminate alluvial fan flood hazards from the area protected by such measures. The provided analyses must include, but are not limited to, the following:

404-2.01 Engineering analyses that quantify the discharges and volumes of water, debris, and sediment movement associated with the flood that has a one percent probability of being exceeded in any year at the apex under current watershed conditions and under potential adverse conditions (e.g., deforestation of the watershed by fire). The potential for debris flow and sediment movement must be assessed using an engineering method acceptable to the Director and Federal Emergency Management Agency (FEMA). The assessment should consider the characteristics and availability of sediment in the drainage basin above the apex and on the alluvial fan.

404-2.02 Engineering analyses showing that the measures will accommodate the estimated peak discharges and volumes of water, debris, and sediment, as determined in accordance with Section 404-2.01, and will withstand the associated hydrodynamic and hydrostatic forces.

404-2.03 Engineering analyses showing that the measures have been designed to withstand the potential erosion and scour associated with estimated discharges.

404-2.04 Engineering analyses or evidence showing that the measures will provide protection from hazards associated with the possible relocation of flow paths from other parts of the fan.

404-2.05 Engineering analyses that assess the effect of the project on flood hazards, including depth and velocity of floodwaters and scour and sediment deposition, on other areas of the fan.

404-2.06 Engineering analyses demonstrating that flooding from sources other than the fan apex, including local runoff, is either insignificant or has been accounted for in the design.

CHAPTER V. STREET DRAINAGE

Sec. 405-1 Design Flow

405-1.01 The ISDD shall include the evaluation of both on-site and off-site watersheds when applicable.

405-1.02 Street Conveyance

1. For Type "A" subdivisions, the ISDD may exceed the top of a six (6) inch curb by 0.10 feet.

2. For Type "B" subdivisions, the depth of flow contained within the road right of way shall not exceed 0.60 feet for the ISDD.

3. The depth of flow for the CSDD on major and secondary highways shall be maintained as not to prohibit reasonable access.

4. For mobile home/recreational vehicle parks, the depth of flow for the ISDD shall not exceed the carrying capacity of the travel way.

5. Where the discharge exceeds the above mentioned limits, a stormdrain or other facilities shall be provided to convey the excess flows.

6. The drainage system shall be free flowing and shall not allow the retention of more than one (1) foot of water measured at the flowline after the flows have subsided.

405-1.03 Sedimentation

In areas suspected of significant sediment yield from an ISDD, the following shall apply:

1. The developer’s engineer shall quantify any sediment yield from on-site or off-site properties based upon the ISDD.

2. Sediment yield shall be independent of the runoff event and is to be mitigated separate from the design discharge.

3. Sediment shall not be deposited on the roadway.

4. Higher levels of mitigation may be required in mudslide-mudflow areas.

405-1.04 Erosion

1. Erosion protection measures based on the ISDD shall be established upstream, downstream and through the project by the developer's engineer subject to approval by the Director.

CHAPTER VI. CULVERTS, BRIDGES AND AT-GRADE-CROSSINGS

Sec. 406-1 General

406-1.01 All publicly maintained crossings of natural channels shall be bridged or culverted. The minimum length of any culvert shall be from toe-of-slope to toe-of-slope. Additional right-of-way may be required for maintenance of these facilities.

406-1.02 Roadways shall be required to bridge a floodway where encroachment of the floodway is prohibited.

406-1.03 Energy losses for bridge piers, interior walls for multiple box culverts, or other obstructions within the channel shall be predicated upon the obstruction width plus two (2) feet of debris allowance for each obstruction.

Sec. 406-2 Culverts

406-2.01 The ISDD for the total upstream watershed under existing conditions shall not exceed soffit of culvert.

406-2.02 The CSDD for the total upstream watershed under existing conditions will be allowed to overtop the roadway until 2.0 feet of specific energy is obtained, at which point additional culverts will be required to meet these minimum requirements.

406-2.03 The 2.0 feet of specific energy shall be calculated at the crown or high point of the traveled roadway.

406-2.04 The minimum size of any culvert under a publicly maintained roadway shall be 18 inches. For private roads or public access, which are privately maintained, this requirement may be waived.

406-2.05 Culverts shall be designed to have a minimum useful life of 50 years.

Sec. 406-3 Bridges

406-3.01 The lowest portion of the bridge span shall be one foot or 0.2 times the specific energy (whichever is greater) above the water surface elevation when the normal depth of flow for the CSDD is subcritical.

406-3.02 The lowest portion of the bridge span shall be one foot or 0.2 times the specific energy (whichever is greater) above the sequent flow depth when the normal depth of flow for the CSDD is supercritical.

406-3.03 When levee conditions exist, the lowest portion of the bridge span shall also meet the minimum freeboard requirements of the levee.

Sec. 406-4 At-Grade-Crossings

406-4.01 At-grade-crossings shall not be permitted on a publicly maintained roadway and shall not encroach upon a floodway.

CHAPTER VII. CLOSED CONDUIT SYSTEMS, CATCH BASINS

Sec. 407-1 Design

407-1.01 Closed conduit system shall be designed for the total ISDD flow less allowable street flow. (see Chapter V Street Drainage)

407-1.02 A closed conduit system intended to serve on-site lot development shall be designed for the total ISDD originating on-site.

407-1.03 Closed conduit system shall be designed to have a minimum useful life of 50 years.

407-1.04 The minimum size of a closed conduit system within the street right-of-way or intended for public maintenance shall be 18 inches.

407-1.05 The minimum size of a closed conduit system outside of the street right-of-way and intended to be privately maintained shall be eight (8) inches.

407-1.06 The minimum cover over any closed conduit system shall be 24 inches. The minimum cover required within the street right-of-way shall be 30 inches.

407-1.07 Closed conduit system shall be free flowing with no continuous standing water within the pipe.

407-1.08 The designed pipe size shall not be allowed to decrease as the system progresses downstream.

407-1.09 The minimum slope of any closed conduit system shall be .001(.10 percent) unless otherwise approved by the Director.

407-1.10 The hydrologic tie-in design criteria for the closed conduit system shall be based on equal recurrence.

407-1.11 Closed conduit system within the street right-of-way or intended for public maintenance shall be Class III reinforced concrete pipe with rubber gasket joints, or cast-in-place concrete pipe unless otherwise approved or required by the Director.

407-1.12 The developer's engineer shall plot the hydraulic grade line and the energy grade line profiles for the closed conduit system either on a set of, or on the original, street improvement plans. All calculations and related data for these profiles shall be included with the street improvement plans when submitted.

Sec. 407-2 Location

407-2.01 A publicly maintained closed conduit system shall be placed within the road right-of-way or easement unless otherwise approved by the Director.

407-2.02 The alignment of a publicly maintained closed conduit system shall be parallel or perpendicular with the centerline of the road unless otherwise approved by the Director.

Sec. 407-3 Freeboard

Within the closed conduit system, the hydraulic grade line shall be at least 0.5 feet below all inlet flowline elevations, and 0.5 feet below the top of non-pressure manholes.

Sec. 407-4 Manholes

407-4.01 Within the closed conduit system, manholes shall be provided at all junctions, bends, and at intervals prescribed below:

a. Manholes shall be provided at intervals no greater than 300 feet where the conduit diameter is less than or equal to 30 inches.

b. Manholes shall be provided at intervals no greater than 400 feet where the conduit diameter is larger than 30 inches, but smaller than 48 inches.

c. Manholes shall be provided at intervals no greater than 500 feet where the conduit diameter is 48 inches or larger.

407-4.02 A pressure manhole shaft and a pressure cover shall be installed in a closed conduit system whenever the energy grade line is less than 0.50 below the top of the manhole.

Sec. 407-5 Losses

In addition to normal friction losses, energy losses due to entrance and exit conditions, bends, junctions, and transitions shall be computed. The engineer shall supply all data and reference material for calculated losses subject to review and approval by the Director.

Sec. 407-6 Erosion

407-6.01 Velocities within the closed conduit system should not exceed 20 feet per second with standard wall RCP, or 10 feet per second for plastic pipe. Where velocities exceed 20 feet per second for RCP, or 10 feet per second for plastic pipe, a special pipe shall be installed as approved by the Director.

407-6.02 Erosion protection against scour velocities shall be provided at the inlet and outlet of the closed conduit system. The engineer shall supply all data and reference material supporting his/her design, subject to approval by the Director.

Sec. 407-7 Catch Basins

407-7.01 The inlet design at closed conduit systems (i.e., location, depression, capacity, structural, etc.) shall be subject to review and approval by the Director.

407-7.02 Grate type inlets to the closed conduit system within the street right-of-way shall be allowed only in conjunction with side curb openings and shall be bicycle safe.

407-7.03 The minimum width of opening for any catch basin intended to be publicly maintained shall be three (3) feet and six (6) inches (3.5').

Sec. 407-8 Rights-of-Way/Easements

407-8.01 A right-of-way sufficient to contain the closed conduit and appurtenances plus a minimum of five feet on each side, measured from the edge of the conduit or drainage structure, shall be provided but in no case shall the right-of-way be less than 15-feet in width. Whenever possible, rights-of-way for conduits shall be adjacent to property lines and outside areas where structures are planned. Under no circumstances shall closed conduits and appurtenances be constructed less than 10-feet from any planned or existing structure.

407-8.02 Easements will be required on all closed conduit systems outside of the street right-of-way, which are intended for public maintenance.

407-8.3 Land rights shall be conveyed to the County in one of the following forms, whichever is appropriate:

1. Separate parcel easement dedicated on a subdivision map.
2. Easement dedicated on a subdivision map as part of adjacent lots.
3. Fee simple or easement offered or granted by separate documents.

CHAPTER VIII. RETENTION BASIN DESIGN

Sec. 408-1 Design Volume

The design volume of storm water retention basins shall be based upon the runoff from the ISDD five-day storm event and a volume of nuisance water determined by the engineer. No runoff generated on site from the design storm or from nuisance flows will be allowed to leave the site unless downstream drainage disposal facilities exist to handle the flow. The retention of upstream off-site flows shall not be considered to reduce the size of the required on-site retention facilities or mitigate the runoff from the proposed development. An evaluation of the runoff volumes associated with the site in its existing condition shall not reduce the size of the required drainage facilities. The runoff volume from the ISDD five-day storm shall be calculated using the formula:

$$\text{Runoff Volume} = 0.12\ (D_{10})(a_i)(\text{Area})$$

D_{10}	=	10 yr 24-hr. depth of rainfall (in.)
a_i	=	average percentage of impervious area
Area	=	Drainage area of total development
0.12	=	1.44 x 1/12
1.44	=	5 day mass ratio (KC Hydrology Manual, Table B-1)
1/12	=	Conversion of rainfall depth in inches to feet

Sec. 408-2 Hydraulic Design

In the absence of a hydrologic volume routing analysis, the storm drain hydraulic grade line calculations shall assume that 50% of the design storm volume and 100% of the nuisance volume is in the basin when the peak flow rates occur.

Sec. 408-3 Freeboard

Freeboard shall be required for all retention basins having a design water depth exceeding 18 inches. Six (6) inches of freeboard will be required when the design ponding depth within the basin is four (4) feet or less. For basins with a design ponding depth greater than four (4) feet the amount of freeboard required shall be one (1) foot. Freeboard shall be measured from the lowest gutter inlet or top of bank, whichever is lower.

Sec. 408-4 Fencing

Retention basins shall be fenced and provided with gated access when the design ponding depth exceeds 18 inches. All retention basins, regardless of ponding depth, that are maintained by the County or an entity administered by the County shall be enclosed by a six (6) foot high masonry block wall. Exceptions may be made, subject to the Director's approval, for certain master planned facilities intended for multi-purpose use.

408-4.01 The fence shall consist of a six (6) foot high chain link fence of 9 gage fabric with redwood slats or a six (6) foot masonry block wall or approved equal. Fence post footings shall have a minimum diameter of 12 inches and a minimum depth of 30 inches. Masonry block walls shall be designed in accordance with accepted engineering practices. Retaining walls used for basin fencing requirements shall have their design approved by the Director. See Plates R-77 thru R-82.

408-4.02 Fence setbacks measured from the top of slope shall provide a reasonable maintenance way for the equipment outlined in the maintenance plan. The following minimum setbacks shall apply:

Design ponding depth	Setback
$\leq$ 18 inches	2 feet
> 18 inches but $\leq$ 4 feet	5 feet
> 4 feet	10 feet
> 8 feet	10 feet (or in accordance with an approved maint-enance plan).

408-4.03 The basin access gate may be chain-link, wrought iron, or other as approved by the Director. The double gate is not to be attached directly to the masonry wall. The opening must be sufficient for the 14-foot double gate and anchor posts. If wrought iron is used, a metal

mesh privacy screen is to be securely attached to the double gate by rivets or equivalent as approved by the Director. Wrought iron double gates will also require a commercial grade latch or equivalent that can be locked with a County padlock (3/8" shackle diameter). See Plates D-11 for specific sizing and material requirements.

Sec. 408-5 Access

An equipment access ramp to the bottom of the retention basin shall be provided when the design depth exceeds 18 inches or when the facility is intended for County maintenance.

408-5.01 The ramp shall be a minimum of 12 feet wide with a maximum slope of 15%. The gate to the access ramp shall be 14 feet wide.

Exception - When the design ponding depth is $\leq$ 4 feet, the maximum slope on the ramp may be increased to 20%.

408-5.02 Ramps shall not be designed to convey drainage water into the sump.

408-5.03 The ramp alignment shall be no more than 45 degrees from the center of the access gate to facilitate maintenance equipment ingress and egress. Other proposed alignments shall have their design approved by the Director.

Sec. 408-6 Curbing and Rodent Barriers

408-6.01 In conjunction with fencing, a six (6) inch wide, eighteen (18) inch deep continuous concrete curb shall be provided around the top of the sump. The top of the curb shall be 0.5 feet above the highest adjacent grade. When the sump is fronting on a street, the top of the curbing shall be a minimum of one (1) foot above the top of the street curb. Ramped access across the curb shall be provided at all gated access points to the sump.

408-6.02 Rodent barriers will be required on the sides of the sump in proximity to open space, agricultural areas or lot one (1) acre or larger. The bottom of the rodent barrier shall be a minimum of 42 inches below finish grade.

Exception - Rodent barriers may be omitted when the design water depth is 4 feet or less.

Sec. 408-7 General Construction Requirements

408-7.01 General construction requirements for retention facilities shall be in accordance with Plates D-1, D-2, and D-3.

408-7.02 Retention facilities shall have the design volume contained entirely in cut.

408-7.03 Slopes shall be designed no steeper than is safe and no steeper than two (2) horizontal to one (1) vertical. A slope stability analysis will be required when the design water depth exceeds eight (8) feet and side slopes are steeper than 3:1.

408-7.04 The minimum bottom dimension for retention basins with a design depth greater than four (4) feet shall be 20 feet. For design water depths 4 feet or less, the minimum bottom width shall be no less than that required for maintenance equipment specified in the maintenance plan.

408-7.05 The maintenance way shall be sloped away from the top of bank at a minimum 2%.

408-7.06 Drainage basins intended for County maintenance shall be located on a lot dedicated exclusively for drainage/recreational purposes.

Sec. 408-8 Testing

408-8.01 Retention basins shall not be permitted unless it can be demonstrated, to the satisfaction of the Director, that the basin will completely drain the design volume within seven (7) days.

408-8.02 Testing of the proposed retention basin shall be provided by a Soils Engineer and shall include, but need not be limited to, an analysis of the soils boring logs and the establishment of the drainage rates of the soils encountered. A minimum of one (1) boring shall be logged within the proposed sump location. This boring shall be advanced below the invert of the basin to a depth equivalent to at least three (3) times the design ponding depth. Testing methods used to establish soil drainage rates shall be approved by the Director.

CHAPTER IX. DETENTION BASIN DESIGN

Sec. 409-1 Design Flow

The design flow into the basin shall be the ISDD five-day runoff hydrograph. Hydrograph design and mass ratios shall be in accordance with the Kern County Hydrology Manual. The out flow hydrograph shall not extend beyond five days from the end of the inflow hydrograph. Infiltration effects from the detention facility shall not be included in the calculation of the outflow hydrograph.

Sec. 409-2 Facility Design

Sizing and placement of detention facilities shall not aggravate the potential for downstream flooding.

Requirements for fencing, curbing, setbacks, access, and freeboard shall be in accordance with retention basin design.

409-2.01 Detention basins shall be provided with a concreted low flow bypass, or approved equivalent, for the conveyance of nuisance flows to the outlet.

409-2.02 An emergency spillway will be incorporated in the design of all detention basins.

Sec. 409-3 Sedimentation

Sediment yield shall be determined and mitigation provided by the developer's engineer.

Sec. 409-4 Duplex Pump Station (Wet Well) Design Specifications

Pumps used in conjunction with detention facilities shall have their design approved by the Director. Specific design criteria shall include the use of an automated duplex pump, and an alarm system. The pump system shall be designed to pass a minimum two (2) inch sphere and for reliability and low maintenance. Pump maintenance shall be included in the facility maintenance plan.

409-4.01 Pump station shall be designed to drain the sump in 5 to 7 days with one (1) pump running. However, the minimum flow rate shall be 100 gpm.

409-4.02 Pump station shall be a duplex system which automatically alternates between pumps at the end of each cycle.

409-4.03 The pump station shall either include a lag pump design or automatic controls, which will start the second pump if the first fails to pump.

409-4.04 Pumps shall be minimum one (1) HP.

409-4.05 Pump station shall be designed to allow easy removal of pumps for maintenance, without requiring personnel to enter into a wet well or similar enclosed structure. A "cage" style pump system, where the pump is located in a cage structure at the bottom of the basin, will not be allowed.

409-4.06 Pumps and pump station inlet structure shall be screened to prohibit plugging by debris.

409-4.07 The pump station (including the electrical/control panel) shall be located next to the entrance of the basin.

409-4.08 The receiver wet well shall consist of one 60” diameter concrete precast manhole sections with single offset R-3 rubber gasket joints per ASTM C-478, latest edition or approved equal. Duplex pump system shall be equipped with two 1HP (minimum), 115V, non-clog, explosion proof, sump pumps with alarm and alarm switch, check valves, ball valves, discharge line, pump lift out assembly, and electrical junction box. Include a 30” x 42” hatch with lockable, steel hinged access with safety grate.

409-4.09 The lifting assembly shall be best suited for the pump arrangement. All cables, etc. are to be stainless steel nylon coated. All slide metal surfaces must be considered non-sparking, by URL, to prevent spark ignition in wet well.

409-4.10 The valve vault shall consist of one 42” diameter concrete precast manhole section (conforming to ASTM C-478 with single offset R-3 gasket joints) with gate valves, swing check valves, and adjustable pipe supports or equivalent. Include a 24” x 24” hatch with lockable, hinged steel access door with safety grate.

409-4.11 Sump pump wiring shall be connected to a waterproof electrical control panel in a NEMA 3 enclosure or equivalent.

409-4.12 A four inch (4”) thick Class 2 concrete pad will be required to encompass the precast top slabs, manholes and control panel.

409-4.13 All electrical conduits and connectors shall be sealed water-tight and gas-tight using bitumastic paint.

409-4.14 All pipe or conduit wall penetrations shall be sealed with a neoprene seal.

409-4.15 All exposed steel (pipe, valves, flanges, elbows, and control box exterior) shall be primed with zinc-chromate primer and painted with an epoxy enamel finish. Color to be grey unless otherwise approved.

409-4.16 A water level staff shall be placed in the sump. The staff may be either anchored to the sideslope of the sump or be attached to the outlet structure, as approved by the Director. The bottom portion of the staff shall be painted black and white, alternating at one-foot increments, to an elevation equivalent to the half full-depth of the sump. The top portion of the staff shall be painted red and white, alternating at one-foot increments, to one foot above design water surface.

409-4.17 All controls shall be mounted in a NEMA (3) metal enclosure or equivalent. The control panel and all electrical components shall bear the Underwriter's Laboratory (UL) Label. All circuit breakers shall have operators extending through the control panel door. All motor starter overload resets, selector switches, push buttons and pilot lights shall be mounted on the control panel door. The control panel shall be enclosed in a vandal resistant enclosure with provisions for locking with a County's lock 3/8" shank pad lock or approved equal.

409-4.18 The control for each pump shall include a thermal magnetic circuit breaker, rotary hand-off-automatic switch, and magnetic motor starter with ambient compensated overload relays and quicktrip heaters. The pump control circuit shall include a door interlock switch to de-energize the control circuit when the control panel door is open, a control mounted transformer with fused 115 volt secondary, and a door mounted control circuit disconnect switch.

409-4.19 Pump operation shall be controlled by three (3) bulb type liquid level sensors. An intrinsically safe pilot circuit shall be provided for each level sensor to reduce the power to the sensor to a level incapable of releasing sufficient electrical or thermal energy to ignite explosive gases.

409-4.20 A fourth level sensor, with intrinsically safe circuit, shall be furnished for indication of high water alarm condition. High water alarm shall be indicated by a panel-mounted pilot light and external audible alarm with silence button.

409-4.21 The controls shall provide for lead/lag sequencing of the pumps, an automatic alternator shall alternate the lead/lag duty on each succeeding pump cycle. An outer pump seal leakage detection system shall be included in the control enclosure. When the motor probes sense the presence of moisture in the oil seal chamber, a

relay coil will illuminate a panel mounted indicating alarm lamp to indicate possible outer motor seal failure and the alarm light.

409-4.22 The pump station shall have a Hand-Off-Auto switch and an automatic low water shut-off, and have green (run) and red (alarm) indicator lights visible from the road/street.

409-4.23 Control panel shall contain hour meters for each pump.

409-4.24 Control panel shall contain a switched GFI 115 volt duplex electrical outlet.

409-4.25 Control panel shall include an emergency generator hook-up connection.

409-4.26 System Testing—Installed pumps, controls and pipes shall be tested in accordance with recommendations of the manufacturer prior to acceptance by the Kern County Engineering, Surveying & permit Services Department.

409-4.27 Prior to acceptance, two (2) complete operation and maintenance manuals, with wiring and interconnect diagrams for all equipment and controls, model and serial numbers of the sump pumps, and a set of as-built drawings on cronar shall be furnished to the County.

CHAPTER X. CONSTRUCTED CHANNEL DESIGN CRITERIA

Sec. 410-1 Design Flow

Constructed channels shall be designed to carry the CSDD plus freeboard.

Sec. 410-2 Freeboard

410-2.01 The minimum freeboard between the design water surface, and the top of bank of the channel shall be 0.50 feet or 0.20 of the specific energy, whichever is greater.

410-2.02 If the designed water surface is within the embankment area, the design and construction of the channel shall be in accordance with the levee design criteria, including freeboard requirements.

410-2.03 The minimum freeboard requirements for bridges, culverts, and utility crossings which span open channels and which are existing, planned

or projected at the time of channel design shall be in accordance with the requirements specified in Sections 406-2 and 406-3.

410-2.04 Superelevation resultant from directional modification shall be considered prior to computing the required freeboard.

Sec. 410-3 Hydraulic Design

410-3.01 Channels shall be designed with proper allowance for hydraulic losses for all planned and projected future crossings or other obstructions to maintain clearance and freeboard as required.

410-3.02 The water surface and the energy grade line profile shall be computed and plotted for all constructed channels and at locations where natural channels modifications are proposed.

410-3.03 Constructed channels shall not be designed with a slope in the range of ± 20% of critical slope unless freeboard equal to the height for instability waves is added.

410-3.04 A minimum velocity of two (2) feet per second shall be maintained for lined channels to prevent sedimentation.

Sec. 410-4 Structural Design

410-4.01 The minimum bottom width of constructed channels shall be ten (10) feet. A triangular channel may be permitted when the channel side slopes are four (4) to one (1) or flatter.

410-4.02 The minimum centerline radii for curves in constructed channels shall be three (3) times the top width of the design water surface.

410-4.03 Design of slopes shall be predicated upon results of an investigation by a Soil Engineer, subject to the approval of the Director.

410-4.04 Adequate bank protection and drop structures shall be provided where the slopes in the channel are steep and high velocities are present.

410-4.05 Bank protection shall be provided based on the design engineer's recommendations, subject to the approval of the Director. Stress area protection shall extend downstream from the end of the stress area a distance equal to ten (10) times the design water depth, unless the engineer can show that the erosion potential is not excessive.

410-4.06 At drop structures or in other locations where a hydraulic jump may occur, bank protection shall be provided through the hydraulic jump for a minimum distance of six (6) times the sum of the sequent depth and the depth of freeboard. This protection shall cover the invert and extend to the height of the sequent depth plus the height of the freeboard. The protection material may be either concrete, concreted-rock slope protection, sacked concrete, air-blown mortar or other approved alternative.

410-4.07 All channel lining materials and methods shall be specified by the engineer and approved by the Director.

410-4.08 All appurtenant drainage facilities shall be constructed and areas adjacent to channels graded so that erosion will be prevented within the channel right-of-way.

410-4.09 Waterways shall enter the main channel at an angle not exceeding 25 degrees.

Sec. 410-5 Erosion

The engineer shall provide recommendations on all necessary mitigation measures for erosion including bank protection and bottom stabilization of the channel, subject to the approval of the Director.

Sec. 410-6 Fencing

410-6.01 Constructed channels with slopes steeper than four (4) to one (1) with specific energy, at any point, greater than 1.5 feet shall be fenced in its entirety.

410-6.02 A six (6) foot high nine (9) gage chain link fence fabric with tension wire shall be installed on each side of the right-of-way.

410-6.03 At all road intersections, fencing shall be installed to prevent public access to constructed channels.

410-6.04 A 14 foot wide chain link drive gate shall be provided at all points of vehicular access.

Sec. 410-7 Easements/Right-of Ways and Maintenance Ways

410-7.01 Right-of-ways for constructed channels with side slopes steeper than four (4) to one (1) shall be provided as follows:

a. The right-of-way for channels with top widths greater than 50 feet, as measured to the top of freeboard, shall include the top width of the channel, two maintenance ways (one on each side of the channel), slope easements (when applicable), and interceptor ditch area (when applicable). The maintenance ways shall be a minimum of 15 feet wide. Runoff from the maintenance ways shall be mitigated.

b. The right-of-way for channels with top widths of 50 feet or less, as measured to the top of freeboard, shall include the top width of the channel, one maintenance way on either side of the channel, slope easements (when applicable), and interceptor ditch area (when applicable). The maintenance way shall be a minimum of 15 feet wide. Runoff from the maintenance way shall be mitigated.

410-7.02 The right-of-way for constructed channels with side slopes four (4) to one (1) or flatter shall be sufficient to contain the top width of the channel (measured from top of freeboard) plus slope easements as needed. A minimum of five (5) feet on either side of the channel shall be provided for maintenance purposes.

410-7.03 Right-of-way for turn-around: Turn-around distance and radii:

At the terminus and at intervals not to exceed one channel mile, turn around areas shall be provided. The minimum inside radii for maintenance roads shall be 40 feet.

410-7.04 Tributary waterways shall be conveyed under maintenance roads in closed conduits or culverts as applicable. Where open channel tributaries cross a maintenance road, a convenient turn-around area shall be provided for maintenance vehicles. The minimum diameter of a turn-around shall be 40 feet.

410-7.05 Right-of-Way for Channels Intersecting Public Roads:
At intersections of the channel with public roads, sufficient right-of-way shall be provided to permit access from the public road to the maintenance road as approved by the Director.

In the event that the channel right-of-way does not intersect a public road, a turn-around or a 15 foot wide access right-of-way shall be provided from a public road to the channel right-of-way at intervals not to exceed one (1) channel mile.

Sec. 410-8 Sedimentation

The determination of sediment yield and proposed mitigation measures of such shall be prepared and recommended by a qualified registered civil engineer, subject to the approval of the Director.

CHAPTER XI. LEVEE DESIGN

Sec. 411-1 Design Flow

Levees shall be designed to accommodate for the CSDD plus freeboard.

Sec. 411-2 Freeboard

411-2.01 The minimum freeboard between the designed CSDD water surface and the levee's top of bank shall be three (3) feet or 0.20 times the specific energy plus one (1) foot, whichever is greater.

411-2.02 An additional one (1) foot, above this minimum of freeboard, shall be required within 100 feet of either side of structures within the levee or whenever the flow is constricted, such as at bridges. An additional 0.50 foot above the minimum is also required at the upstream end, tapering to the minimum at the downstream end of the levee.

Sec. 411-3 Hydraulic Design

See Section 410-3 Hydraulic Design for details.

Sec. 411-4 Structural Design

Levees shall be designed in accordance with the latest revision of the Corps of Engineers Design and Construction of Levees, Engineer Manual, EM1110-2-1913.

Sec. 411-5 Erosion

Mitigation measure for erosion protection shall be prepared and recommended by a registered civil engineer, subject to the approval of the Director.

Sec. 411-6 Fencing

Fencing requirements for levees shall be in accordance with the criteria contained in the constructed channel design, Section 410-6.

Sec. 411-7 Easements/Right-Of-Way

Access, easements and right-of-way shall be in accordance with the requirements set forth in Section 410-7. (Constructed Channels).

Sec. 411-8 Sedimentation

Mitigation measures shall be prepared and recommended by a qualified, registered engineer, subject to the approval of the Director.

Sec. 411-9 Maintenance

A maintenance plan and an entity with taxing power to maintain levees shall be established, subject to the approval of the Director. Neither the County nor County Service Area will maintain a levee.

CHAPTER XII. NATURAL CHANNELS

Sec. 412-1 Delineation

All natural channels shall be identified and clearly delineated on the plans with the appropriate floodplain designation.

For defined natural channels, the Floodplain and Floodway Boundaries shall be delineated, subject to the approval of the Director.

Sec. 412-2 Setback

The minimum setback from the top of bank of a natural channel with side slopes steeper than two (2) horizontal to one (1) vertical, shall be a two (2) to one (1) slope plus a 10 foot wide buffer strip. The setback shall be measured from the toe of the slope. Where the slopes are flatter than two (2) to one (1), the required setback shall be a minimum of 10 feet from the Floodway limit.

Sec. 412-3 Tie-Ins

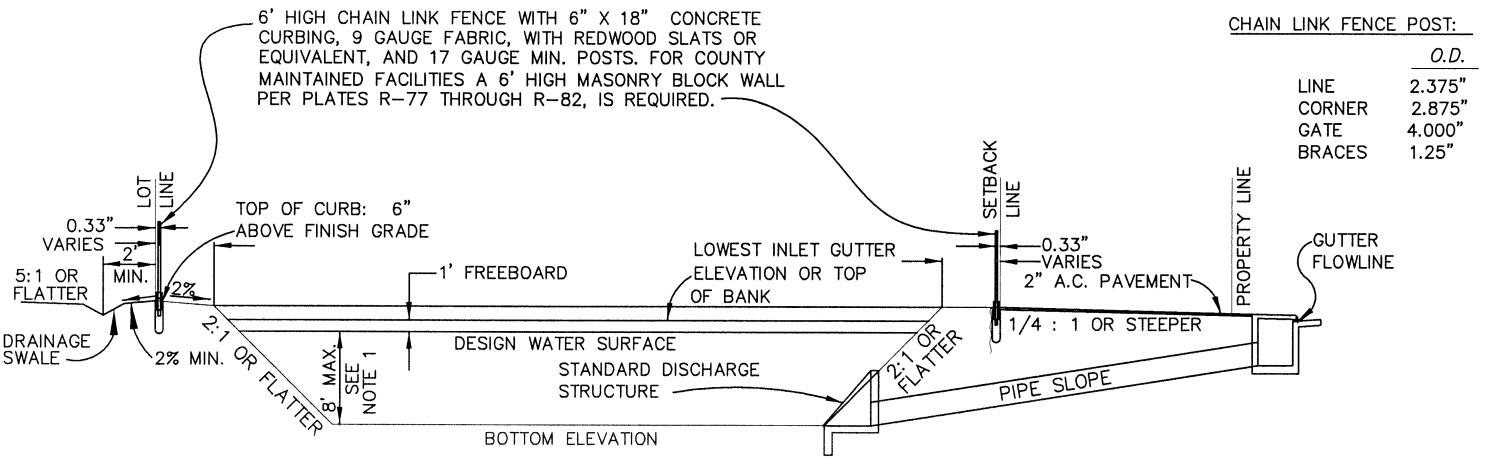
Where natural channels merge into constructed channels, the tie-ins shall be designed in a manner to dissipate energy and protect against erosion. The design for such tie-ins shall be in accordance with acceptable engineering practices and approved by the Director.

Sec. 412-4 Relocation

Should an existing natural channel be relocated, the channel shall be designed in accordance with the criteria specified herein for constructed channels.

Sec. 412-5 Use of Natural Facilities

All applicable Federal and State permits and requirements shall be required for any operation that would discharge dredged or fill material in any waters of the United States (normally channels identified with blue lines on the U.S.G.S. maps).



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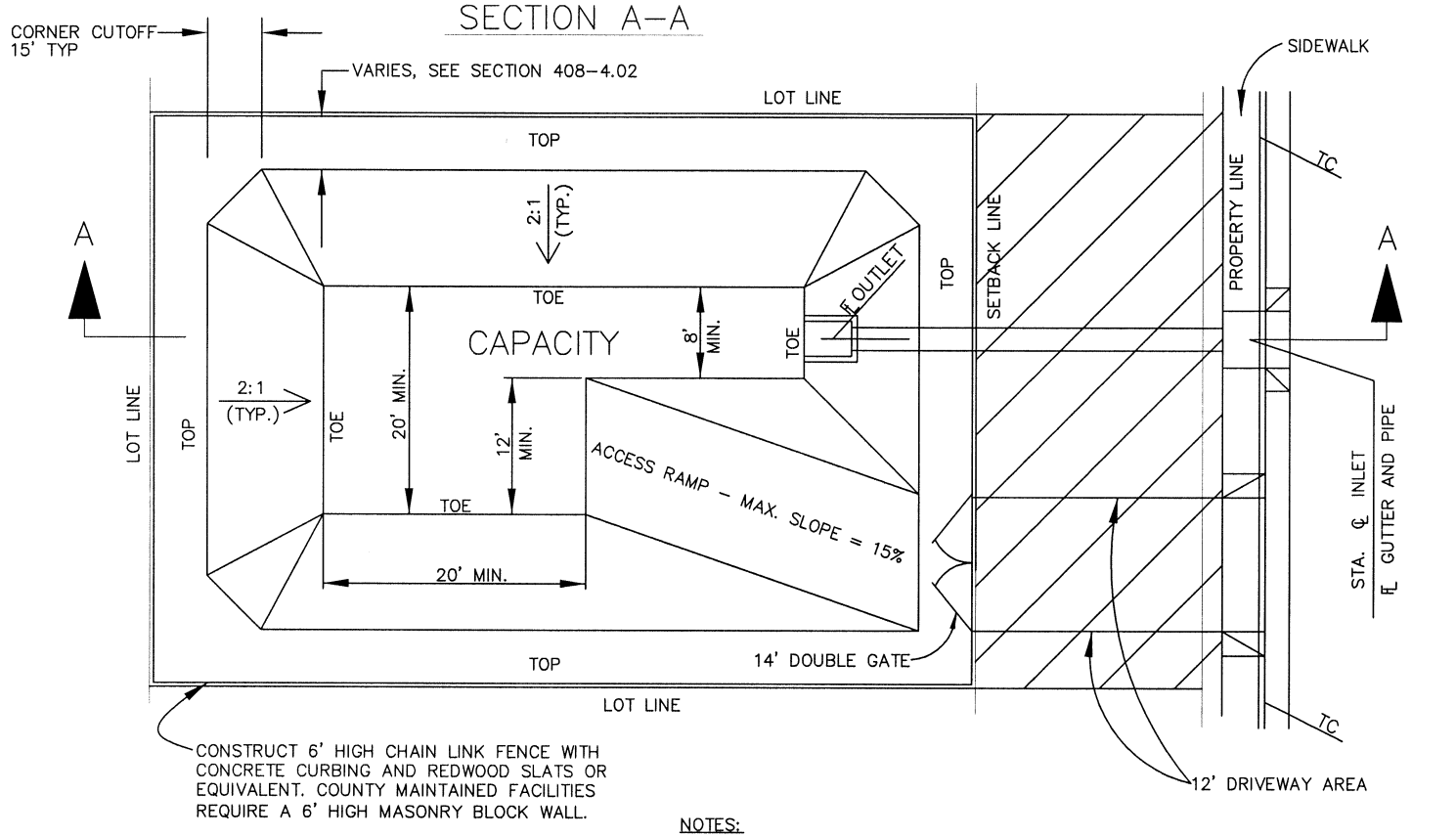

SUMP PLAN

LEGEND

TOP – TOP OF CURB
FG – FINISH GRADE
OG – ORIGINAL GROUND

INDICATES 2" A.C. OVER NATIVE SOIL WHICH HAS BEEN TREATED WITH A PERMANENT SOIL STERILANT SUBJECT TO THE APPROVAL OF THE DIRECTOR.

NOTES:

1. MAY EXCEED 8' IF SIDE SLOPES ARE 3:1 OR FLATTER; OR A SLOPE STABILITY ANALYSIS IS PROVIDED.
2. VARIATIONS TO THE DIMENSION MAY BE APPROVED BY THE DIRECTOR.
3. ADDITIONAL REQUIREMENTS MAY BE IMPOSED AS PART OF THE CONDITIONS ISSUED.
4. COMPACT O.G. TO 95% FOR MINIMUM OF SIX (6) INCHES UNDER 2" A.C.
5. WHEN FENCE IS SET ON FRONT R/W LINE SIDEWALK SHALL BE FULL WIDTH.
6. TACK WELD FABRIC AND HARDWARE TO POSTS.
7. TREAT BLOCK WALL WITH ANTI-GRAFFITI PRODUCT SUBJECT TO APPROVAL OF THE DIRECTOR.
8. CONSTRUCT 6" X 18" CONCRETE CURB UNDER GATE W/ TWO (2) #4 REBAR TOP AND BOTTOM.

PLOTTED: 02/25/2010

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Revisions Date	Desc
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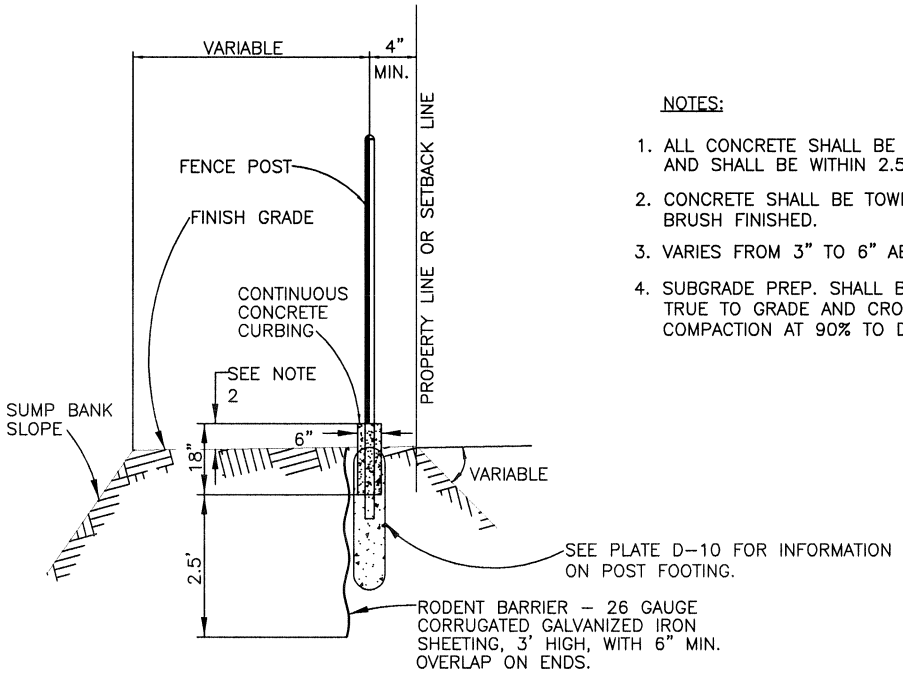
DATE: 8-18-1995
DESIGNED BY: R.J.L.
DRAWN BY: K.S.
CHECKED BY: A.A.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

SUMP DETAILS

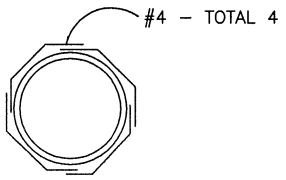
PLATE NO. D-1



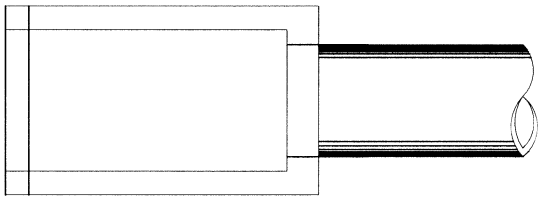
NOTES:

1. ALL CONCRETE SHALL BE CLASS 3 CONCRETE AND SHALL BE WITHIN 2.5" TO 5.5" SLUMP.
2. CONCRETE SHALL BE TOWELED SMOOTH AND BRUSH FINISHED.
3. VARIES FROM 3" TO 6" ABOVE FINISH GRADE.
4. SUBGRADE PREP. SHALL BE CONSTRUCTED TRUE TO GRADE AND CROSS SECTION WITH COMPACTION AT 90% TO DEPTH OF 6"

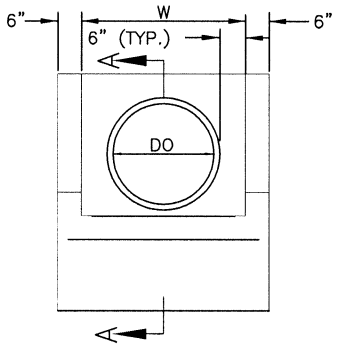
CURBING AND RODENT BARRIER DETAILS



DETAIL "A"



PLAN



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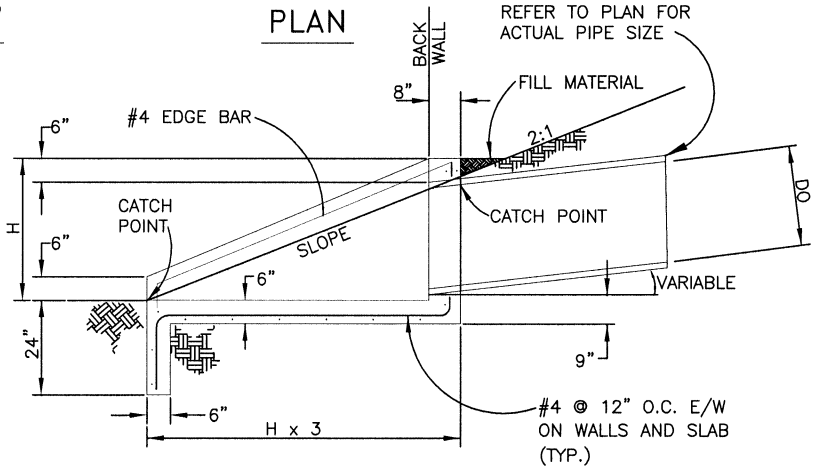

SECTION A-A

DISCHARGE STRUCTURE

PLOTTED: 02/25/2010

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Revisions		DATE: 3-31-1995	COUNTY OF KERN STATE OF CALIFORNIA DEVELOPMENT STANDARD	CURBING, RODENT BARRIER, AND DISCHARGE STRUCTURE DETAILS	PLATE NO. D-2
Date	Desc				
4/09	B HILL	DESIGNED BY: R.J.L.			
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.	.	DRAWN BY: K.S			
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.	.	CHECKED BY: C.L.			
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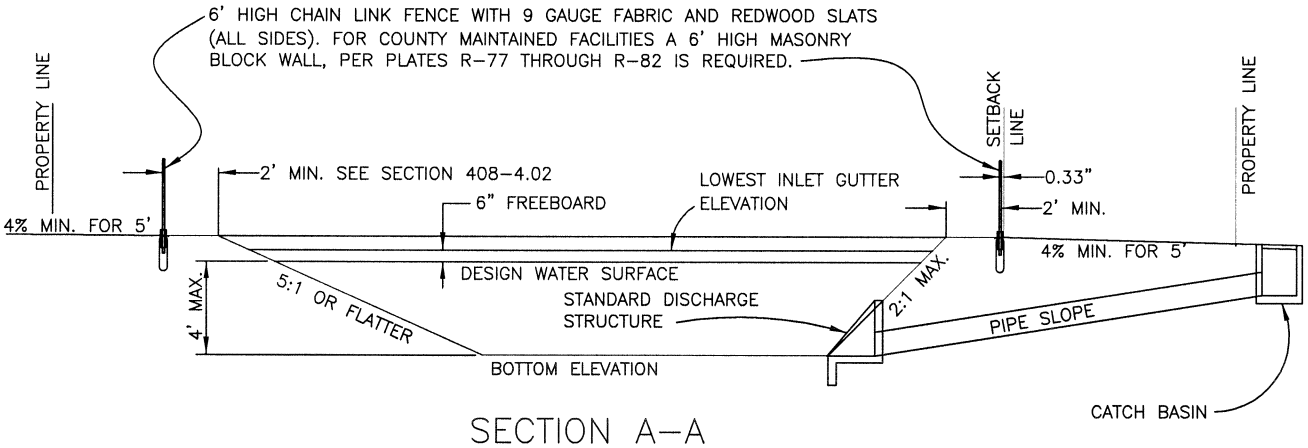
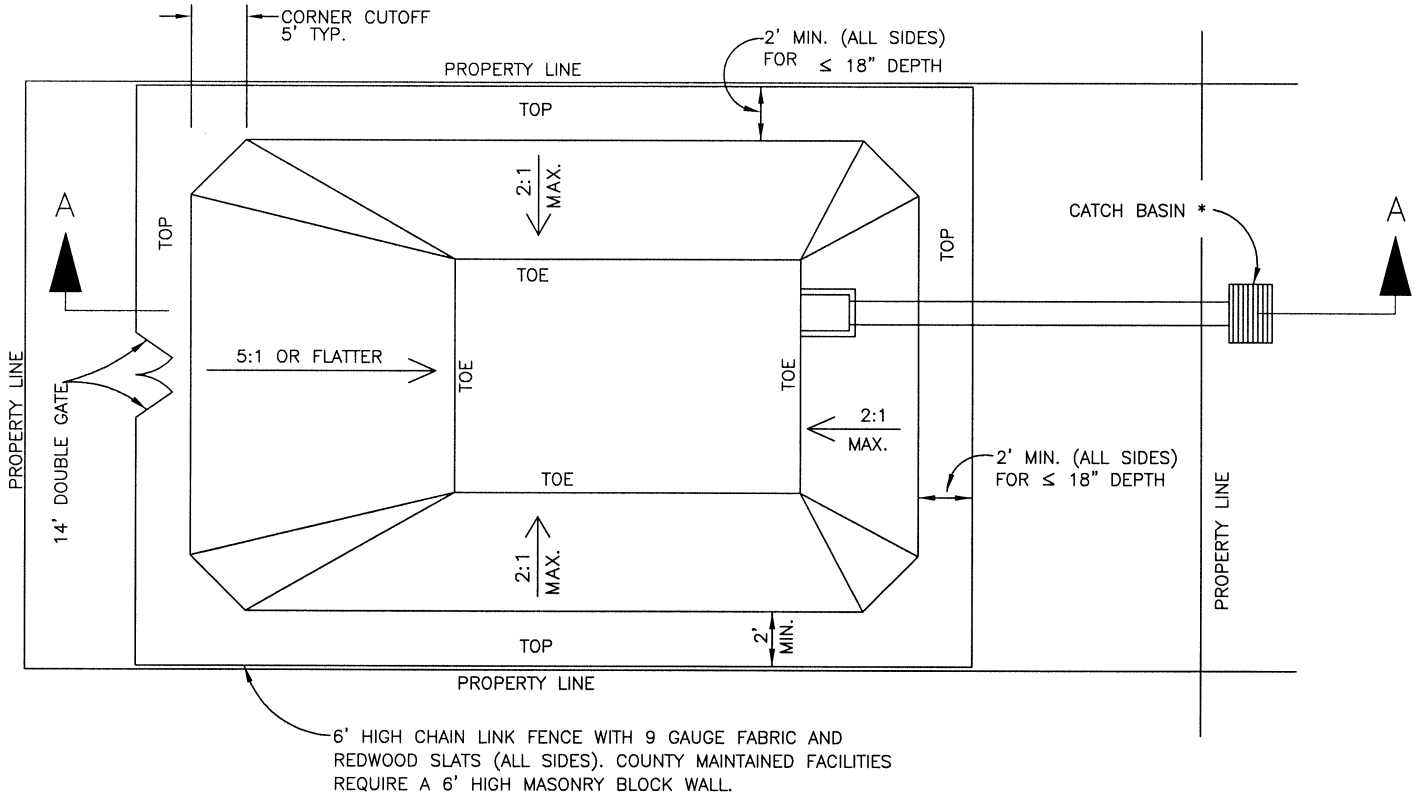


SECTION A-A



SUMP PLAN

* NO CURB AND GUTTER SHOWN

NOTE:
SEE ADDITIONAL NOTES AND REQUIREMENTS FOR CHAIN-LINK FENCES AND MASONRY WALLS ON PLATE D-1

PLOTTED: 02/25/2010

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Revisions Date	Desc
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DATE: 8-18-1995
DESIGNED BY: R.J.L.
DRAWN BY: K.S
CHECKED BY: C.L.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

SHALLOW SUMP DETAILS

PLATE NO. D-3

PLOTTED: 02/25/2010

Revisions		
Date	Desc.	
4/10/09	REVISED	
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DATE: 8-18-1995
DESIGNED BY: A.A.
DRAWN BY: D.M.
CHECKED BY: G.F.

COUNTY OF KERN
STATE OF CALIFORNIA

DEVELOPMENT STANDARD

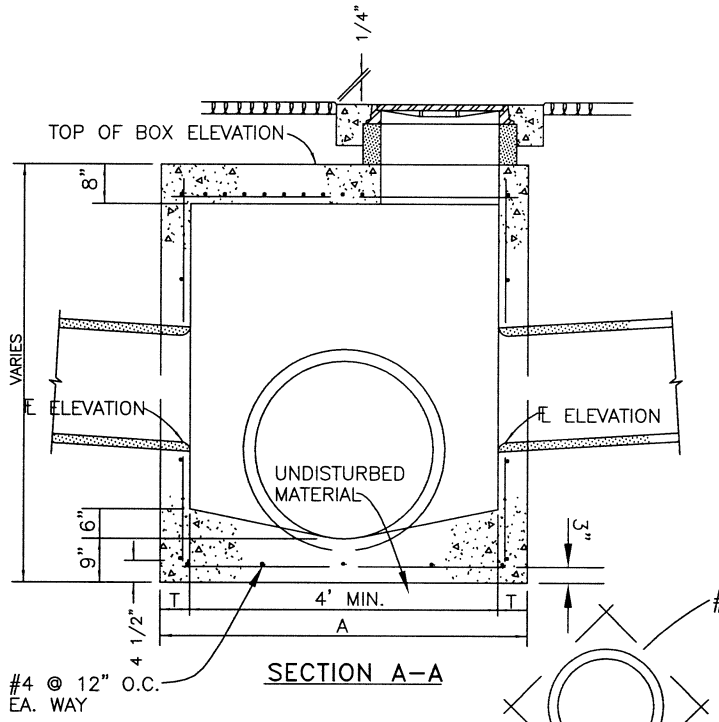
TYPE "B" MINOR STRUCTURE - JUNCTION BOX

PLATE NO. D-4

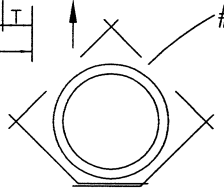
222

NOTES:

1. ALL CONCRETE SHALL BE MINOR CONCRETE.
2. WALL REINFORCING NOT REQUIRED WHEN H = 8' OR LESS AND THE UNSUPPORTED LENGTH OF ALL WALLS = 7' OR LESS. WALLS EXCEEDING EITHER LIMIT SHALL BE REINFORCED WITH #4 BARS AT 18" CENTERS PLACED 1 1/2" CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
3. GALAVANIZING – SEE STANDARD SPECIFICATIONS OR SPECIAL PROVISIONS.
4. T = 6" WHEN H = 8' OR LESS AND THE UNSUPPORTED LENGTH OF ALL WALLS = 7' OR LESS. WALLS EXCEEDING EITHER LIMIT SHALL HAVE T = 8".
5. LOCATION OF FRAME AND COVER TO BE DETERMINED BY THE ENGINEER.
6. PRECAST ALTERNATIVE IS OPTIONAL. SEE SECTION 51-1.02 OF STANDARD SPECIFICATIONS.

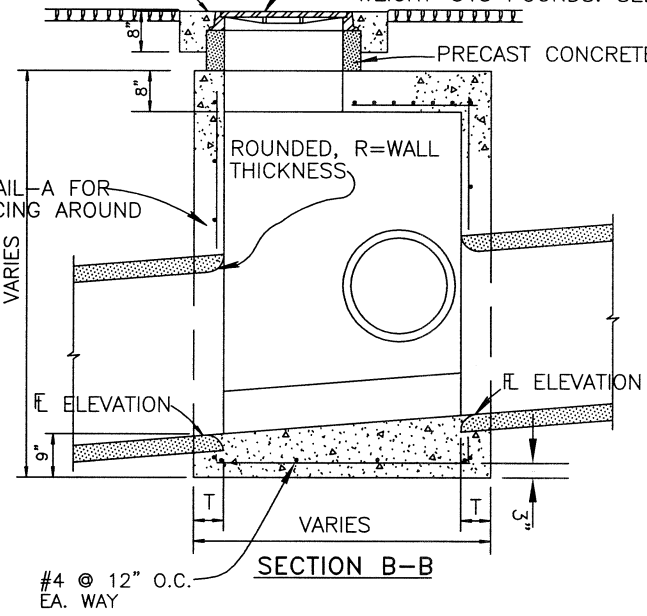


SECTION A-A

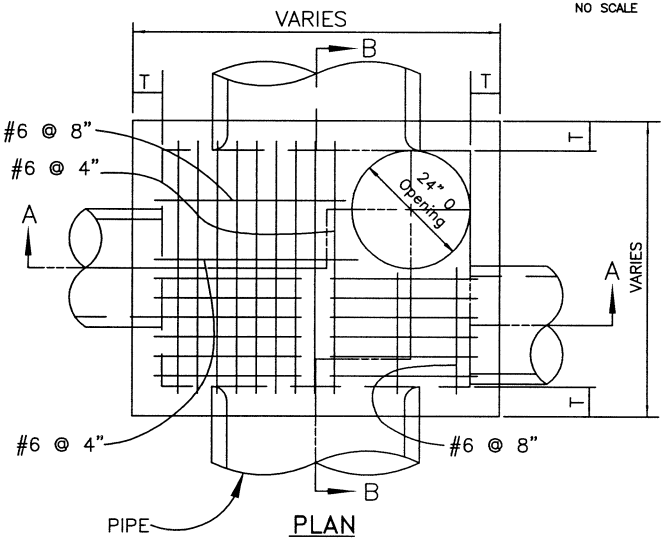


DETAIL A
NO SCALE

TRAFFIC FRAME AND COVER SET TO GRADE AS DIRECTED BY THE ENGINEER. COVER AND FRAME MACHINED TO FIT. COVER TO HAVE RADIAL BLOCK TREAD, FRAME TO HAVE FLANGE DOWN, APPROXIMATE WEIGHT-315 POUNDS. SEE NOTE #5



SECTION B-B



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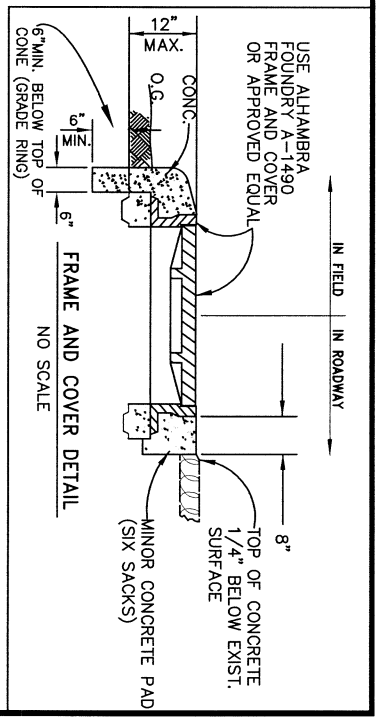

FRAME AND COVER DETAIL
NO SCALE

TYPE "B" MINOR STRUCTURE

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Desc	Date	
REVISED	4/10/09	

PLOTTED: 02/25/2010

DATE: 8-18-1995

DESIGNED BY: A.A.

DRAWN BY: D.M.

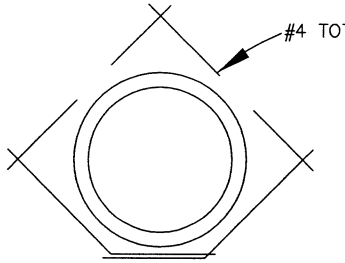
CHECKED BY: G.F.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

TYPE "C" MINOR STRUCTURE– MANHOLE

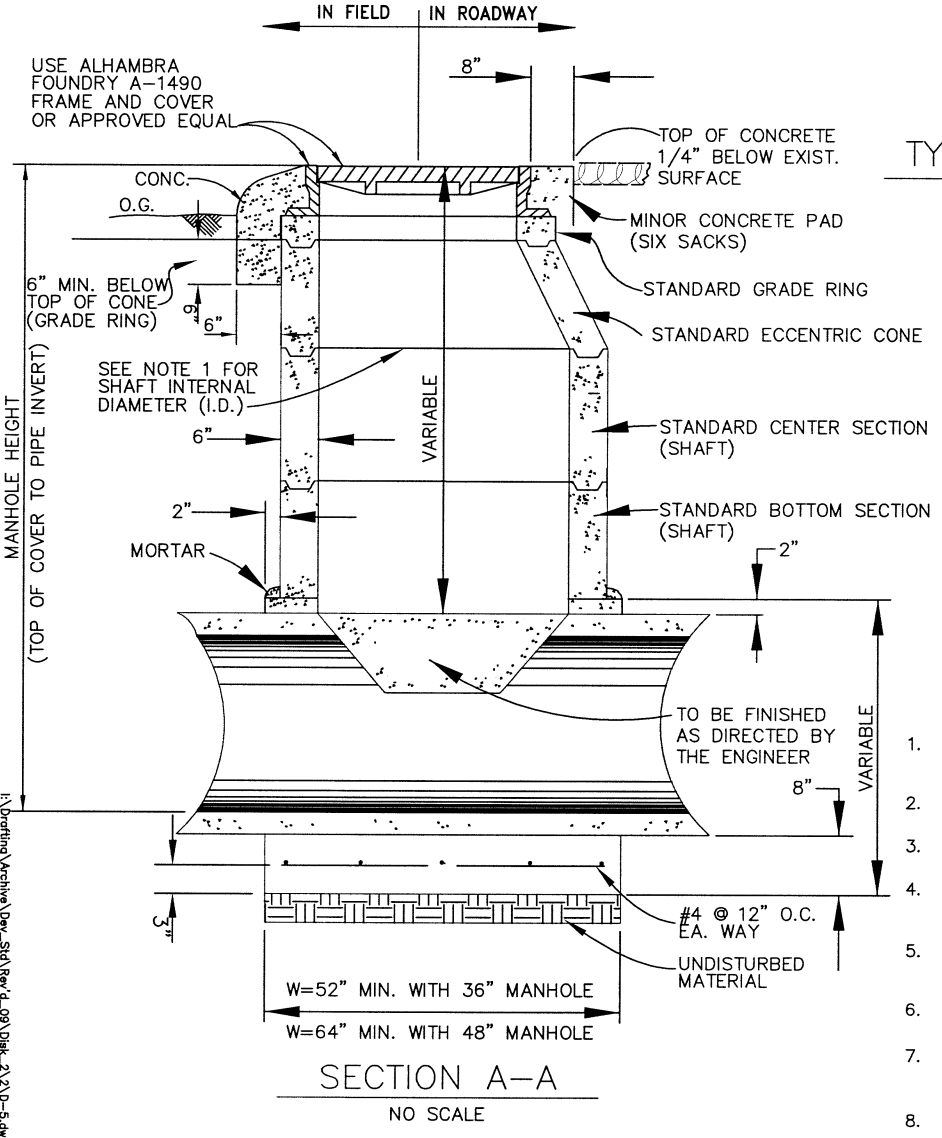
PLATE NO. D–5

223



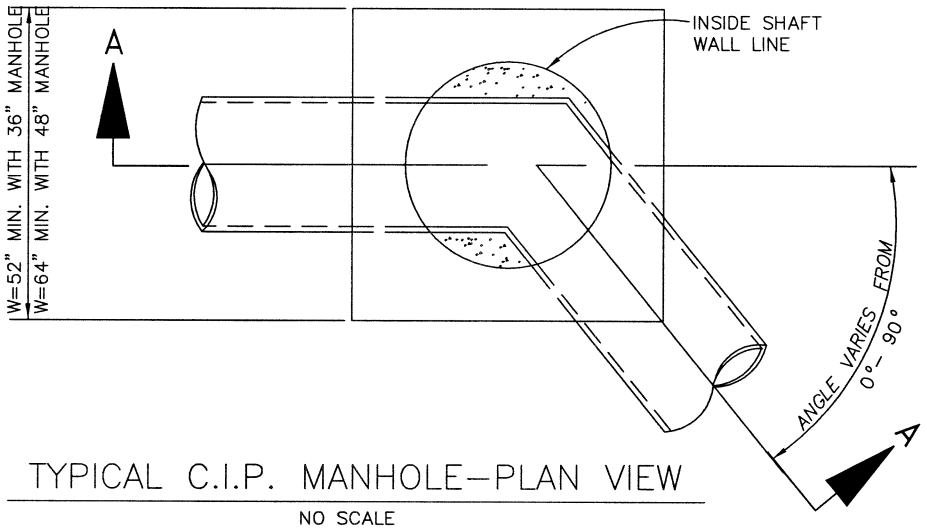
DETAIL A

NO SCALE



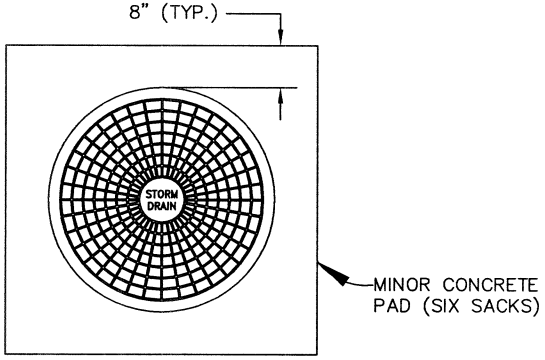
SECTION A–A

NO SCALE



TYPICAL C.I.P. MANHOLE–PLAN VIEW

NO SCALE



MANHOLE COVER AND CONCRETE PAD

NO SCALE

NOTES:

1. MANHOLE CONSTRUCTED ON CONCRETE PIPE OF 36" I.D. OR GREATER SHALL USE 48" SHAFT; CONCRETE PIPE WITH LESS THAN 36" I.D. SHALL USE 36" SHAFT.
2. USE COMBINATION OF CONE AND SHAFT AS DIRECTED BY THE ENGINEER.
3. ALL CONCRETE TO BE MINOR CONCRETE.
4. ALL REINFORCING TO BE NO.4 BARS AT 12" O.C., 1 1/2" CLEAR OF INSIDE FACE UNLESS OTHERWISE NOTED. SEE DETAIL "A" FOR REINFORCING AROUND PIPE.
5. ALL EXPOSED METAL PARTS SHALL BE GALVANIZED AFTER FABRICATION EXCEPT FRAME AND COVER.
6. LOCATION OF FRAME AND COVER TO BE DETERMINED BY THE ENGINEER.
7. ALL REINFORCEMENT FOR SURFACES IN CONTACT WITH THE GROUND SHALL BE PROTECTED WITH NOT LESS THAN 2" OF CONCRETE.
8. WORDING ON MANHOLE TO READ "STORM DRAIN".

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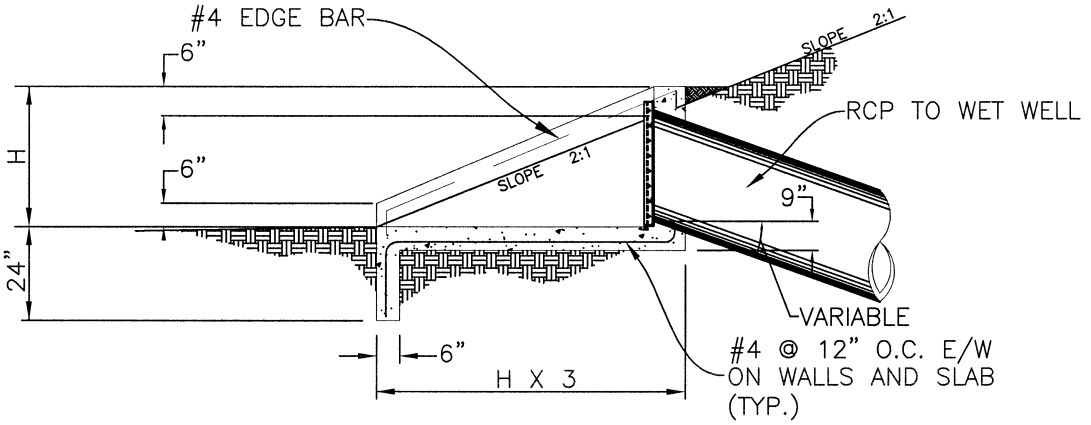

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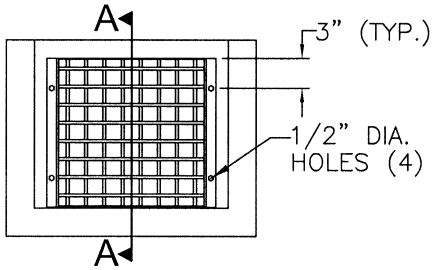

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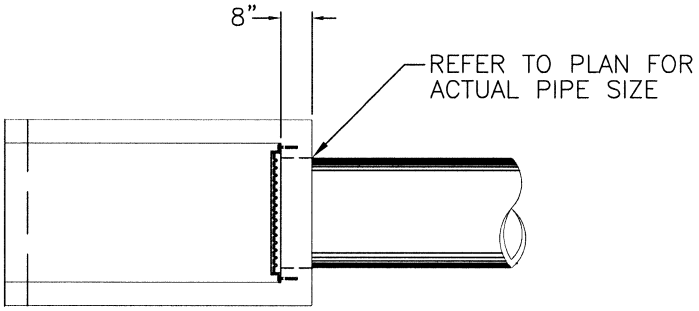

PLAN

INLET STRUCTURE

GRATE NOTES:

1. GRATE FABRICATED OR EQUIVALENT SHELF ITEM– ALL PARTS & PRODUCTS GALVANIZED
2. FRAME CONSTRUCTED W/ 1/4" x 3/4" x 2" x LENGTH (VARIES TO PIPE SIZE) ANGLE IRON
3. MIN. FOUR– 3/8"X 3" S.S. RED HEAD ANCHOR BOLTS FLAT LOCK WASHER, 2 EA PER VERTICAL ANGLE 3" FROM TOP & BOTTOM OF FRAME.
4. FOUR–1/2" DIA. HOLES IN FRAME
5. GRATE OPENING $1\frac{3}{16}$" x 2" O.C.
6. 1/4" DIA ROD WELDED TO FRAME ON ALL SIDES

NOTES:

1. PIPE DETAIL REFER TO PLATE D–2.

PLOTTED: 02/25/2010

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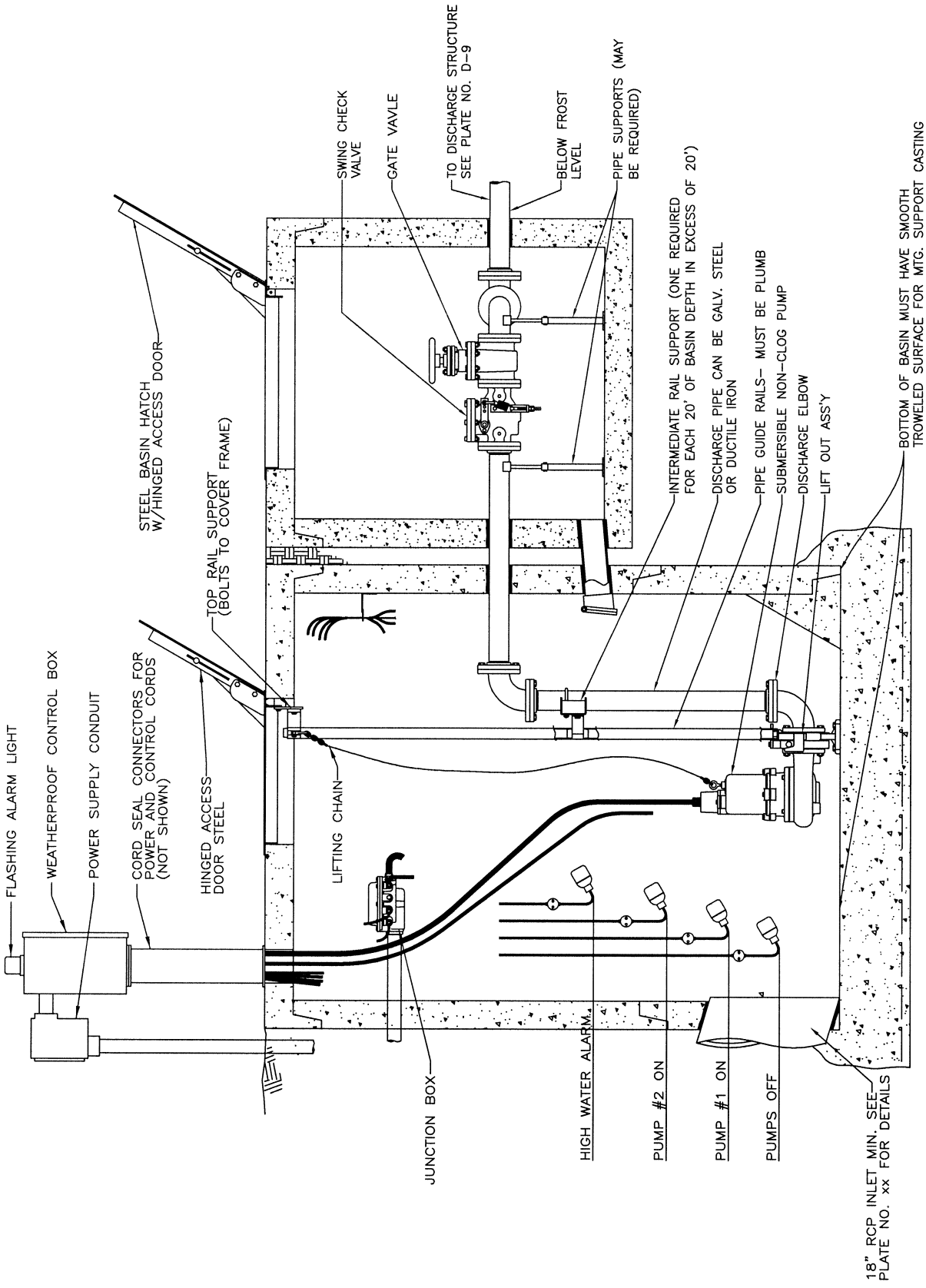
Revisions Date	Desc	4–30–2009	COUNTY OF KERN STATE OF CALIFORNIA DEVELOPMENT STANDARD	PUMP STATION INLET STRUCTURE	PLATE NO. D–6
.	.	DESIGNED BY: K.L.H.			
.	.	DRAWN BY: B.D.H.			
.	.	CHECKED BY: A.A.			



PLOTTED: 02/25/2010

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4-30-2009

DESIGNED BY: F.E.M.

DRAWN BY: B.D.H

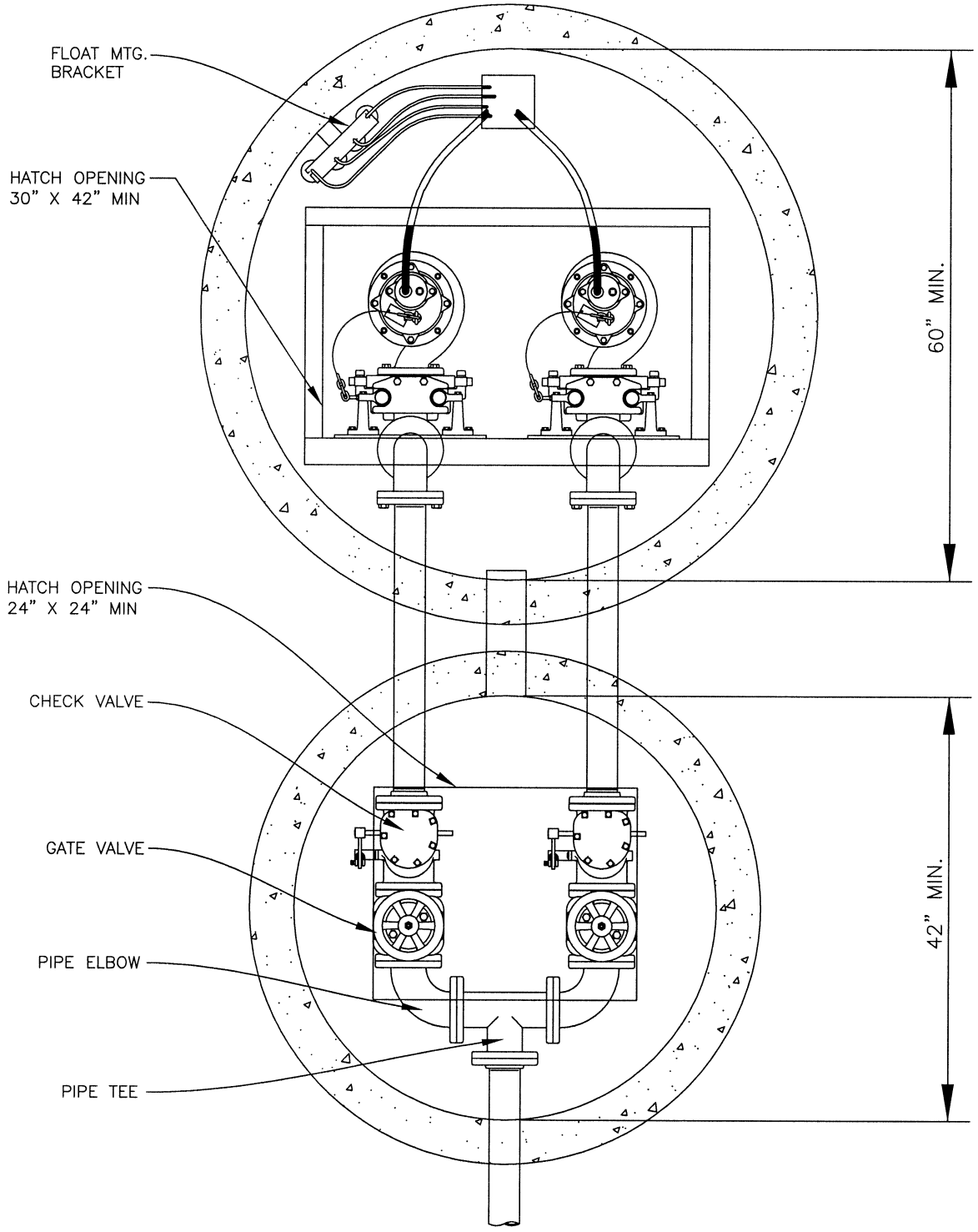
CHECKED BY: K.L.H.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

DUPLEX PUMP STATION

PLATE NO.

D-7



*MODIFIED FROM FEMyers.com NON-CLOG, 3" DISCHARGE, DUPLEX PUMP INSTALLATION DRAWING ESS-2228b

PLOTTED: 02/25/2010

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4-30-2009

DESIGNED BY: F.E.M.

DRAWN BY: B.D.H.

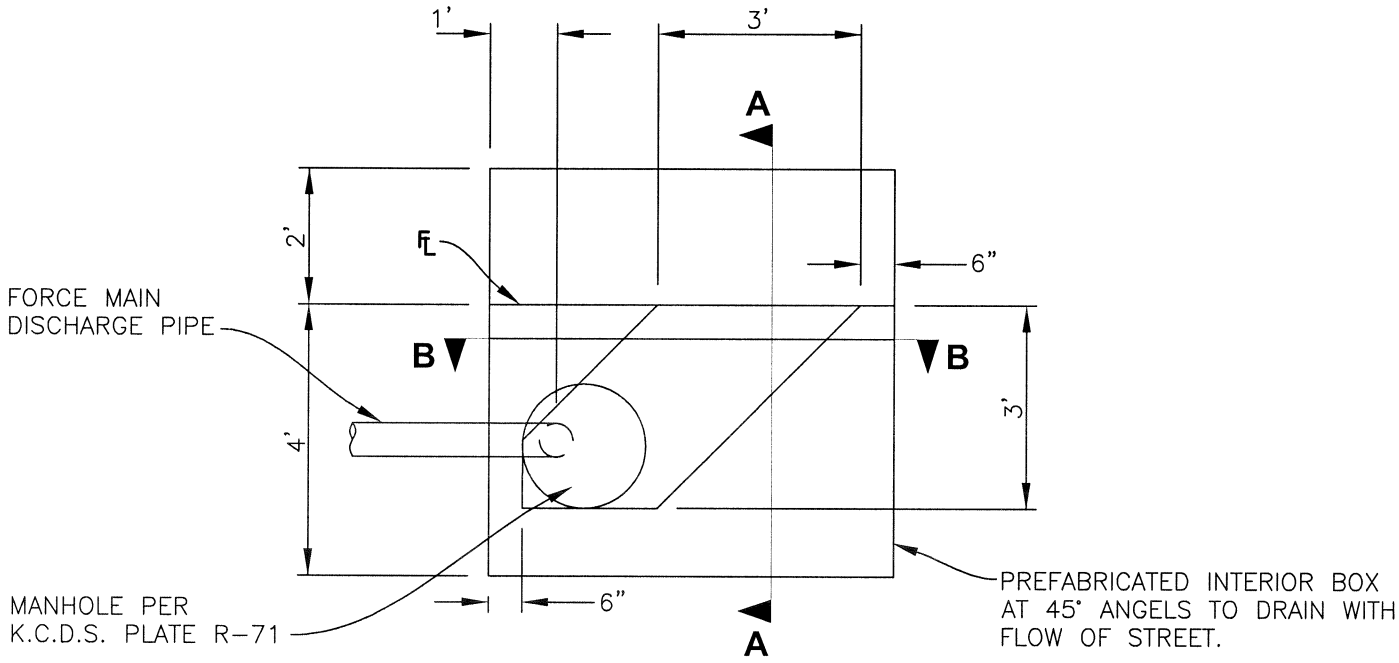
CHECKED BY: K.L.H.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

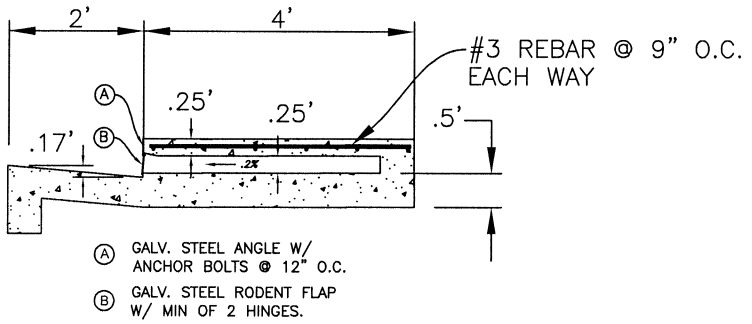
PLAN VIEW DUPLEX PUMPS

PLATE NO.

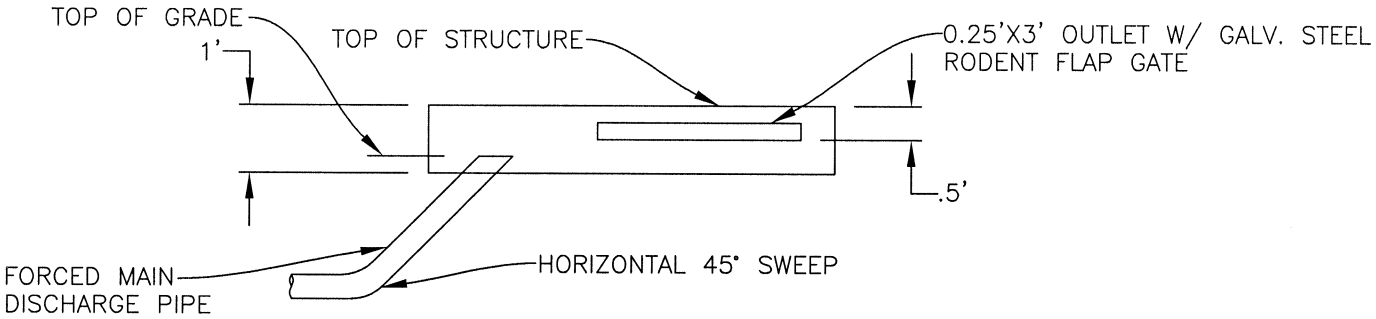
D-8



DISCHARGE STRUCTURE



SECTION A-A



SECTION B-B

PLOTTED: 02/25/2010

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4-30-2009

DESIGNED BY: K.L.H.

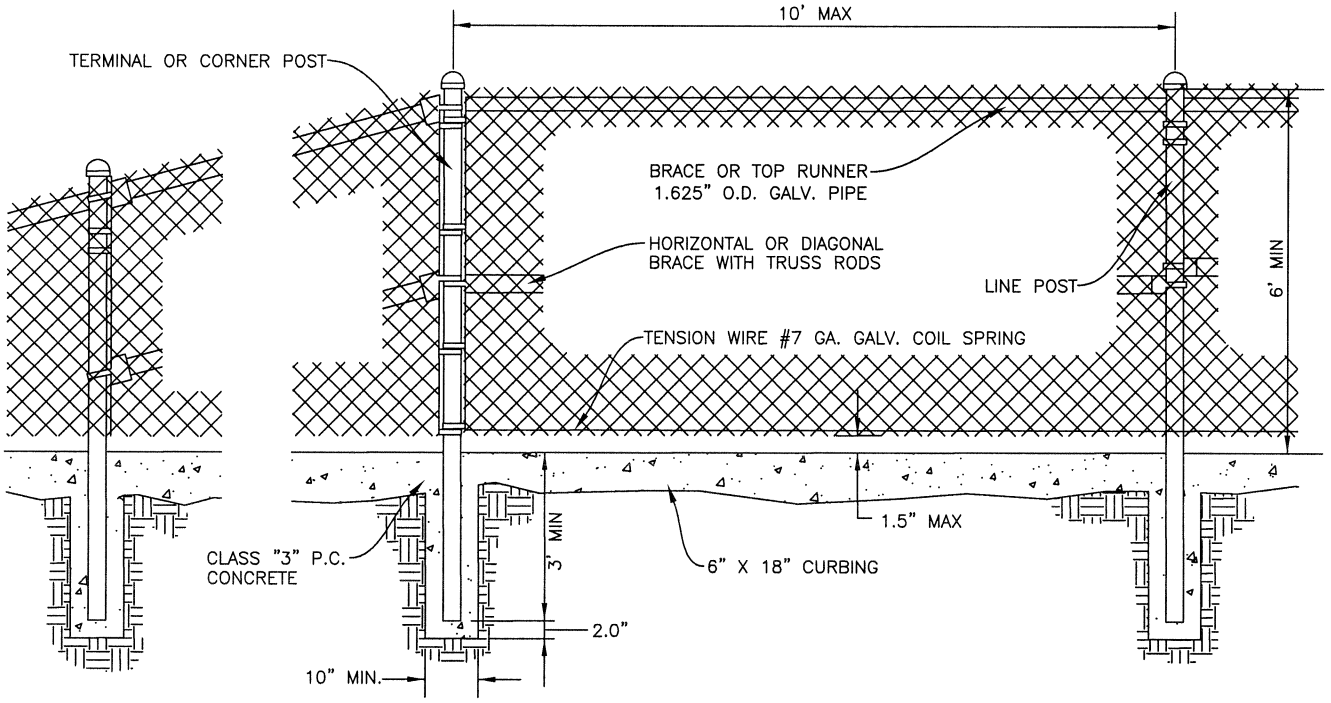
DRAWN BY: B.D.H.

CHECKED BY: A.A.

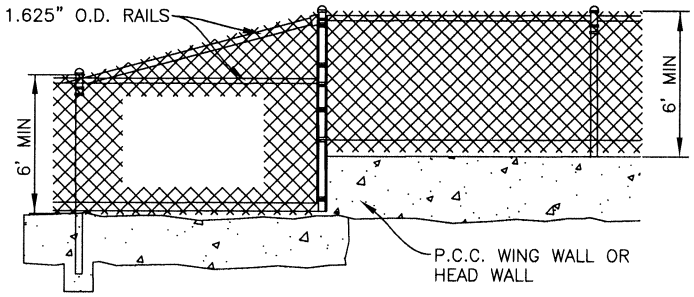
COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

PUMP STATION
DISCHARGE STRUCTURE

PLATE NO.
D-9



TYPICAL CHAIN LINK FENCE DETAIL



TYPICAL DETAIL AT CULVERT ENDWALLS

FENCING SPECIFICATIONS:

1. FENCING FABRIC SHALL BE 9 GUAGE, 2" MESH, AFTER WEAVING, KNUCKLED TOP AND BOTTOM, 6' HIGH GALV.
2. CORNER POSTS SHALL BE 2–7/8" O.D. GALV. PIPE.
3. LINE POST 2–3/8" O.D. GALV. PIPE.
4. PRIVACY SLATS SHALL BE 2–3/16" X 1/4".

NOTES:

1. INSTALLATION OF FENCING AND GATES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF "STANDARD SPECIFICATION, STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION," APPROVED CURRENT EDITION.
2. CONCRETE CURBING SHALL BE CONSTRUCTED UNDER ALL FENCES. CURBING SHALL BE 6" X 18", CLASS 3 CONCRETE.
3. CORNER POST SHALL BE INSTALLED AT ALL ANGLES IN FENCE LINE IN EXCESS OF 10".
4. END, CORNER, AND GATE POSTS SHALL BE BRACED TO THE NEAREST LINE POST WITH GALV. DIAGONAL OR HORIZONTAL BRACES USED AS COMPRESSION MEMBERS AND GALV. 0.375" STEEL TRUSS RODS WITH TURNBUCKLES OR TRUSS TIGHTENER USED AS TENSION MEMBERS.
5. FABRIC SHALL BE FASTENED TO GATE POST, TERMINAL POST, OR CORNER POST WITH 3" X 3/4" STRETCHER BAR BONDS AT 8" ON CENTER.
6. FABRIC SHALL BE FASTENED TO LINE POST, LAST RUNNER, AND BOTTOM TENSION WIRES WITH FABRIC BONDS SPACED APPROX. 14" APART.
7. FABRIC SHALL CONFORM TO ASTM A–392, CLASS 1.
8. SUBGRADE PREPARATION SHALL BE CONSTRUCTED TRUE TO GRADE AND CROSS SECTION WITH COMPACTION OF 85% TO A DEPTH OF 0.5"
9. WHEN REDWOOD SUBURBAN SCREEN, OR EQUIVALENT IS REQUIRED IT SHALL BE CONSTRUCTED SO THAT THE SLATS ARE LOCKED INTO POSITION AND CAN ONLY BE REMOVED WITH TOOLS.
10. FENCE FABRIC IS TO BE TACK WELDED TO POSTS IN THREE PLACES (TOP, CENTER, AND BOTTOM). FENCE HARDWARE IS TO BE TACK WELDED AND GROUND SMOOTH. ALL EXPOSED METAL PARTS ARE TO BE GALV. PRIOR TO INSTALLATION.

PLOTTED: 02/25/2010

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Revisions Date	Desc	DATE: 6-6-2009	COUNTY OF KERN STATE OF CALIFORNIA DEVELOPMENT STANDARD	CHAIN LINK FENCING SPECIFICATIONS	PLATE NO. D–10
.	.	DESIGNED BY: K.L.H.			
.	.	DRAWN BY: B.D.H.			
.	.	CHECKED BY: A.A.			
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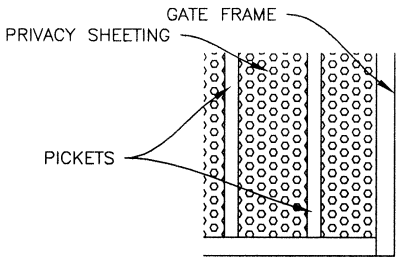
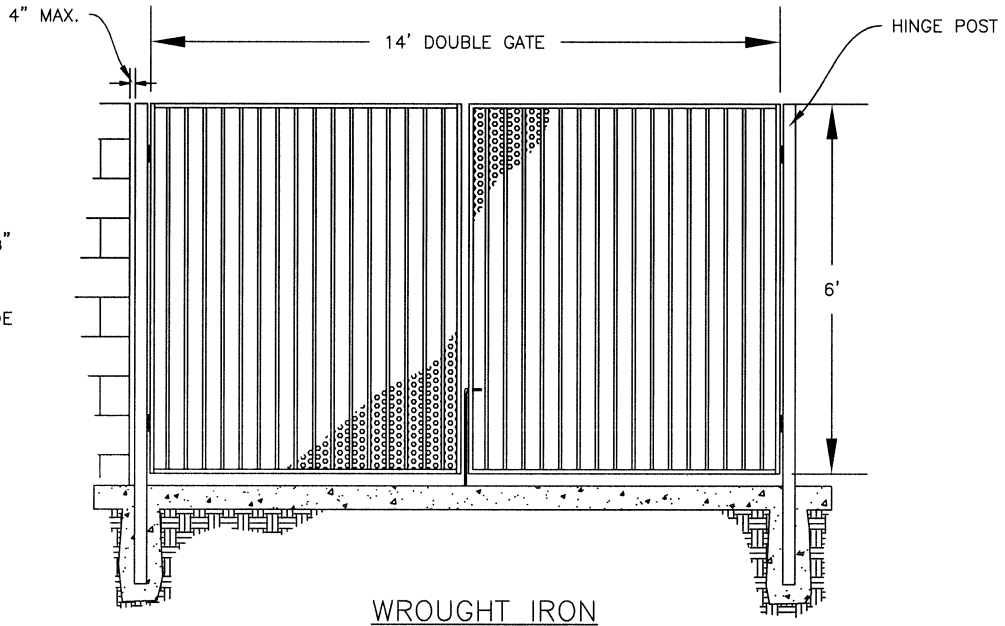
WROUGHT IRON GATE SPECS:

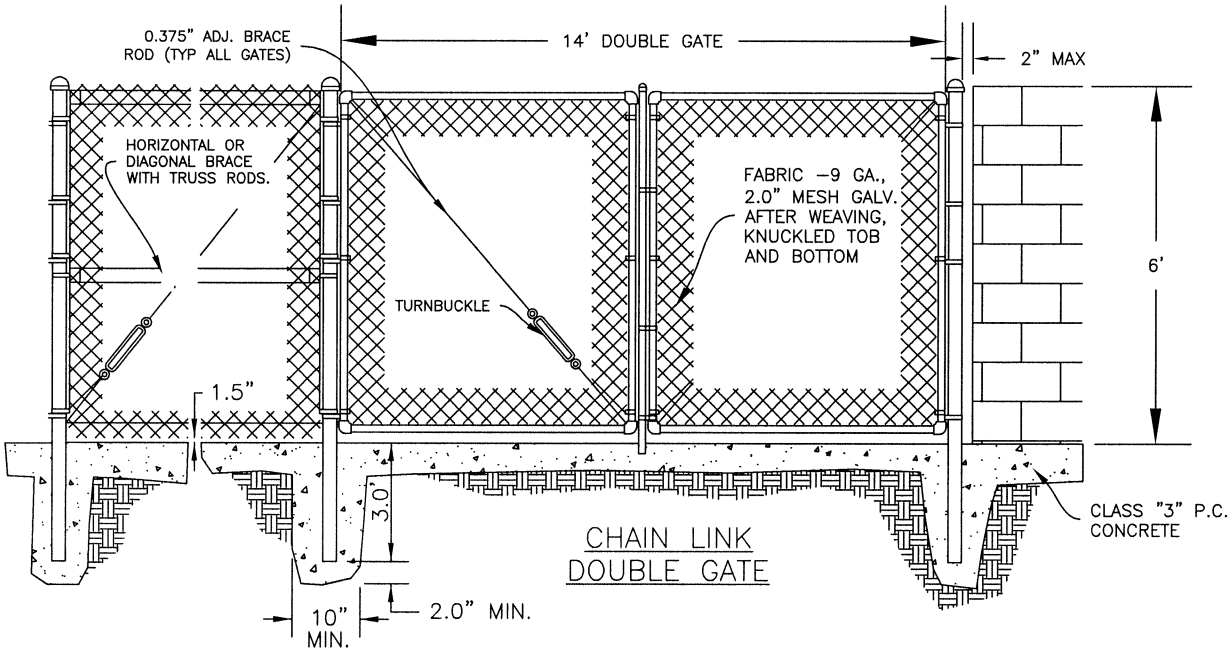
1. HINGE POST SHALL BE A MIN. OF 4x4x3/16" SQ TUBING.
2. GATE FRAME SHALL BE A MIN. 1-1/2" SQ. TUBING.
3. PICKETS SHALL BE A MIN. 3/4" SQ TUBING WITH 4" MAX CLEAR DIMENSION.
4. PRIVACY SHEETING SHALL BE PERFORATED SHEET METAL, 24 GAUGE, 1/16" DIM HOLE, 1/8" STAGGERED CENTER.
5. GATE SHALL BE A 14' DOUBLE GATE.
6. GATE LATCH SHALL HAVE COMMERCIAL GRADE LOCKING DEVICE FOR 3/8" PADLOCK SHANK OR A LICKING DEVICE THAT CAN BE KEYED TO THE STANDARD K.C.E.S.S. KEY-CORE.



PRIVACY SHEETING DETAIL



WROUGHT IRON DOUBLE GATE



CHAIN LINK DOUBLE GATE

DOUBLE DRIVE GATE

WIDTH-14'
HEIGHT-6'
FRAME-1.875" O.D. GALV. PIPE 2.72LB/FT
COMMERCIAL LOCKING DEVICE WITH DROP ROD

NOTES:

1. CURBING AS SPECIFIED BY COUNTY OF KERN DEVELOPMENT STANDARDS, PLATE D-2.
2. END, CORNER, AND GATE POSTS SHALL BE BRACED TO THE NEAREST LINE POST WITH GALV. DIAGONAL OR HORIZONTAL BRACES USED AS COMPRESSION MEMBERS AND GALV. 0.375" STEEL TRUSS RODS WITH TURNBUCKLES OR TRUSS TIGHTENERS USED AS TENSION MEMBERS.
3. WHEN REDWOOD SUBURBAN SCREEN, OR EQUIVALENT, IS REQUIRED IT SHALL BE CONSTRUCTED SO THAT THE SLATS ARE LOCKED INTO POSITION AND CAN ONLY BE REMOVED WITH TOOLS.
4. FRAMES SHALL BE MADE WITH FITTINGS OR WELDS GROUND SMOOTH, AND GALVANIZED.
5. CHAIN LINK FENCE FABRIC SHALL CONFORM TO ASTM: A-392, CLASS 1, AND BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 80-4 OF THE "STANDARD SPECIFICATIONS, STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION", APPROVED CURRENT EDITION.

PLOTTED: 02/25/2010

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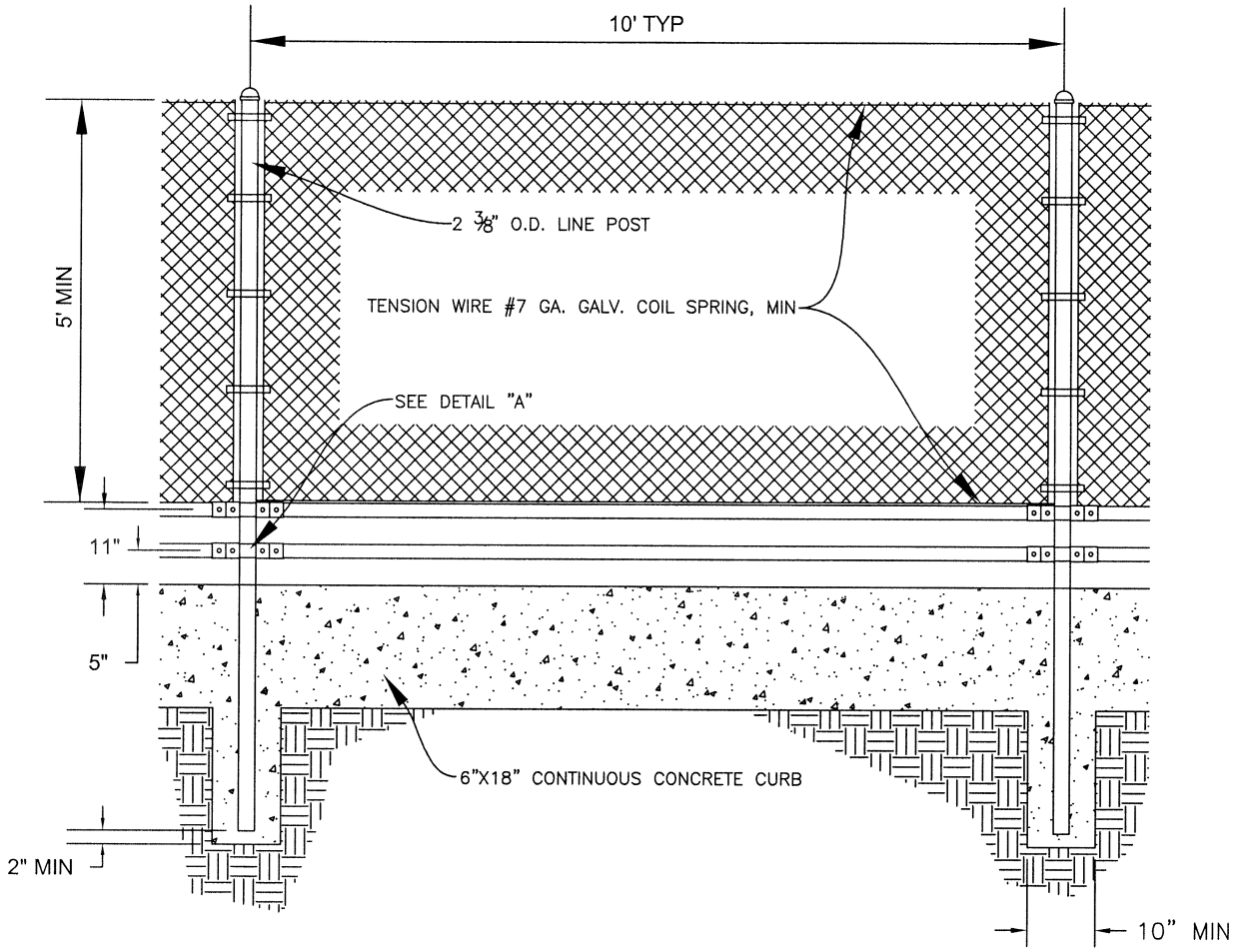
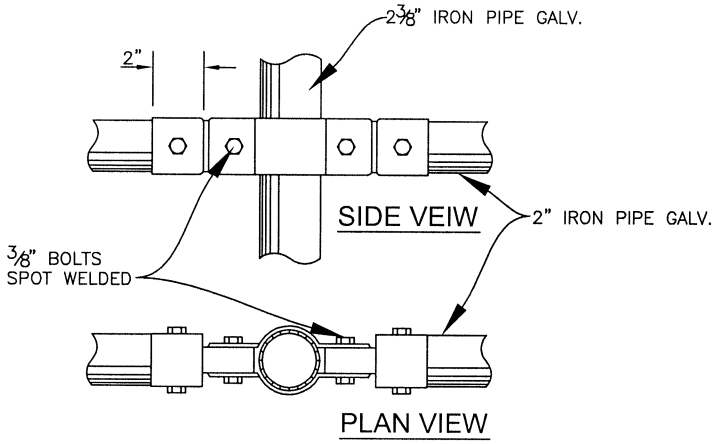
Revisions Date	Desc	6-6-2009	COUNTY OF KERN STATE OF CALIFORNIA DEVELOPMENT STANDARD	DOUBLE GATE SPECIFICATIONS	PLATE NO. D-11
.	.	DESIGNED BY: K.L.H.			
.	.	DRAWN BY: B.D.H.			
.	.	CHECKED BY: A.A.			
.	.				
.	.				
.	.				



TRANSVERSE PROTECTION BAR



DETAIL "A"

NOTES:

1. ALL CONCRETE SHALL BE CLASS 3.
2. SEE PLATE D-10 FOR ADDITIONAL FENCE DETAILS.
3. ALL EXPOSED METAL PARTS ARE TO BE GALV PRIOR TO INSTALLATION.
4. HARDWARE IS TO BE TACK WELDED AND GROUND SMOOTH AND GALV.
5. SEE PLATE D-2 FOR RODENT BARRIER DETAILS.

PLOTTED: 02/26/2010

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Revisions Date	Desc
.	.
.	.
.	.
.	.
.	.
.	.

6-5-2009

DESIGNED BY: K.L.H.

DRAWN BY: B.D.H.

CHECKED BY: A,J.L.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

FLOOD ZONE FENCING SPECIFICATIONS

PLATE NO. D-12

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Appendix F

Pre-Post Water Balance Calculation Sheets

Kudu Solar Project Post Construction Stormwater Calculation Worksheet

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area?	No
Note: Non-traditional small MS4s that lie within a Phase I or II MS4 area but are NOT designated must comply with the Construction General Permit post construction calculator.	
Will the project use an alternative method to calculate runoff volume or use different site design measures than those listed in the CGP calculator?	No
Will the project be subdivided into smaller sub-areas or drainage management areas?	No

INPUT FOR WATERSHED: Enter watershed details and click on the Compute & Save button.

I.a. Name:	Kudu Solar Project
I.b. County:	Kern
I.c. Closest Location:	Mojave
I.d. Size(acres):	4000

Pre-Construction INPUT

I.e. Dominant Soil Type:	Group B Soils - Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type:	Natural Desert
I.g. Existing rooftop impervious area(acres):	0
I.h. Existing non-rooftop impervious area(acres):	0

Post-Construction INPUT

I.i. Proposed Dominant Non-built Land Use Type:	Natural Desert Landscape
I.j. Proposed rooftop impervious area(acres):	0
I.k. Proposed non-rooftop impervious area(acres):	200

Compute & Save

OUTPUT:

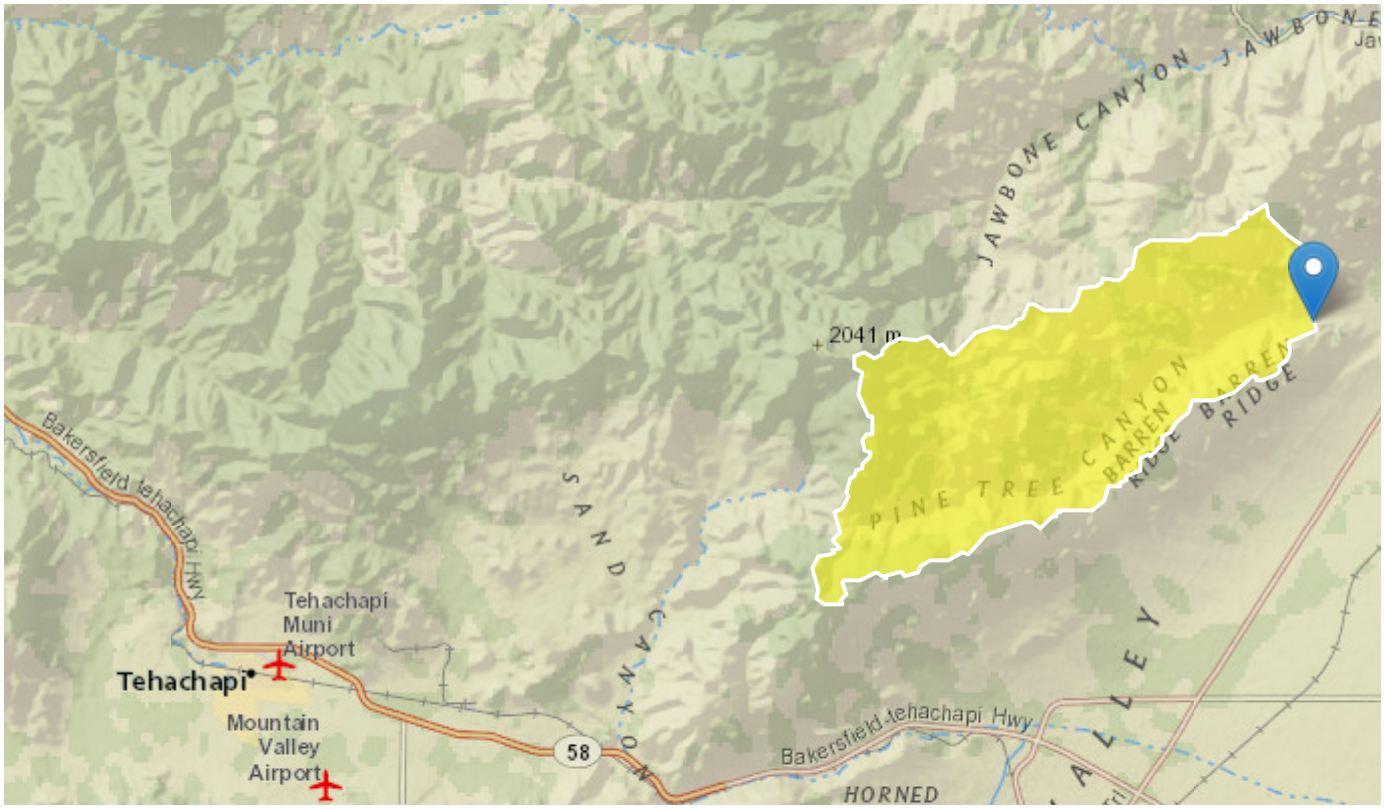
O.a. Existing Runoff Curve Number:	77	**O.d. Proposed Runoff Curve Number:**	78.05
O.b. Design Storm(inches):	0.5	**O.e. Net Credit of Volume Credits(Cubic feet):**	3329.99991
O.c. Pre-project Runoff Volume(Cubic Feet):	0.00	**O.f. Post-project Runoff Volume(Cubic Feet):**	0.00
O.g. Post-project Runoff Volume minus Volume Credits(Cubic Feet):	-171.08		

***Pre-project Runoff Volume >= Post-project Runoff Volume. No further calculation is necessary!

Appendix G
Inflow Rates

Inflow 1

Region ID: CA
Workspace ID: CA20190326172345723000
Clicked Point (Latitude, Longitude): 35.23105, -118.08454
Time: 2019-03-26 11:24:00 -0600



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	34.2	square miles

Peak-Flow Statistics Parameters [100 Percent (34.2 square miles) 2012 5113 Region 6 Desert]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	34.2	square miles	0.04	173

Peak-Flow Statistics Flow Report [100 Percent (34.2 square miles) 2012 5113 Region 6 Desert]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
2 Year Peak Flood	61.5	ft^3/s	214
5 Year Peak Flood	358	ft^3/s	226
10 Year Peak Flood	902	ft^3/s	248
25 Year Peak Flood	2410	ft^3/s	298
50 Year Peak Flood	4540	ft^3/s	357
100 Year Peak Flood	8060	ft^3/s	444
200 Year Peak Flood	13600	ft^3/s	575
500 Year Peak Flood	25600	ft^3/s	856

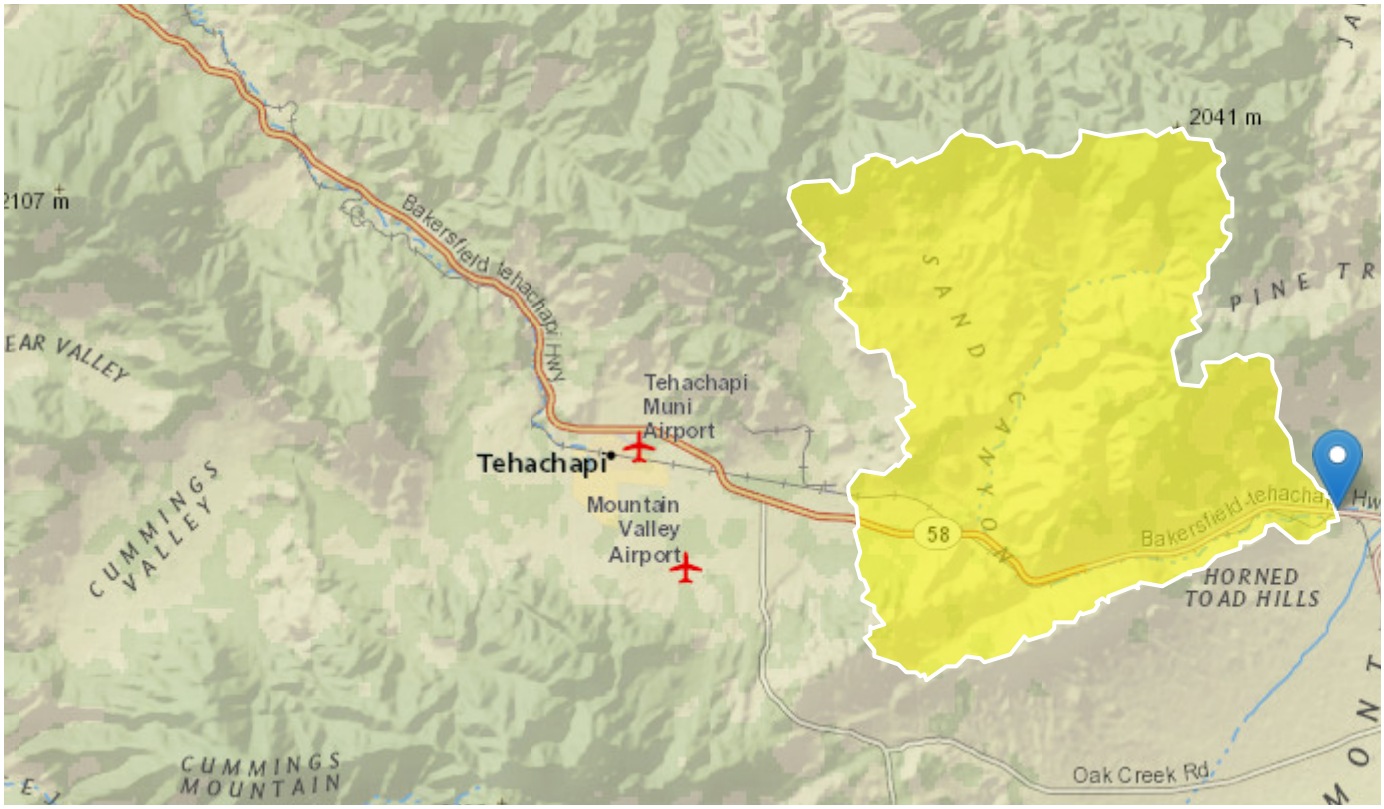
Peak-Flow Statistics Citations

Gotvald, A.J., Barth, N.A., Veilleux, A.G., and Parrett, Charles,2012, Methods for determining magnitude and frequency of floods in California, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2012–5113, 38 p., 1 pl. (http://pubs.usgs.gov/sir/2012/5113/)

Application Version: 4.3.0

Inflow 2

Region ID: CA
Workspace ID: CA20190326172044886000
Clicked Point (Latitude, Longitude): 35.11700, -118.19982
Time: 2019-03-26 11:20:59 -0600



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	69.9	square miles

Peak-Flow Statistics Parameters [100 Percent (69.9 square miles) 2012 5113 Region 6 Desert]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	69.9	square miles	0.04	173

Peak-Flow Statistics Flow Report [100 Percent (69.9 square miles) 2012 5113 Region 6 Desert]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
2 Year Peak Flood	88.3	ft^3/s	214
5 Year Peak Flood	515	ft^3/s	226
10 Year Peak Flood	1300	ft^3/s	248
25 Year Peak Flood	3460	ft^3/s	298
50 Year Peak Flood	6520	ft^3/s	357
100 Year Peak Flood	11600	ft^3/s	444
200 Year Peak Flood	19500	ft^3/s	575
500 Year Peak Flood	36700	ft^3/s	856

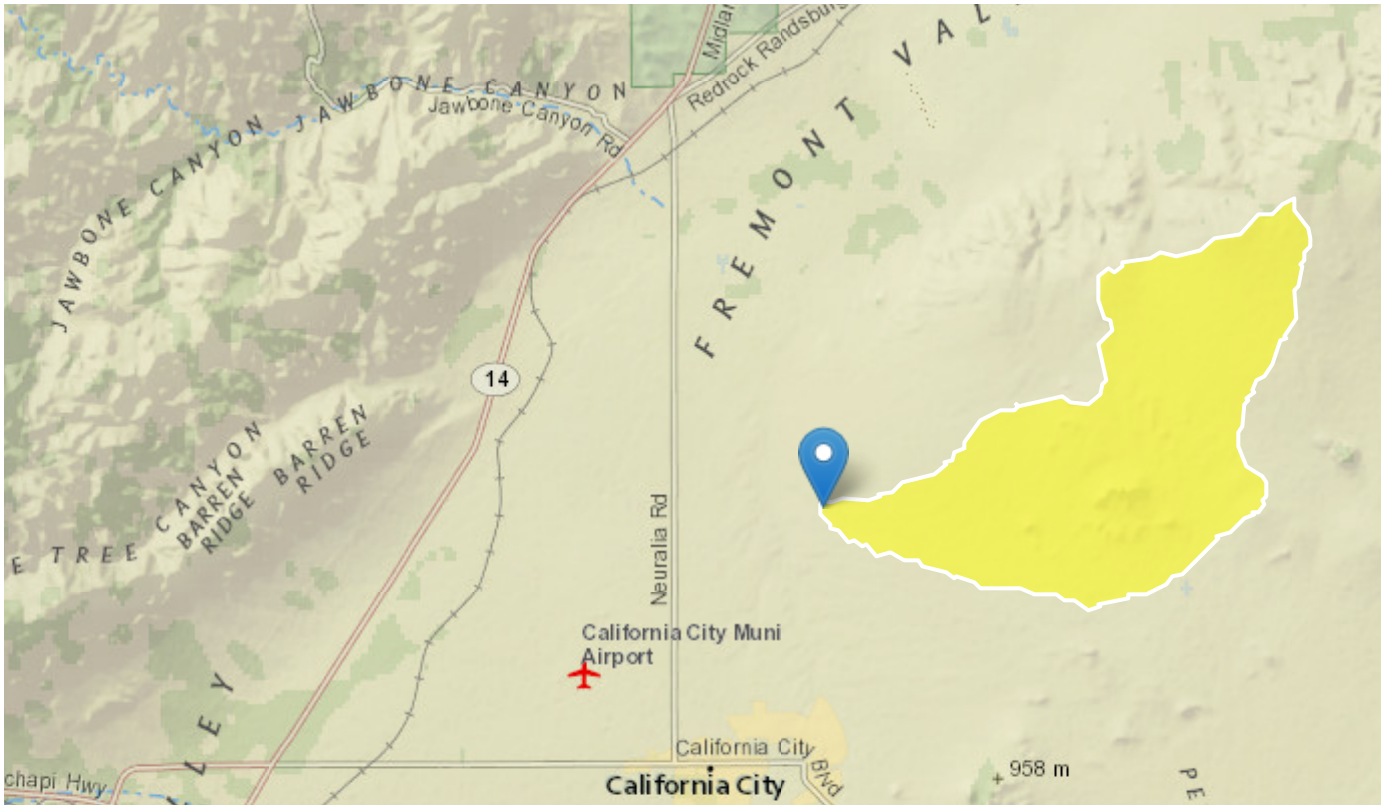
Peak-Flow Statistics Citations

Gotvald, A.J., Barth, N.A., Veilleux, A.G., and Parrett, Charles,2012, Methods for determining magnitude and frequency of floods in California, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2012–5113, 38 p., 1 pl. (http://pubs.usgs.gov/sir/2012/5113/)

Application Version: 4.3.0

Inflow 3

Region ID: CA
Workspace ID: CA20190326172511217000
Clicked Point (Latitude, Longitude): 35.19725, -117.93514
Time: 2019-03-26 11:25:25 -0600



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	33.7	square miles

Peak-Flow Statistics Parameters [2012 5113 Region 6 Desert]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	33.7	square miles	0.04	173

Peak-Flow Statistics Flow Report [2012 5113 Region 6 Desert]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
2 Year Peak Flood	61.1	ft^3/s	214
5 Year Peak Flood	356	ft^3/s	226
10 Year Peak Flood	895	ft^3/s	248
25 Year Peak Flood	2390	ft^3/s	298
50 Year Peak Flood	4510	ft^3/s	357
100 Year Peak Flood	8000	ft^3/s	444
200 Year Peak Flood	13500	ft^3/s	575
500 Year Peak Flood	25400	ft^3/s	856

Peak-Flow Statistics Citations

Gotvald, A.J., Barth, N.A., Veilleux, A.G., and Parrett, Charles,2012, Methods for determining magnitude and frequency of floods in California, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2012–5113, 38 p., 1 pl. (http://pubs.usgs.gov/sir/2012/5113/)

Application Version: 4.3.0

Table 5 - SUMMARY OF PEAK DISCHARGES

Flooding Source and Location	Drainage Area (sq. mi.)	Peak Discharges (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
2,850 Feet above Confluence with Kern River	14.2	--	--	7,280	--
11,000 Feet above Confluence with Kern River	7.7	--	--	3,780	--
At Confluence with Kern River	16.8	--	--	8,530	--
Boron Avenue Creek					
At Confluence with Twenty Mule Team Creek	3.6	580	2,000	3,000	6,700
Breckenridge					
At Fairfax Road	14.0	520	1,200	1,600	2,900
Cache Creek					
At Downstream Limit of Study	163.4	1,900	5,300	7,800	16,400

Inflow 4 excerpt from FEMA FIS 06029CV001A Volume 1 of 3

-- Data Not Available

Appendix H

FEMA FIRM Panels

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from USDA - Farm Service Agency - Aerial Photography Field Office dated 2005 and from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

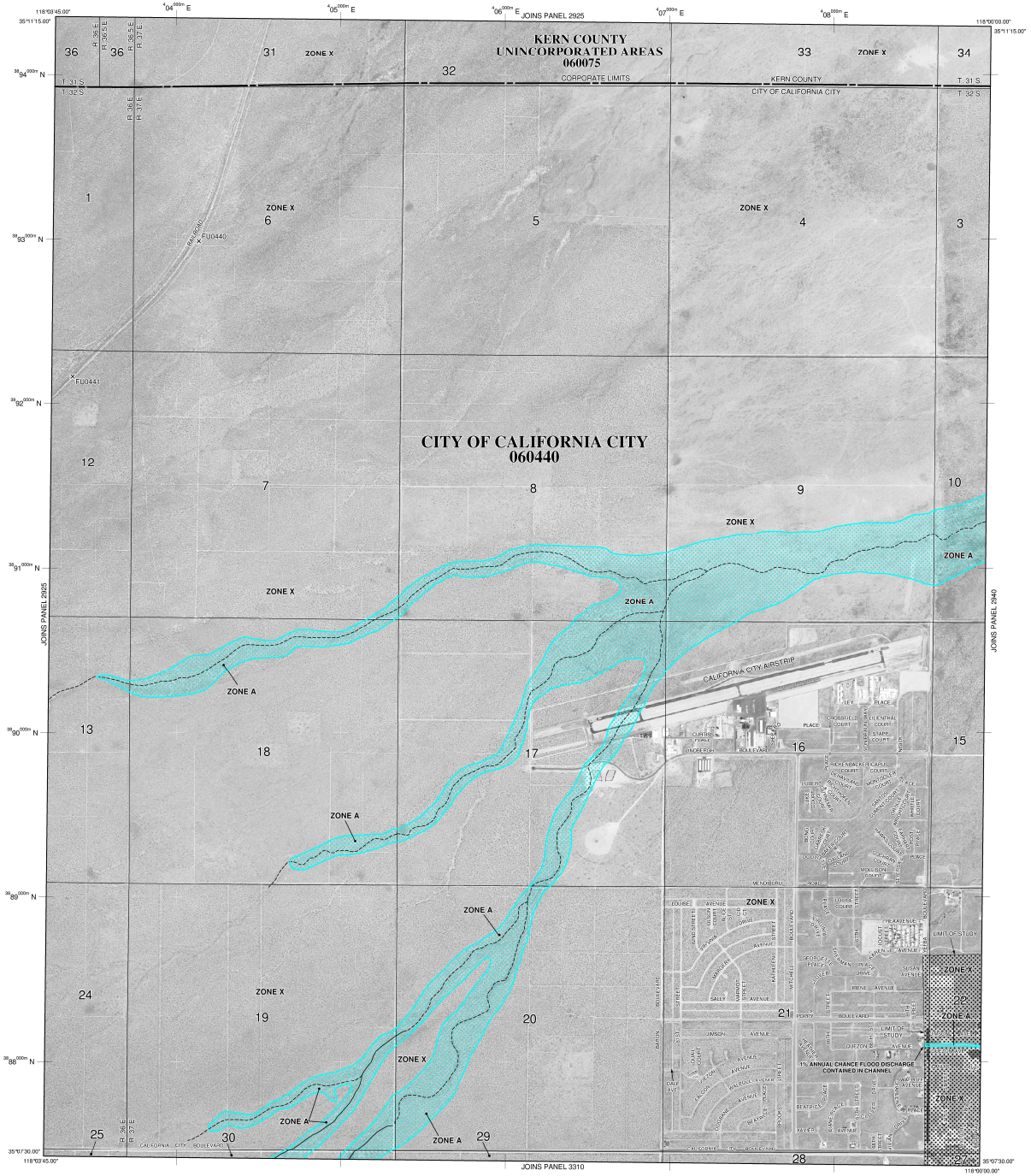
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP**(1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A) — (A) Cross section line
- (23) — (23) Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 M — 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2920E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 2920 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	2920	E
CALIFORNIA CITY, CITY OF	060440	2920	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C2920E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

NOTES TO USERS

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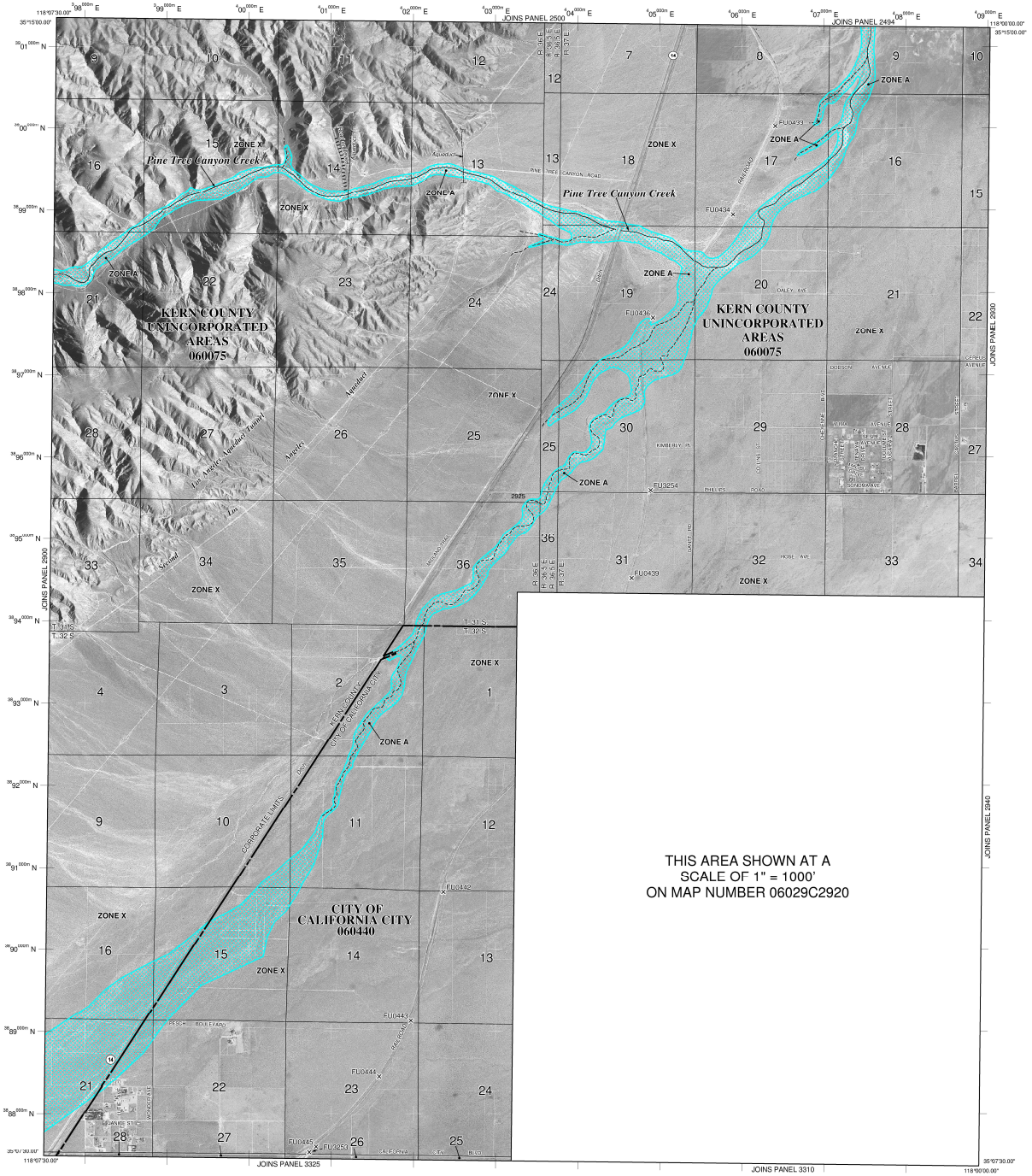

LEGEND

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

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ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

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ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4375000 mN — 1000-meter Universal Transverse Mercator grid ticks, zone 11
- 6000000 M — 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2925E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 2925 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	2925	E
CALIFORNIA CITY, CITY OF	060440	2925	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C2925E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

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Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from USDA –Farm Service Agency –Aerial Photography Field Office dated 2005 and from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

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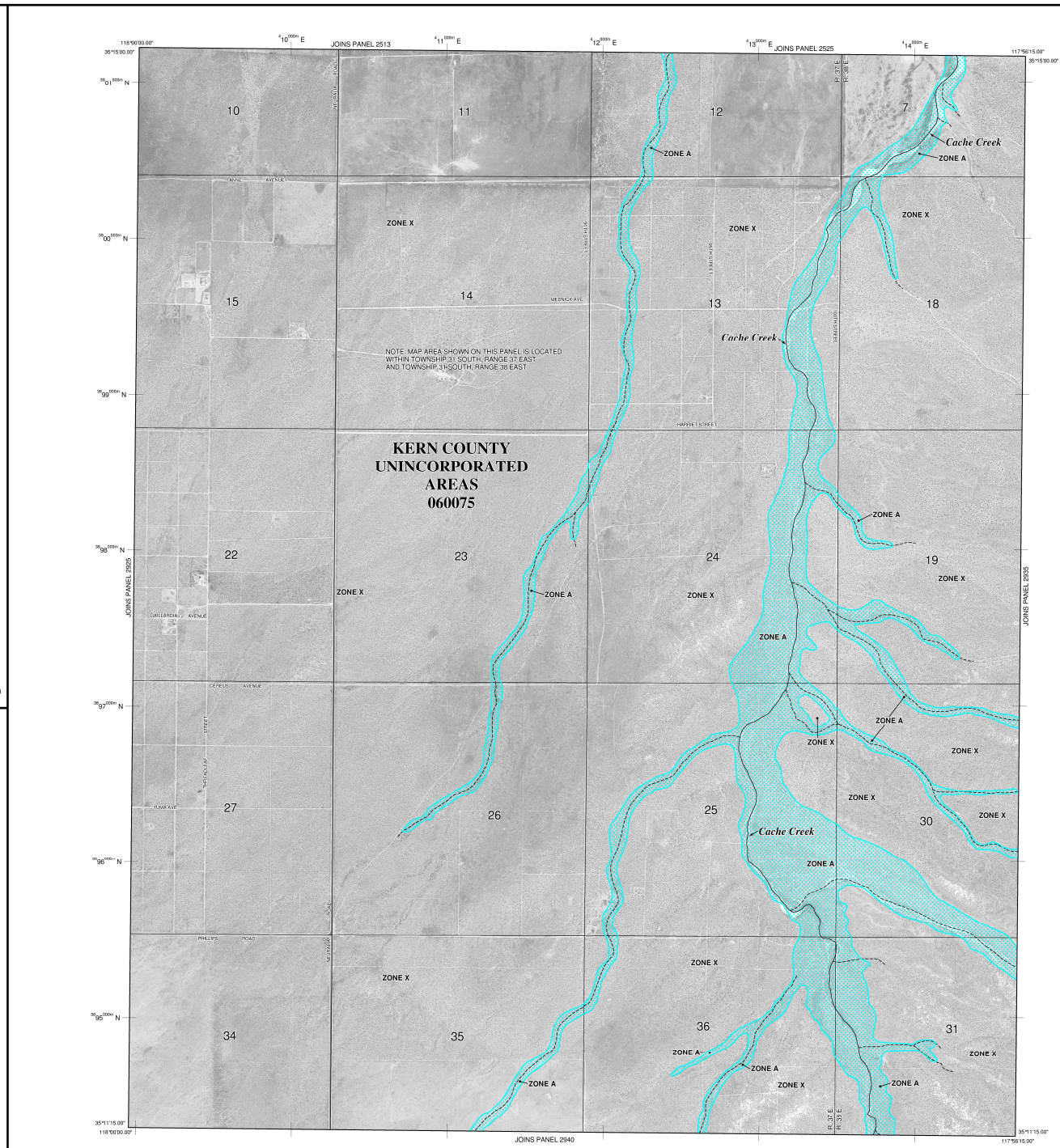

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 11
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MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2930E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 2930 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	2930	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C2930E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

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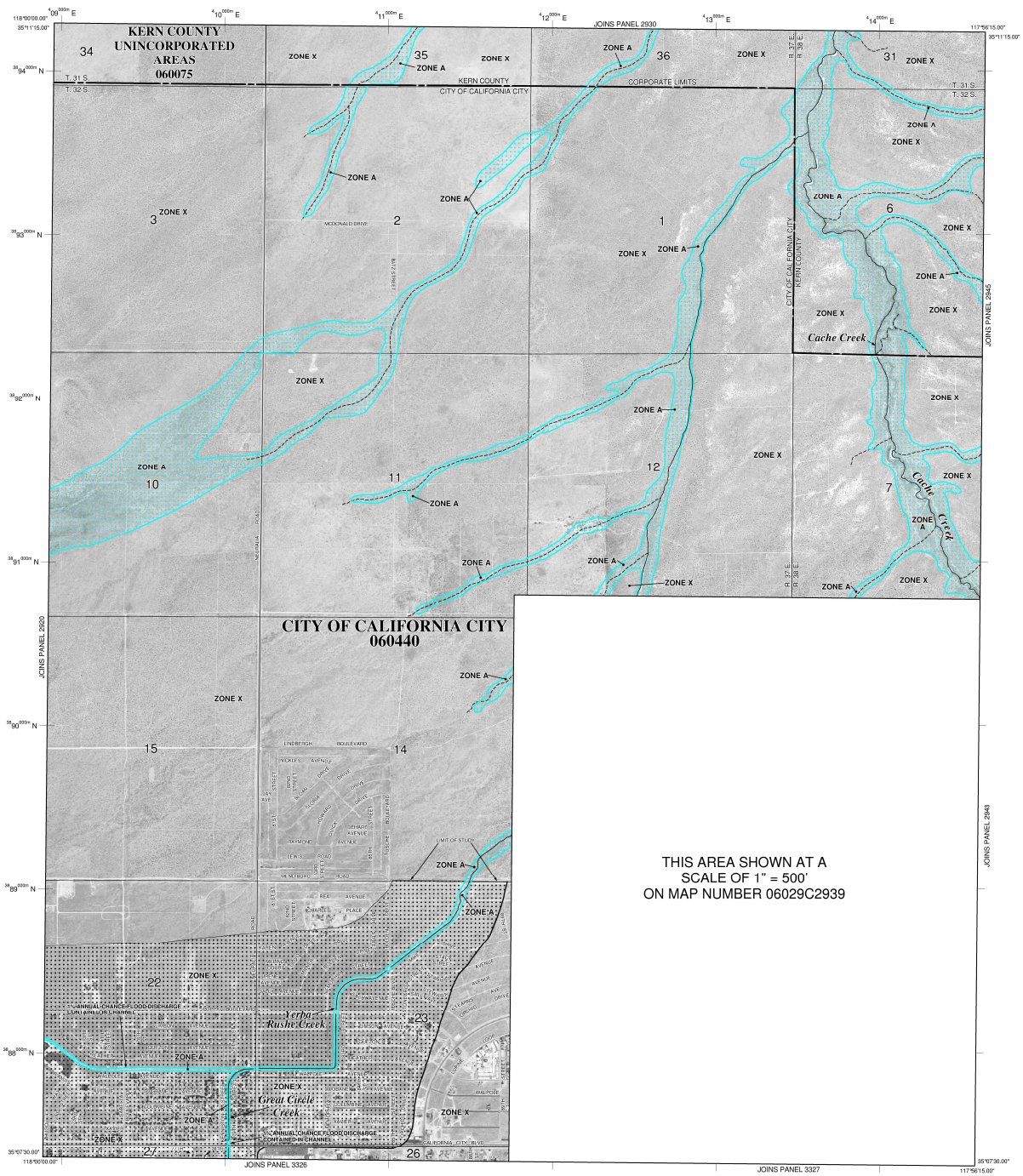

LEGEND

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ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
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500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2940E

FIRM

FLOOD INSURANCE RATE MAP

KERN COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2940 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	2940	E
CALIFORNIA CITY, CITY OF	060440	2940	E

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MAP NUMBER
06029C2940E

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

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Appendix J
Noise Study

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Kudu Solar Farm Project

Noise Study

prepared for

69SV 8me LLC
5455 Wilshire Boulevard, Suite 2010
Los Angeles, California 90036
Contact: Mr. Erec DeVost

prepared by

Rincon Consultants, Inc.
449 15th Street, Suite 303
Oakland, California 94612

November 2021

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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1 Project Description

1.1 Introduction

This study analyzes the potential noise impacts of the proposed Kudu Solar Farm Project (Project) located within the unincorporated Kern County and within California City. Rincon Consultants, Inc. (Rincon) prepared this study under contract to 8minute Solar Energy, LLC for use by Kern County, the lead agency. The study evaluates the short- and long-term impacts of the Project to noise-sensitive receivers.

1.2 Project Site and Description

The Project site is located in unincorporated Kern County and a northern section of the California City. The area is a relatively flat desert landscape. The majority of the Project is bisected by Washburn Boulevard (which is also the California City boundary) and Neuralia Road. The westernmost portion of the Project is located approximately one mile east of State Route 14 (SR 14); the southernmost portion of the Project is located approximately 500 feet north of the California City Municipal Airport; the easternmost portion of the Project is located just east of 90th Street in California City; and the northernmost portion of the Project is located just north of Harriet Avenue in Kern County. The Project includes 75 parcels totaling approximately 1,955 gross acres. Figure 1 and Figure 2 show the regional location and immediate vicinity of the Project site, respectively.

This Project description is abbreviated, focusing on elements of the proposed solar facility that are most relevant for the noise analysis. On the parcels, the Project would use solar photovoltaic (PV) panels or modules on mounting frameworks to convert sunlight directly into electricity. This electricity would be delivered from the panels to inverter stations, where the electricity would be converted from direct current (DC) to alternating current (AC). Each parcel may also include an operations and maintenance (O&M) building, substations, energy storage systems, and/or transmission facilities, as necessary. In addition to the solar PV sites, the Project would include a gen-tie corridor to deliver power from the solar facility to the electrical grid. This corridor would run to a dedicated Project substation, or to the Eland 1 Substation. The Project may also share the Eland 1 generation tie-line (gen-tie) facilities, or gen-tie rights-of-way. The Eland 1 substation and gen-tie line have gone through environmental analysis and subsequent approval by Kern County and are not part of the Project (Kern County 2018).

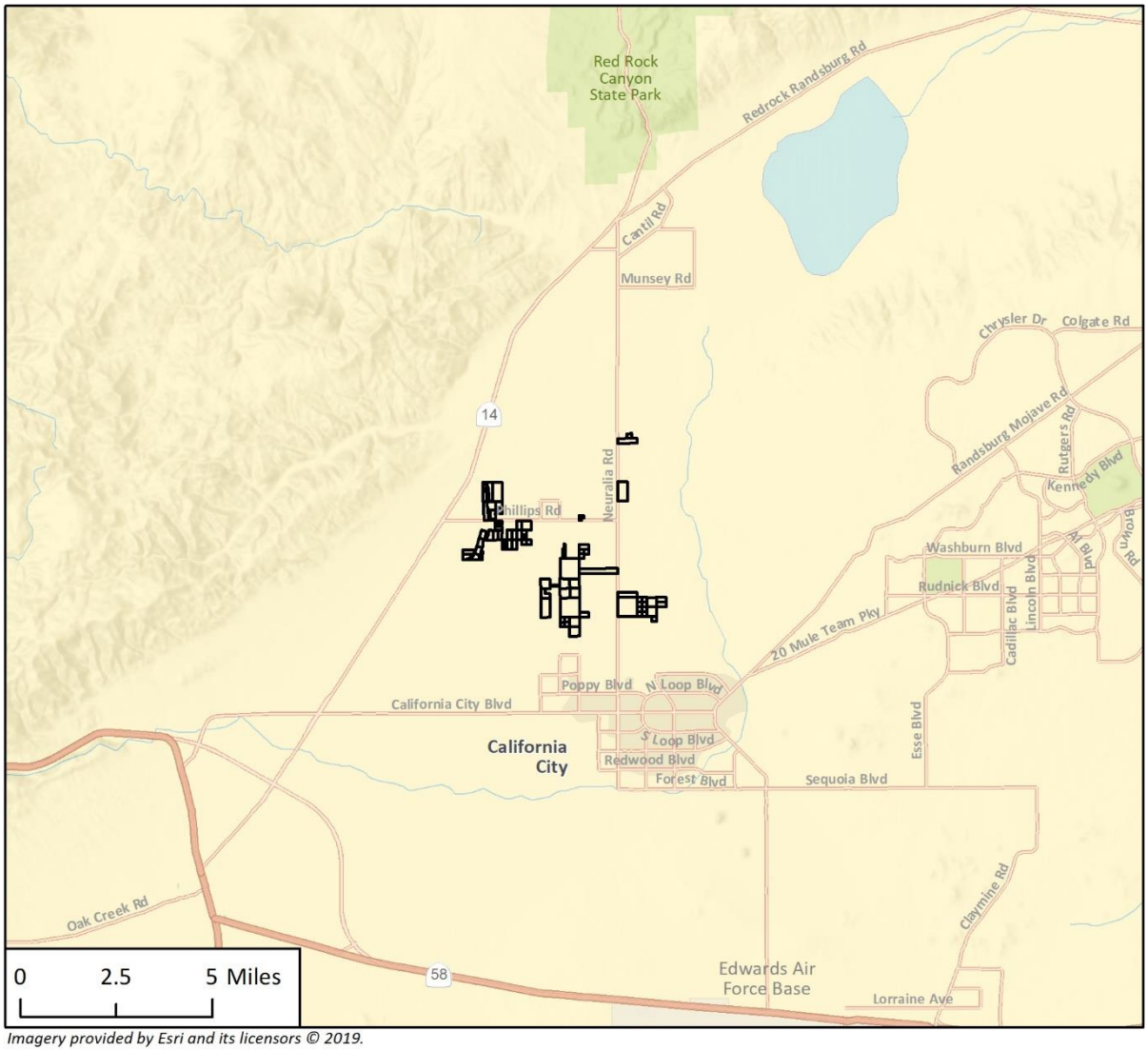
1.3 Construction Activities

Construction of all Project components would occur over approximately 12 to 18 months beginning as early as the fourth quarter of 2021 (i.e., October 1, 2021). Construction of the Project would include the following types of activities:[1]

[1] This list of types of construction activities is presented without respect to the phasing of construction over time.

- Site preparation
- Grading and earthwork
- Concrete foundations

Figure 1 Regional Location

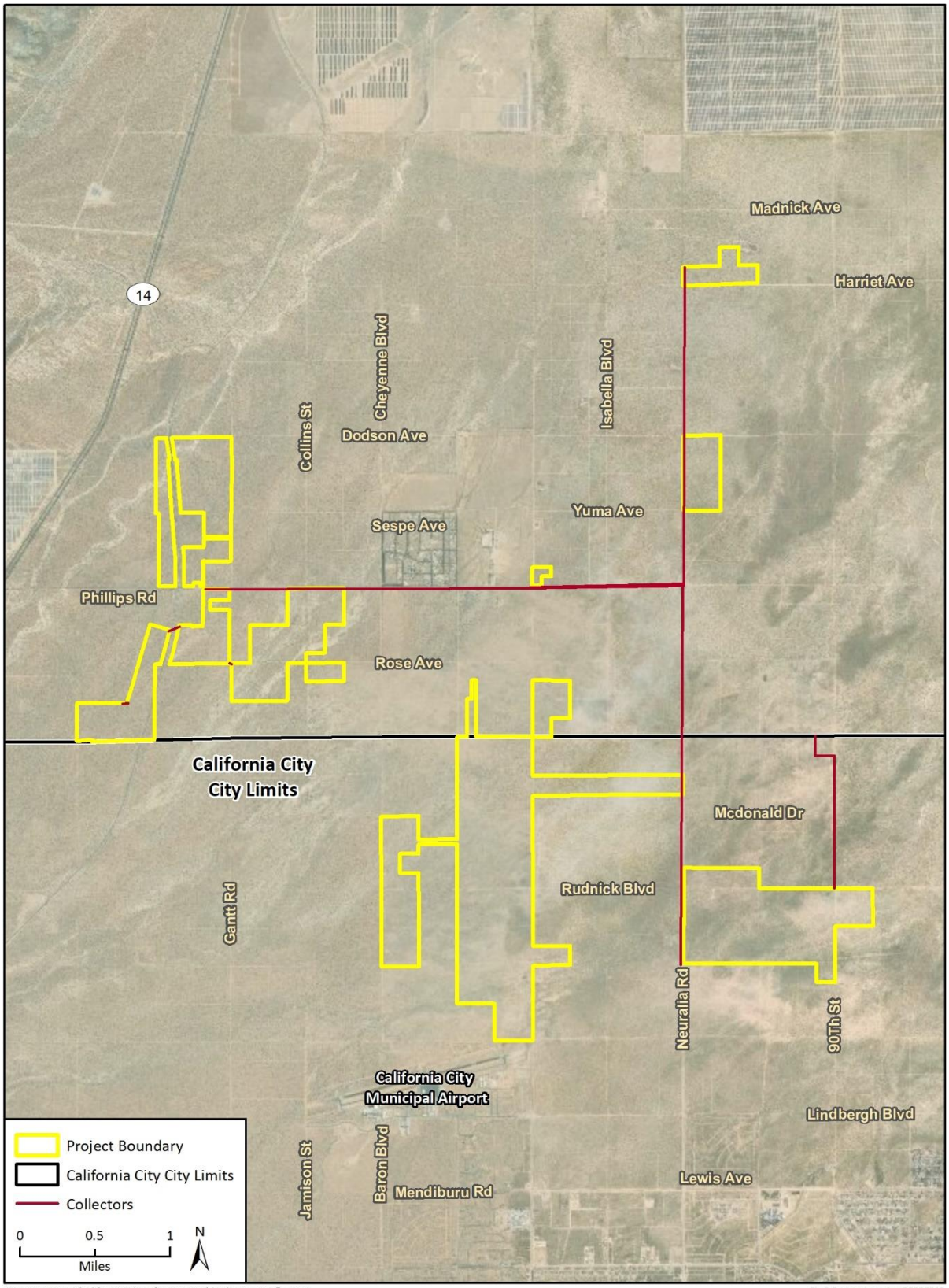


Imagery provided by Esri and its licensors © 2019.

Project Location

N

Figure 2 Project Location



Imagery provided by Microsoft Bing and its licensors © 2019.

Fig 2 Project Location 20200213

- Structural steel work
- Electrical/instrumentation work
- Collector line installation
- Architecture and landscaping

Each Project parcel may be constructed simultaneously and phases of construction would overlap.

Table 1 shows the construction schedule, number of workdays, and overlapping phases that were assumed in the following analysis.

Table 1 Overall Project Construction Schedule

Phase	Work Days	Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Phase 1: Site preparation & Grading	86															
Phase 2: Tracker Foundations (Piles)	150															
Phase 3: Underground Cabling	150															
Phase 4: Mechanical Installation	175															
Phase 5: Electrical Installation	200															

Note: Construction schedule of 15 months is the average time estimated by the applicant for the construction period (i.e., 12 to 18 months).

Construction traffic would access the Project from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 Project site. It is estimated that up to 1,000 workers per day (during peak construction periods) would be required during the construction of the Project. On-road traffic would consist of employee and vendor vehicle trips. The number of vehicle trips would vary by month depending on the construction activities.

Heavy construction is expected to occur between 6:00 AM and 5:00 PM, Monday through Friday. Additional hours may be necessary to make-up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Nighttime activities could include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Materials and supplies would be delivered to the Project site by truck. Truck deliveries would normally occur during daylight hours. However, there could be offloading and/or transporting of materials to the Project site on weekends and during evening hours.

Earthmoving activities are expected to be limited to the construction of access roads, O&M buildings, substations, energy storage systems, and storm water protection or storage (detention) facilities. Final grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas.

1.4 Operational Activities

Once completed, the Project would generally be limited to the following maintenance activities:

- Cleaning PV panels
- Monitoring electricity generation

- Providing site security
- Maintaining the facility: replacing or repairing inverters, wiring, and PV modules

The Project would operate continuously, seven days a week, until the anticipated repowering or decommissioning of the Project in 30 to 40 years. It is expected that the Project would require an operational staff of up to 20 full-time employees. The Project may share an O&M, substation, and/or transmission facilities with one or more nearby energy projects, which could reduce the proposed Project's on-site operational staff. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

2 Background

2.1 Overview of Sound Measurement

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013).

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while easily confused are two distinct characteristics of sound. Both share the same unit of measure, the decibel (dB). However, the sound power level, expressed as L_w, is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave in the air that exerts pressure on receivers such as an eardrum or microphone, the SPL. Sound measurement instruments only measure SPL, and limits used in standards are generally SPL. Modeling uses the L_w of equipment to calculate the SPL at a distance.

Noise levels are commonly measured in dB using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not "sound twice as loud" as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud ([10.5x the sound energy] Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense

woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2017). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of Project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest root mean squared (RMS) sound pressure level within the sampling period, and L_{min} is the lowest RMS sound pressure level within the measuring period (Crocker 2007).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The relationship between the peak-hour L_{eq} value and the L_{dn} depends on the distribution of traffic during the day, evening, and night.

2.2 Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (Federal Transit Administration [FTA] 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level.

However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in./sec.). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Existing Project Area Noise Levels

The Project site is located in a rural desert environment with scattered rural residential uses. The primary sources of noise on-site and in the surrounding area include motor vehicles, wind, and fauna (birds, small mammals, etc.). The greatest vehicle noise would occur from vehicles on the main thoroughfares (SR 14, Philips Road, and Neuralia Road). Additional noise sources in the area include aircraft associated with the California City Municipal Airport.

To evaluate existing noise levels in the area, four 15-minute noise measurements (ST1 through ST4) and two 24-hour noise measurements (LT1 and LT2) were taken on and near the Project site on September 18 and 19, 2019, using an ANSI Type II integrating sound level meter. Figure 3 shows the locations of the noise measurements. The noise measurement locations were chosen to provide a representative range of ambient noise levels across the Project site and in the nearby area, especially near existing noise-sensitive residences and roadways. The short-term noise measurement results are shown in Table 2 and the long-term results are shown in Table 3. Detailed noise meter outputs are included in Appendix A.

Figure 3 Noise Measurement Locations

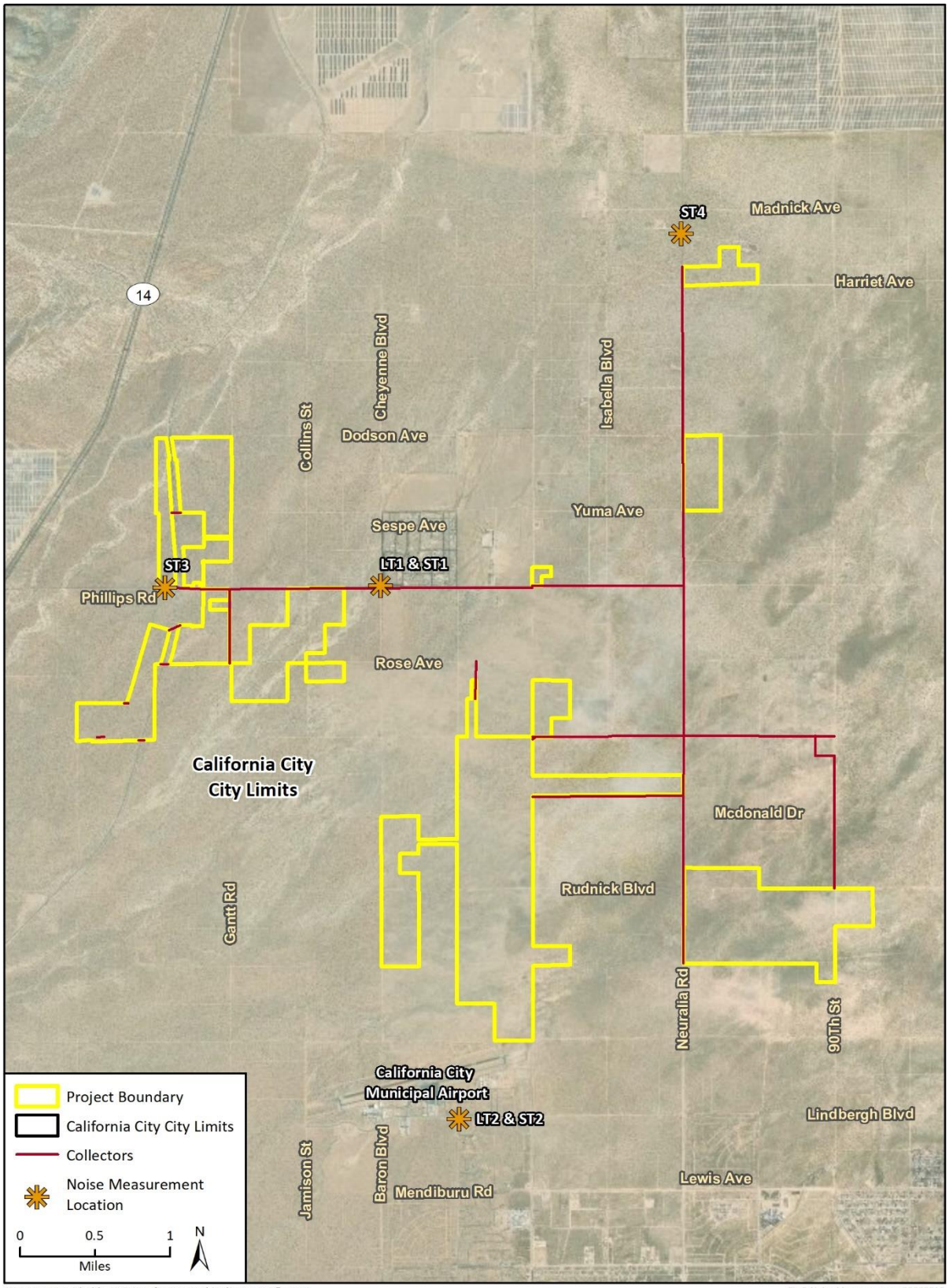


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Fig 3 Noise Measurements 20200213

Table 2 Noise Monitoring Results in the Project Site Vicinity – Short Term

Measurement Number	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	Noise Level (dBA L_{eq})[1]
1	Cheyenne Boulevard/Phillips Road in Kern County (LT1 Location)	12:31 PM – 12:46 PM	40 feet from centerline of Phillips Road	51
2	Mitchell Boulevard/Lindbergh Boulevard, California City (LT2 location)	11:32 AM – 11:47 AM	90 feet from centerline of Lindbergh Boulevard	52
3	Phillips Road near Sage Street in Kern County	1:43 PM – 1:58 PM	25 feet from centerline of from centerline of Phillips Road	55
4	Neuralia Road and Esther Avenue	1:02 PM – 1:17 PM	30 feet from center of Neuralia Road	63

See Figure **3** for Noise Measurement Locations.

[1] The equivalent noise level (L_{eq}) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For these measurements, the L_{eq} was over a 15-minute period.

Source: Rincon Consultants, field measurements conducted on September 18, 2019, using ANSI Type II Integrating sound level meter. See Appendix A.

Table 3 Project Site Noise Monitoring Results – Long Term

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
LT1 - Cheyenne Boulevard/Phillips Road in Kern County, September 18-19, 2019			
12:28 PM	63	12:28 AM	58
1:28 PM	62	1:28 AM	41
2:28 PM	64	2:28 AM	52
3:28 PM	63	3:28 AM	49
4:28 PM	61	4:28 AM	54
5:28 PM	60	5:28 AM	51
6:28 PM	55	6:28 AM	41
7:28 PM	49	7:28 AM	44
8:28 PM	50	8:28 AM	59
9:28 PM	51	9:28 AM	60
10:28 PM	44	10:28 AM	61
11:28 PM	51	11:28 AM	61
		24-hour Noise Level	**58**
LT2 - Mitchell Boulevard/Lindbergh Boulevard, California City, September 18-19, 2019			
11:31 AM	51	11:31 PM	56
12:31 PM	51	12:31 AM	52
1:31 PM	51	1:31 AM	32
2:31 PM	52	2:31 AM	31
3:31 PM	49	3:31 AM	35
4:31 PM	54	4:31 AM	41
5:31 PM	49	5:31 AM	55
6:31 PM	47	6:31 AM	44
7:31 PM	51	7:31 AM	60
8:31 PM	47	8:31 AM	54
9:31 PM	46	9:31 AM	57
10:31 PM	48	10:31 AM	52
		24-hour Noise Level	**52**

Source: Rincon Consultants, field measurements conducted on September 18 and 19, 2019, using ANSI Type II Integrating sound level meter. See Appendix A.

2.4 Regulatory Setting

Kern County

The Noise Element of the Kern County General Plan, which was adopted in 2004 and last updated in 2009, sets goals and policies that guide the physical development of the unincorporated areas under the County's discretionary land use authority. These goals include ensuring residents of Kern County are protected from excessive noise, moderate levels of noise are maintained in the County, and ensuring the protection of the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise producing roadways, industries, railroads, airports, oil and gas extraction, and other sources. To help achieve these goals, the Noise Element includes policy requirements for new noise-sensitive land uses, noise level criteria, and enforcing the State Noise Insulation Standards.

Implementation Measure F in the Noise Element, as follows, would apply the Project, limiting the exposure of sensitive land uses to exterior noise:

- Require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB Ldn and interior noise levels in excess of 45 dB Ldn.

Pursuant to Policy 5, the exterior noise standard applies to outdoor activity areas at sensitive land uses:

- Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design. Such mitigation shall be designed to reduce noise to the following levels:

  a) 65 dB Ldn or less in outdoor activity areas;

  b) 45 dB Ldn or less within interior living spaces or other noise sensitive interior spaces.

Operation of the proposed solar energy Project would be subject to these County standards.

Noise issues are also addressed in Chapter 8.36 of the Kern County Code. These include acceptable hours of construction and limitations on construction related noise impacts on adjacent sensitive receptors. Noise-producing construction activities that are audible to a person with average hearing ability at a distance of 150 feet from a construction site, if the site is within 1,000 feet of an occupied residential dwelling, are prohibited between the hours of 9:00 PM to 6:00 AM on weekdays, and 9:00 PM to 8:00 AM on weekends. However, the following exceptions are permitted:

1. The resource management director or his designated representative may for good cause exempt some construction work for a limited time.
2. Emergency work is exempt from this section.

Kern County has not adopted specific policies or standards pertaining to vibration.

California City

Article 4, *Noise and Vibration,* of California City's Municipal Code contains operational noise limits for exterior and interior areas. Exterior noise standards are shown in Table 4. In addition to the exterior noise standards, the interior noise standard in California City is 55 dBA from 7:00 AM to 10:00 PM and 45 dBA from 10:00 PM to 7:00 AM.

Table 4 California City Exterior Noise Standards

		Allowable Exterior Noise Level (dBA L_{eq})	
Noise Zone	**Noise Zone Definition (Type of Land Use)**	**7:00 AM to 10:00 PM**	**10:00 PM to 7:00 AM**
I	Single, double and multiple family residential properties located at a distance more than 600 feet from a major roadway	50	45
II	Single, double and multiple family residential properties located at a distance equal to or less than 600 feet from a major roadway	55	50
III	Commercial properties	65	60
IV	Manufacturing or industrial properties	70	70

- No person shall create noise, or allow the creation of noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on other property to exceed:
  - The noise standard for a cumulative period of more than thirty minutes in any hour; or
  - The noise standard plus 5 dBA for a cumulative period of more than fifteen minutes in any hour; or
  - The noise standard plus 10 dBA for a cumulative period of more than five minutes in any hour; or
  - The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour; or
  - The noise standard plus 20 dBA for any period of time.
- If the ambient noise level exceeds any of the above five noise limit categories, the cumulative period applicable to the category shall be increased to reflect the noise level.
- Each of the noise limits specified above shall be reduced by 5 dBA for impact or simple tone noises, or for noises consisting of speech or music.
- If the measurement location is on a boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.
- If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the source is in operation shall be compared directly to the allowable noise level standards as specified respective to the measurement location's designated land use and for the time of day the noise level is measured.

Source: Section 5-1.405 of the California City Municipal Code

Per Section 5-1.407 of the California City Municipal Code, noise sources associated with or vibration created by construction, repair or remodeling of real property or during authorized seismic surveys are exempt from the above standards under the following conditions:

- The activities occur between the hours of 6:00 AM and 8:00 PM between May 15 and September 15 of each year or between the hours of 7:00 AM and 8:00 PM during the remainder of the year.
- The activities do not take place on Sundays or federal holidays.
- The noise level created by such activities does not exceed 60 dBA plus the limits specific herein as measured on residential property; and
- A vibration does not endanger the public health, welfare and safety.

Per Section 5-1.412 and 5.1-413 of the California City Municipal Code, if the generator of noise is unable to comply with the above standards (e.g., performing construction activities outside of the allowed hours), the owner or operator of a noise or vibration source may file an application with the Health Officer for a variance. The owner or operator shall set forth actions taken to comply with the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for accomplishment. The application shall be accompanied by a fee in the amount established from time to time by resolution. A separate

application shall be filed for each noise source. Several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of the application and fee, the Health Officer shall refer it with a recommendation within 30 days to the Planning Commission. The Planning Commission will consider the variance with the following:

- The magnitude of nuisance caused by the offensive noise;
- The uses of property within the area of impingement by the noise;
- The time factors related to study, design, financing and construction of remedial work;
- The economic factors related to age and useful life of the equipment; and
- The general public interest, welfare and safety.

Section 5-1.410 of the California City Municipal Code outlines the vibration standards, which states that no person shall create, maintain or cause ground vibration perceptible without instruments at any point on adjoining property. The perception threshold shall be presumed to be more than 0.05 in./sec. RMS vertical velocity.

3 Impact Analysis

3.1 Methodology and Significance Thresholds

To assess the potential for temporary construction and long-term operational noise impacts, noise-sensitive receivers closest to the Project site were identified. Figure 4 shows the general locations of noise-sensitive receivers used in the analysis. The Project parcels are generally located in a rural area, with nearby noise-sensitive receivers being single-family residences. The nearest residences in Kern County are approximately 50feet from Project parcels and the nearest residences in California City are approximately 3,250 feet from the southernmost Project parcel (see Table 5). Some of the proposed routes for the gen-tie corridor would run adjacent to noise-sensitive receivers in a single-family residential neighborhood north of Phillips Road. For the analysis, it is assumed that gen-tie corridor construction would occur within 50 feet of noise-sensitive receivers. Noise-sensitive receivers would be located no closer to the project site that the polygons used in Figure 4 to delineate the boundaries of the nearest receptors such as residences and parks. Receivers and distances are shown in Table 5.

Table 5 Modeled Distances of Noise-Sensitive Receivers to Project Site

Receiver[1]	Description	Jurisdiction	Approximate Modeled Distance to Project Site
R1	Esther Ave Residence	Kern County	1,700
R2	Isabella Blvd Residence	Kern County	3,300
R3	Near Dodson Ave and Isabella Blvd	Kern County	3,500
R4	Yerba Blvd Residence	Kern County	1,300
R5	Southeast Phillips Rd Residence	Kern County	2,100
R6	Southwestern Phillips Rd Residence	Kern County	3,000
R7	Residence south of Lindbergh	California City	3,250
R8	Denhart Ave Residence	California City	6,700
R9	Possible Residence near Neuralia Road	Kern County	50
R10	Possible Residence near Neuralia Road	Kern County	50

[1] Receiver locations shown in Figure 4.

Due to the large distance included in noise modeling between Project activities that generate noise and the nearest noise-sensitive receivers (e.g., located from 1,200 feet up to several miles from Project activities), the accuracy of the models compared to real world conditions is uncertain. This is because the models assume perfect travel of noise with standard atmospheric attenuation, while in the real world complicating variables would occur that the models are unable to or inaccurately able to capture (e.g., interference with other noise sources, curvature of the earth, complicated atmospheric or topographical conditions, etc.). Therefore, with the simplicity of the models and the complicated variables that come into play with large distances between a noise source and a receiver, the modeling results at these distances should be considered theoretical in nature.

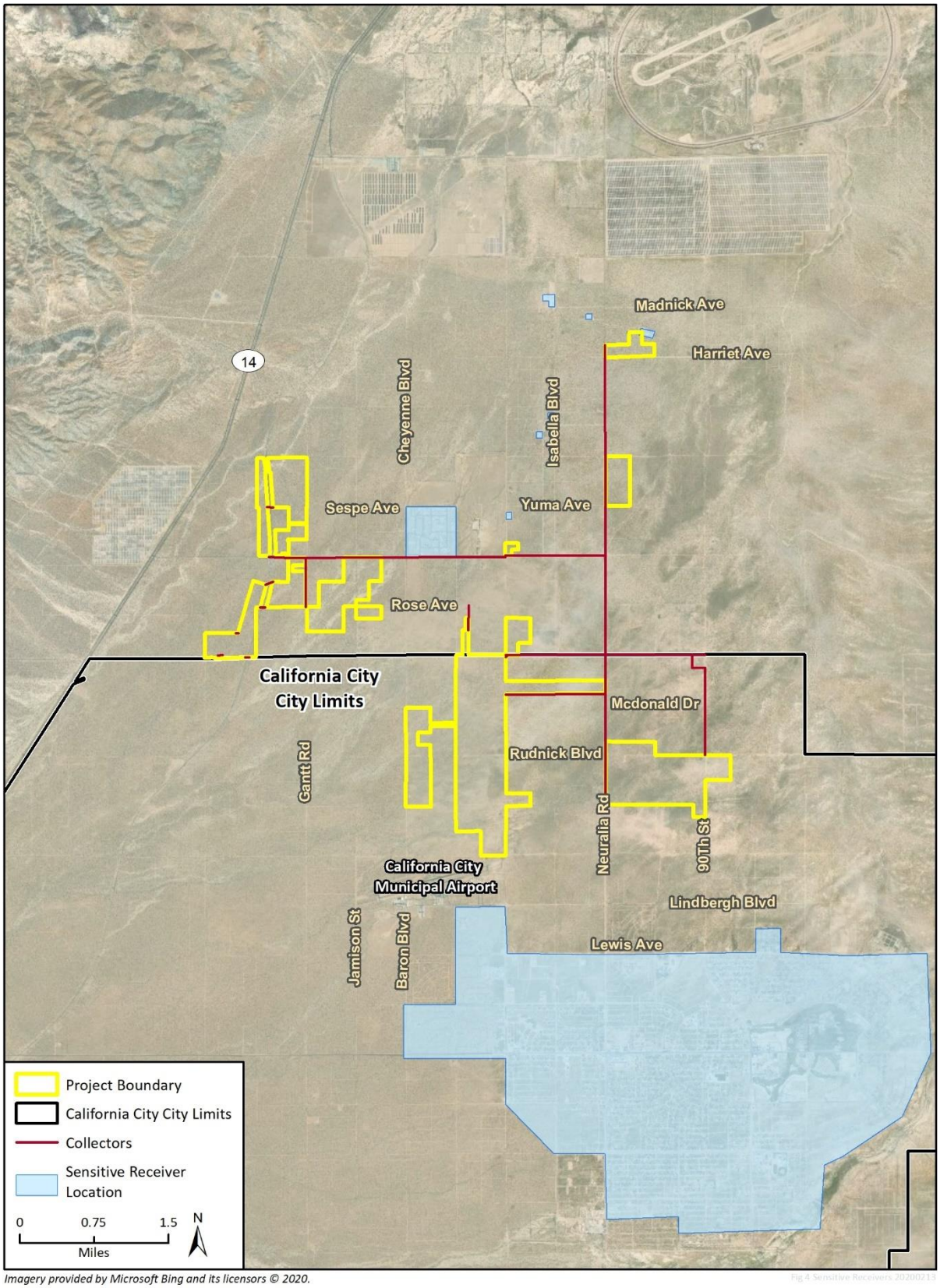
Exposure of the proposed solar facility to ambient noise was not evaluated because the solar facility would not be a noise-sensitive land use.

Construction and Decommissioning Noise

The FHWA's software program Roadway Construction Noise Model (RCNM) was used to estimate construction noise at nearby sensitive receptors. Construction noise modeling results are provided in Appendix B. The types of construction equipment that would be used on-site were provided by 8minute Solar Energy. RCNM provides reference noise levels at the standard distance of 50 feet and estimates noise levels at nearby sensitive receivers based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise such as construction equipment). Although construction activity would typically take place in the interior of Project parcels, this analysis conservatively assumes that equipment may be used along the boundaries of Project parcels facing the nearest noise-sensitive receivers. In addition, RCNM does not consider topography or other environmental factors that attenuate noise. The average noise levels (L_{eq}) from all combined equipment were modeled at the nearest noise-sensitive receivers. Noise levels were modeled from the use of equipment at individual Project parcels and the gen-tie corridor, as well as from multiple sites simultaneously under construction.

On-site construction noise would cause a significant impact if it occurs outside of the County's permitted hours of 6:00AM to 9:00 PM on weekdays and 8:00 AM to 9:00 PM on weekends, within 1,000 feet of an occupied residential dwelling, unless the applicant obtains an exemption to

Figure 4 Locations of Noise-Sensitive Receptors Closest to Project Site



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prohibited nighttime construction noise pursuant to Chapter 8.36 of the Kern County Code and implements a noise control plan to reduce nighttime construction noise. On-site construction noise would also create a significant impact if it exceeds California City's 60 dBA construction noise limit. In addition, a significant impact may occur if daytime construction activity results in extremely high noise levels that could be detrimental to the health and safety of nearby residents.

As stated in Section 1.2, *Project Site and Description*, at the end of the Project's useful life (anticipated to be 30-40 years), the proposed solar facility and associated infrastructure would be decommissioned in accordance with then-current decommissioning practices. At this time, it is not possible to quantitatively evaluate potential noise that would result from Project decommissioning, due to the uncertainty of when decommissioning would occur and the technology or construction practices that would be available at that time. Therefore, based on current decommissioning practices and as a reasonable worst-case scenario, this analysis assumes that noise impacts generated during future decommissioning would be similar to noise impacts generated during the construction phase of the Project.

Construction Traffic Noise

Noise levels from existing traffic and with-construction traffic along SR 14, Phillips Road, and Neuralia Road were estimated in terms of peak-hour L_{eq} using the Traffic Noise Model, Version 2.5 (TNM 2.5) (FHWA 2004). The model calculations are based on estimates of existing vehicle trips collected by Kern Council of Governments in 2017, and from Caltrans traffic counts taken in 2017 for SR 14. Vehicle trips generated by Project construction activities are estimated by traffic volumes provided in the Aratina Solar Project Traffic Impact Analysis (EPD Solutions, Inc. 2019), a similar project in the region. The Aratina Solar Project also assumed up to 1,000 workers during peak construction periods; which would occur during the overlap of concrete foundations, structural steel work, and electrical/instrumentation work. A vehicle trip is defined as a one-direction vehicle movement. The total number of trips generated by the Project includes both inbound and outbound trips. The roadways were modeled conservatively using a straight-line analysis (i.e., assuming no attenuation from topography and a straight roadway). Loose soil was used as the default ground type; per FHWA's *Ground and Pavement Effects using FHWA's Traffic Noise Model 2.5* report, an example of loose soil ground can be dirt soil with sparse vegetation, similar to the environmental setting of the area (FHWA 2010).

Table 6 shows the estimated number of existing and construction-generated vehicle trips at the modeled roadway segments. The table also includes the estimated speeds for each roadway used in the model. The modal split of construction trips was assumed to be 95 percent passenger cars and 5 percent heavy trucks for construction on Project parcels, consistent with the Aratina Solar Project Traffic Impact Analysis (EPD Solutions, Inc. 2019). The modal split of existing trips was assumed to be a typical 94 percent passenger cars, 4 percent medium trucks, and 2 percent heavy trucks. Peak hour traffic was assumed to be 10 percent of daily traffic (a standard conversion rate between peak-hour and daily traffic). Construction trips were assumed to be split from SR 14 on to Phillips Road or Neuralia Road (8minute 2019, pers. comm.).

Table 6 Estimated Existing and Construction Vehicle Trips

Roadway Segment	Speed Limit (mph)	Existing Daily Vehicle Trips[1]	Construction Daily Vehicle Trips[2]	Existing + Construction Daily Vehicle Trips
SR 14	65 (55 for heavy trucks)	7,700	2,110	9,810
Phillips Road	55	214	1,055	1,552
Neuralia Road	55	720	1,055	1,775

[1] Existing average daily vehicle trips obtained from 2017 traffic counts on local roadways (Kern Council of Governments 2019), and from Caltrans traffic counts taken in 2017 for SR 14 (Caltrans 2019).

[2] Daily vehicle trips generated by construction were estimated by Aratina Solar Project Traffic Impact Analysis (EPD Solutions, Inc. 2019), a similar project in the region that would also have 1,000 peak construction workers. Construction trips were assumed to be split from SR 14 on to Phillips Road or Neuralia Road (8minute 2019, pers. comm.).

For traffic-related noise, impacts are considered potentially significant if Project-generated traffic would result in exposure of sensitive receivers to an unacceptable increase in noise levels during construction and/or operational activities. Recommendations in the FTA's *Transit Noise and Vibration Impact Assessment Manual* were used to determine whether increases in traffic noise would be unacceptable (FTA 2018). Under these FTA criteria, as existing ambient noise increases, the "allowable" increase in noise exposure due to a project is reduced. Table 7 shows the FTA criteria considered when evaluating traffic noise generated by this Project. If sensitive receivers would be exposed to long-term traffic noise increases exceeding these criteria, impacts may be considered significant.

Table 7 Significance of Changes in Roadway Noise Exposure

Existing Noise Exposure (dBA L_{dn} or L_{eq})	Allowable Noise Exposure Increase (dBA L_{dn} or L_{eq})
40-45	10
45-50	7
50-55	5
55-60	3
60-65	2
65-74	1
75+	0

Source: FTA 2018 (Figure 4-3 on page 30)

On-Site Operational Noise

On-site operational noise sources were modeled with SoundPLAN. Propagation of modeled stationary noise sources was based on ISO Standard 9613-2, "Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation." The assessment methodology assumes that all receivers would be downwind of stationary sources. This is a worst-case assumption for total noise impacts, since, in reality, only some receivers would be downwind at any one time.

Operational noise sources from the Project include PV solar arrays with associated electrical equipment (such as transformers and inverters), energy storage systems, substations, collector lines, and the operations and maintenance facility. Details of each source are provided under Section 3.2.

Operational noise would result in a significant impact if it would exceed Kern County's standard of 65 dBA L_{dn} for exterior noise at the nearest noise-sensitive receptors or California City's 50 dBA L_{eq} from 7:00 AM to 10:00 PM or 45 dBA L_{eq} from 10:00 PM to 7:00 AM noise limits for single- and multi-family residences.

Operational Traffic Noise

Vehicle trips generated by Project operational activities are estimated by traffic volumes provided in the Aratina Solar Project Traffic Impact Analysis, a similar project in the region, which listed 22 trips for 5 employees (EPD Solutions, Inc. 2019) or 4.4 trips per employee. The Kudu Solar Farm Project is estimated to have 20 employees; therefore, Project operation is estimated to generate 88 trips per day.

The existing traffic volumes used in this analysis are shown in Table 6. These traffic volumes were compared with the expected increase in traffic volumes after construction of the Project. Modeling of traffic noise indicates that, in general, a 10 percent increase in traffic volume would raise traffic noise by approximately 0.4 dBA, a 20 percent increase would raise traffic noise by about 0.8 dBA, a 30 percent increase would result in an approximately 1.1 dBA increase in traffic noise, and a 40 percent increase would increase traffic noise by about 1.5 dBA. The significance of the Project's increase in traffic noise was determined using the FTA criteria shown in Table 7.

Vibration

Vibration associated with construction of the Project has the potential to be an annoyance to nearby land uses. The criteria used for California City is 0.05 in./sec. RMS, which is specified by California City's Municipal Code.

3.2 Results

Construction and Decommissioning Noise

Construction and decommissioning of the Project would involve the use of noise-generating equipment during various phases, including transport of personnel and materials to the site, heavy machinery used in grading and clearing the site, pneumatic post drivers to install foundation supports for solar array modules, as well as equipment used during construction of the proposed solar arrays, infrastructure improvements, and related structures. Emergency diesel generators may be used during construction activities.

Table 8 shows the noise levels associated with heavy construction equipment at a reference distance of 50 feet from the source. As shown in this table, noise levels at this distance can range from about 74 to 85 dBA, depending upon the types of equipment in operation at any given time and phase of construction (FHWA 2006). The highest noise levels during construction would result from pneumatic post-driving of foundation support posts (similar to steel posts used in highway guard rails) for the solar array modules and from the use of auger drill rigs and scrapers.

Table 8 Typical Construction Equipment Noise Levels

Equipment	Acoustical Usage Factor (%)[1]	Measured L_{max} (dBA at 50 feet)
Augur Drill Rig	20	84
Backhoe	40	78
Compactor (ground)	20	83
Concrete Mixer Truck	40	85
Crane	16	85
Dozer	40	82
Dump Truck	40	76
Excavator	40	81
Flat Bed Truck	40	74
Front End Loader	40	79
Generator	50	81
Grader	40	83
Pickup Truck	40	75
Pneumatic Tools	50	85
Roller	20	80
Scraper	40	84
Warning Horn	5	83
Welder/Torch	40	74

[1] The average fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: FHWA 2006

Project components at all Project parcels and the gen-tie would be constructed over a 12- to 18-month period. This analysis makes a conservative assumption that all construction at a Project parcel and the gen-tie would occur simultaneously (i.e., modeling assumed all equipment listed in Table 8 would be operational at once). In practice, however, grading and site preparation would take place sequentially at the Project sites. When these activities are completed at one Project parcel, post driving would start in that area while grading equipment would begin operating at another Project parcel.

Construction activities would be subject to Kern County and California City policies and regulations. Heavy construction activities would normally occur on-site between the hours of 6:00 AM and 5:00 PM, which is between the acceptable hours for construction listed in Section 8.36.020(H) of the Kern County Code and Section 5-1.407 of the California City Municipal Code. However, additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. As a result, some construction activities may be required to continue 24 hours per day, seven days per week. Activities that generate relatively low amounts of noise, such as refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning, may potentially occur between the hours of 9:00 PM and 6:00 AM on weekdays and the hours of 9:00 PM and 8:00 AM on weekends. Per Section 8.36.020 of the Kern County Code, these activities would require approval from the development services agency director or his or her designated representative if audible to a person with average hearing ability at a distance of 150 feet from a construction site, if the site is within 1,000 feet of an occupied residential dwelling. Per Section 5-1.412 of the California City Municipal Code, a variance can be requested for construction work outside of allowed hours; this variance is reviewed by California City's Planning Commission that will consider the

magnitude, uses, time, economic factors, and general public interest of the construction activities in granting the waiver.

Noise-sensitive receivers near Project construction include single-family residences in Kern County and California City. These land uses would experience a temporary increase in noise during construction of the Project. The following subsections detail the impacts to noise-sensitive receivers in proximity to the Project parcels and the gen-tie corridor.

Construction at Project Parcels

Table 9 shows the estimated average noise level from construction at the Project parcels at the nearest noise-sensitive land use areas, based on a standard noise attenuation rate of 6 dBA per doubling of distance for point sources of noise. Each noise-sensitive land use listed is the closest land use in that general area, and therefore noise-sensitive receivers in those general areas further away would experience lower noise levels.

Table 9 Noise Levels at Various Distances from Construction at the Project Parcels

Receptor	Distance from Construction (feet)	Noise Level at Receptor (dBA L_{eq})
Reference Distance	50	89
Potential residences off Neuralia Road[1]	50	89
Single-family residence in California City[2]	3,250	53

See Appendix B

[1] Closest noise-sensitive land uses from different areas of the Project in Kern County; these are identified as R9 and R10 in Figure 4.

[2] Closest noise-sensitive land use in California City; this are identified as R7 in Figure 4.

As shown in Table 9, although construction noise levels from simultaneous heavy equipment operation would reach 89 dBA L_{eq} at the reference distance of 50 feet, due to the large distance between construction at the Project parcels and the nearest noise-sensitive receivers, construction noise levels under the conservative scenario analyzed would only reach as high as 61 dBA L_{eq}. Most construction activities would occur in the body of each parcel, farther from nearby noise-sensitive receivers than analyzed, and would therefore result in lower noise levels, especially in later construction phases when equipment with the loudest equipment, such as pneumatic tools and graders, would no longer be used. Heavy construction activity involving pneumatic tools and graders also would not occur during nighttime hours.

Per Section 8.36.020 of the Kern County Code, construction activities outside of acceptable hours would require approval from the development services agency director or designated representative if audible to a person with average hearing ability at a distance of 150 feet from a construction site, if the site is within 1,000 feet of an occupied residential dwelling. Because sensitive receivers are closer than 1,000 feet away from construction, County approval and implementation of a noise control plan would be required unless nighttime construction noise is inaudible at nearby residences. In addition, daytime construction noise levels in excess of 70 dBA L_{eq} could disturb nearby residents. Therefore, cumulative construction noise would have a potentially significant temporary impact. Section 4, *Recommendations*, provides measures to mitigate construction noise outside of permitted hours.

The closest California City residences are located further away and therefore would be subject to noise levels of 53 dBA L_{eq}. These noise levels would be below California City's 60 dBA construction noise limit. However, construction may occur outside of California City's allowed construction hours

(6:00 AM and 8:00 PM between May 15 and September 15 of each year or between the hours of 7:00 AM and 8:00 PM during the remainder of the year, and no construction on Sundays or federal holidays). Per Section 5-1.412 of the California City Municipal Code, a variance can be requested for construction work outside of allowed hours; this variance is reviewed by California City's Planning Commission that will consider the magnitude, uses, time, economic factors, and general public interest of the construction activities in granting the waiver. Construction during these hours may exceed California City's single-family residential exterior noise standard of 50 dBA Leq from 7:00 AM to 10:00 PM and 45 dBA L_{eq} from 10:00 PM to 7:00 AM. Project parcel construction within 8,000 feet may exceed the 45 dBA L_{eq} from 10:00 PM to 7:00 AM. In accordance with the requirements of Section 5-1.412 of the California City Municipal Code, the Project would obtain a variance if construction were to occur during the nighttime hours at these distances to California City residences. Therefore, impacts would be less than significant.

Gen-Tie

In connecting to a substation, the gen-tie corridor may be routed through Phillips Road adjacent to noise-sensitive receivers in the single-family residential neighborhood bordered by Yuma Street, Yucaipa Street, Cheyenne Boulevard, and Phillips Road in Kern County. Therefore, for the purposes of this analysis, at the closest point of construction, the gen-tie routes would be located approximately 50 feet from single-family residences. These are the nearest sensitive receivers to any of the gen-tie route alternatives, and they would experience a temporary increase in noise during construction of the Project. As modeled, construction of the gen-tie would potentially involve the use an auger drill rig, front end loader, grader, pickup truck, crane, and concrete mixer truck. Table 10 shows construction noise levels at various distances from gen-tie construction activity, including those of the nearest noise-sensitive receivers, based on a standard noise attenuation rate of 6 dBA per doubling of distance for point sources of noise.

Table 10 Typical Construction Noise Levels at Various Distances from Gen-Tie Construction

Receptor	Distance from Construction (feet)	Noise Level at Receptor (dBA L_{eq})
Reference Distance	50	84
Single-family residence Kern County[1]	50	84
Single-family residence in California City[2]	8,300	40

See Appendix B

[1] Closest noise-sensitive land use in the Kern County single-family neighborhood bordered by Yuma Street, Yucaipa Street, Cheyenne Boulevard, and Phillips Road in Kern County.

[2] Closest noise-sensitive land use in California City.

As shown in Table 10, simultaneous heavy equipment use during gen-tie construction would generate a noise level of up to 84 dBA L_{eq} when within 50 feet of single-family residences in Kern County. Most construction activities would occur further from nearby noise receptors, and would, therefore, result in lower noise levels, especially in later construction phases when equipment with louder equipment, such as cranes and concrete mixer trucks, would no longer be used. Heavy construction activity involving cranes and concrete mixer trucks also would not occur during nighttime hours. Per Section 8.36.020 of the Kern County Code, construction activities outside of acceptable hours would require approval from the development services agency director or

designated representative if audible to a person with average hearing ability at a distance of 150 feet from a construction site, if the site is within 1,000 feet of an occupied residential dwelling. Because sensitive receivers in Kern County are closer than 1,000 feet away from gen-tie construction, County approval and implementation of a noise control plan would be required unless nighttime construction noise is in compliance with County regulations. In addition, daytime construction noise levels in excess of 70 dBA L_{eq} could disturb nearby residents. Therefore, combined construction noise would have a potentially significant temporary impact. Section 4, *Recommendations*, provides measures to mitigate construction noise outside of permitted hours. Gen-tie construction in Kern County would not be conducted within 1,000 feet of noise-sensitive receivers outside of the single-family neighborhood bordered by Yuma Street, Yucaipa Street, Cheyenne Boulevard, and Phillips Road.

The closest California City residences are located much further away and therefore would be subject to minor noise levels of 40 dBA L_{eq}. These noise levels would be below California City's 60 dBA construction noise limit. Although construction of the gen-tie may occur outside of California City's allowed construction hours, a noise level of 40 dBA L_{eq} would be below California City's nighttime exterior and interior noise standard of 45 dBA L_{eq}. Therefore, noise generated by construction at California City sensitive receivers would not have a significant impact. Nevertheless, implementation of measures in Section 4, *Recommendations*, would reduce construction noise to the extent feasible.

Project Decommissioning

As stated in Section 1.2, *Project Site and Description*, at the end of the Project's useful life (anticipated to be 30-40 years), the solar facility and associated infrastructure may be decommissioned in accordance with then-current decommissioning practices. Given the Project's operating life cycle and distant timeframe for decommissioning activities, it is too speculative to quantify the potential noise impacts that could occur during decommissioning activities. On a rough basis, decommissioning would be similar to Project construction and be completed in 12 to 18 months. Assuming that the facility would be torn down and the materials present recycled or disposed, temporary noise associated with such actions are assumed to be generally similar to the noise levels that would result from Project construction. Similar to the noise generated during construction of the Project, decommissioning activities would be conducted in accordance with all applicable requirements in effect at the time of Project termination. Potential future environmental effects associated with Project decommissioning would be addressed at the time decommissioning is proposed consistent with regulations in effect at that time. A final decommissioning plan, based on then-current technology, site conditions, and regulations, would be prepared prior to actual decommissioning.

Combined On-Site Construction Noise

As described in Section 1.2, *Project Site and Description*, Project components at all sites would be constructed over a 12- to 18-month period. This analysis makes a conservative assumption that construction at all Project parcels and the gen-tie would occur simultaneously. Concurrent construction activity at more than one parcel and the gen-tie line may expose nearby residences to combined noise impacts. This analysis of combined effects focuses on the effects of concurrent construction activities for the worst-case scenario (i.e., the closest residences which would be exposed to construction activities at multiple sites).

Some residences located in Kern County would be exposed to adjacent construction noise from gen-tie construction and more distant noise from Project parcels, specifically at the single-family

neighborhood bordered by Yuma Street, Yucaipa Street, Cheyenne Boulevard, and Phillips Road. Because of these residences proximity to gen-tie construction (as close as 50 feet), combined noise levels are dominated by gen-tie construction noise. The single-family residence off Morongo Drive near Phillips Road in Kern County is the closest residence within 50 feet of gen-tie construction that is closest to parcel construction. These include parcels located at a distance of 2,000, 3,100, 3,500, 3,600, and 4,500 feet. This residence is representative of a reasonable worst-case scenario for combined project construction noise impacts, assuming concurrent construction of gen-tie corridor and the nearest Project parcels. Table 11 estimates the combined construction noise levels for this scenario, which could reach approximately 84 dBA L_{eq}.

Table 11 Combined Construction Noise Levels for Worst-Case Scenario[1]

Project Site	Distance from Construction (feet)	Noise Level at Receptor (dBA L_{eq})
Gen-tie	50	84
Project Parcel	2,000	52
Project Parcel	3,100	48
Project Parcel	3,500	47
Project Parcel	3,600	47
Project Parcel	4,500	45
Combined Noise Level		**84**

[1] Worst-case scenario is for single-family residence off Morongo Drive near Phillips Road in Kern County, which is closest residence to the Project parcels that is adjacent to gen-tie construction.

Per Section 8.36.020 of the Kern County Code, construction activities outside of acceptable hours would require approval from the development services agency director or designated representative if audible to a person with average hearing ability at a distance of 150 feet from a construction site, if the site is within 1,000 feet of an occupied residential dwelling. Because sensitive receivers in Mojave are closer than 1,000 feet away from gen-tie construction, County approval and implementation of a noise control plan would be required unless nighttime construction noise is in compliance with County regulations. In addition, daytime construction noise levels in excess of 70 dBA L_{eq} could disturb nearby residents. Therefore, combined construction noise would have a potentially significant temporary impact. Section 4, *Recommendations*, provides measures to mitigate construction noise outside of permitted hours.

Construction Traffic Noise

Construction of the Project would increase traffic noise offsite from commuting construction workers and from haul trucks bringing materials to and from the Project site. As mentioned previously, Project components would be constructed simultaneously over a 12- to 18-month period. This could expose nearby residences to combined noise from construction traffic. This analysis of combined effects focuses on the effects of concurrent construction traffic for the worst-case scenario (i.e., traffic generated by the peak construction period). Table 6 in Section 3.1, *Methodology and Significance Thresholds*, compares existing daily traffic volumes on nearby road segments to anticipated traffic generated by Project construction. Based on these traffic volumes, Table 12 shows

modeled traffic noise levels at the nearest receivers under existing traffic conditions and with construction traffic.

Table 12 Construction Traffic Noise

Roadway	Nearest Sensitive Receiver	Distance from Roadway Centerline to Nearest Sensitive Receiver (feet)	Existing Traffic Noise (dBA L_{eq})	With-Construction Traffic Noise (dBA L_{eq})	Change in Traffic Noise (dBA L_{eq})	FTA Allowable Noise Exposure Increase (dBA L_{eq})
SR 14	Single-family residences in Kern County	300	54	55	1	5
Phillips Road	Single-family residences in Kern County	80	53	58	5	5
Neuralia Road	Single-family residences in Kern County	105	52	57	5	5

As shown in Table 12, construction traffic would increase noise levels by up to 5 dBA L_{eq} at the nearest sensitive receivers from Project construction. However, none of the traffic noise increases would exceed the applicable FTA criteria. Therefore, the short-term increase in traffic noise from Project construction would be less than significant.

On-Site Operational Noise

The Project would operate continuously, seven days a week, until the anticipated repowering or decommissioning of the Project in 30 to 40 years. Stationary noise sources during operation would include PV solar arrays with associated electrical equipment (such as transformers and inverters), energy storage systems, substations, collector lines, and the operations and maintenance facility. Electrical equipment produces a discrete low-frequency humming noise. The noise from transformers is produced by alternating current flux in the core, which causes it to vibrate.

Transformers would be located within the inverters, which would lie within an enclosed or canopied metal structure. Within enclosures, inverters typically produce a noise level of 58 dBA L_{eq} at the source (Monterey County 2014). However, a fully enclosed metal structure would attenuate noise from inverter stations more effectively than would a canopy structure with open walls. It is unknown at this time whether the inverters/transformers would be enclosed or open. This would be determined during design once the inverter/transformer manufacturer has been selected. Open inverters would generate a noise level of approximately 52 dBA at a distance of 75 feet (*California Valley Solar Project Final EIR*, San Luis Obispo County 2011). If the inverters are enclosed, each inverter enclosure may also include heating, ventilation, and air conditioning (HVAC) systems mounted on the exterior of the inverter enclosure, which would generate a noise level of 58 dBA at a distance of 75 feet.

Table 13 lists representative noise levels of equipment used for similar solar projects that are assumed to be used on the Project site.

Table 13 Estimated Noise Rating for Equipment Utilized During Project Operations

Equipment Type	Reference Noise Level (dBA L_{eq})	Distance from Source (feet)
Gen-Tie [1]	20	50
PV Panel	44	50
500+ kW Inverter (unenclosed)	52	75
Transformer	58	3.3
Inverter HVAC System	58	75

[1] Only applicable to the gen-tie transmission line.

Sources: U.S. Department of Energy 2011; San Luis Obispo County 2011; Illingworth and Rodkin 2009; Kern County 2014; Monterey County 2014

As shown in Table 13, it is expected that the loudest noise generated by on-site solar operations would come from the HVAC systems at 58 dBA L_{eq} at a distance of 75 feet from the source. As the closed inverter would generate a higher noise level than an open inverter due to the inclusion of HVAC units, the enclosed inverters are conservatively used for this analysis. The combined noise levels from the HVAC systems and transformers, which would be anticipated to operate simultaneously, are analyzed below at the closest sensitive receivers through SoundPLAN modeling. Noise levels from the gen-tie transmission line, PV panels, and substations/energy storage systems are discussed separately, as these noise sources would be minor in comparison to the HVAC systems and transformers and were not modeled.

Solar Array Noise

Sensitive receivers nearby the Project parcels include rural single-family residences in Kern County and single-family residences located in the northern neighborhoods of California City. Noise levels from the Project's solar array operations (transformers and inverters [HVAC]) are shown in Table 14, and noise level contours and receiver locations are shown in Figure 5.

Table 14 Operational Noise Levels at Nearest Sensitive Receivers

Receiver	Receiver Description	Jurisdiction[1]	Noise Level at Receiver		Exceed Threshold?
			dBA L_{eq}	dBA L_{dn}	
R1	Esther Ave Residence	Kern County	24	30	No
R2	Isabella Blvd Residence	Kern County	21	27	No
R3	Near Dodson Ave and Isabella Blvd	Kern County	21	27	No
R4	Yerba Blvd Residence	Kern County	25	31	No
R5	Southeast Phillips Rd Residence	Kern County	27	33	No
R6	Southwestern Phillips Rd Residence	Kern County	28	34	No
R7	Residence south of Lindbergh	California City	23	30	No
R8	Denhart Ave Residence	California City	18	24	No
R9	Possible Residence near Neuralia Road	Kern County	34	40	No
R10	Possible Residence near Neuralia Road	Kern County	34	40	No

Note: Calculations completed in SoundPLAN; see Figure 5 for receiver locations.

[1] Operational noise would result in a significant impact depending on the jurisdiction it is location in; the Kern County standard is 65 dBA L_{dn} for exterior noise at the nearest noise-sensitive receptors, and the California City standard is 50 dBA L_{eq} from 7:00 AM to 10:00 PM or 45 dBA L_{eq} from 10:00 PM to 7:00 AM noise limits at single- and multi-family residences.

As shown in Table 14, operational noise levels from the project site would reach up to 34 dBA L_{dn} at Kern County sensitive receivers and 24 dBA L_{eq} at California City sensitive receivers. These noise levels would be well below Kern County's standard of 65 dBA L_{dn} for exterior noise at the nearest noise-sensitive receptors or California City's 50 dBA L_{eq} from 7:00 AM to 10:00 PM and 45 dBA L_{eq} from 10:00 PM to 7:00 AM noise limits for residences. The noise would likely not be audible over the existing ambient noise in the areas. Therefore, operational noise impacts from the Project would be less than significant.

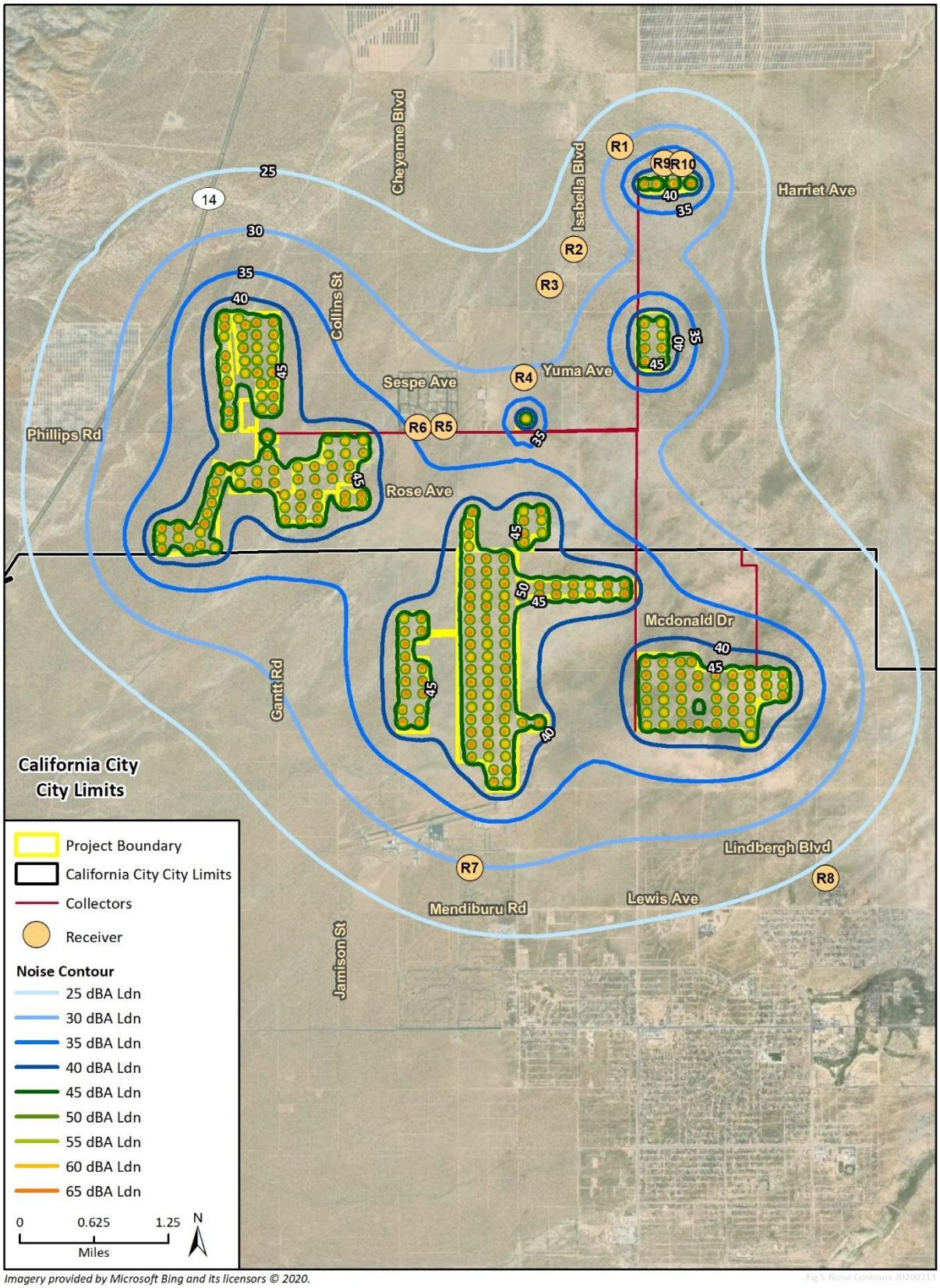
Gen-Tie

The gen-tie transmission line would generate noise from the corona affect, which is a phenomenon associated with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. The corona effect on the gen-tie transmission line would generate a noise level of approximately 20 dBA at a distance of 50 feet (*California Valley Solar Project Final EIR*, San Luis Obispo County 2011). This is the approximate distance to the nearest residences from the gen-tie route. As observed during a site visit to the area and transmission lines from existing solar farms in the area, noise levels from these transmissions lines were not detected over the existing ambient noise sources in the area (wind, vehicles, planes, and trains) just outside of the solar farm properties. Therefore, per site observations and the general low noise of transmissions lines, gen-tie noise would not exceed County's standard of 65 dBA L_{dn} at the nearest residences, and impacts would be less than significant.

PV Panel

PV panel noise would come from the tracking motors. These systems involve the panels being driven by motors to make brief, incremental adjustments to track the arc of the sun to maximize the solar effect. While these motors may generate noise of up to 44 dBA at 50 feet, these motors would

Figure 5 Receiver Locations and Operational Noise Contours



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operate briefly throughout an hour (e.g., several minutes per hour) as the sun moves west across the sky, and then would reset at night to face the eastern sky. By operating only several minutes per hour, the hourly noise level would be negligible at the nearest sensitive receivers. In addition, as observed during a site visit to the area and viewing of existing solar farms in the area, noise levels from PV panel tracking were not detected over the existing ambient noise sources in the area (wind, vehicles, planes, and trains) just outside of the solar farm properties. Therefore, noise levels from the PV panels would be less than significant.

Substation/Energy Storage System

The substation and energy storage systems would likely be constructed in a similar area of the Project. These facilities would collect, transmit, and store energy generated by the solar arrays. Noise generated by these facilities may include HVAC units. However, the transformers and inverters analyzed earlier in this section would include a much larger number of HVAC units for the inverters and additional noise from the transformers spread across the Project site that would be more prominent than the noise generated by the substation and energy storage system, which would be located in one area of the Project sites. In addition, as observed during a site visit to the area and viewing of existing solar farms in the area, noise levels from substations and energy storage systems were not detected over the existing ambient noise sources in the area (wind, vehicles, planes, and trains) just outside of the solar farm properties. Therefore, noise levels from the PV panels would be less than significant.

Operational Traffic Noise

Once the Project is complete, vehicle trips to the Project site would be associated with operations and maintenance of the solar facility. In addition, the Project would require occasional nighttime activities, including deliveries, repairs, maintenance, office and administrative activities, security personnel, and emergency response.

As shown in Table 15, existing roadways would generate noise levels of 52 to 54 dBA L_{eq} to the nearest single-family residences. Pursuant to the FTA criteria described in Table 7, a significant noise impact would occur if roadway noise would increase by more than 5 dBA. With the relatively minor increase in traffic volumes from Project operation (88 trips), Project operation would increase noise by or less than 1 dBA. This increase would be imperceptible to the nearest residents and would not exceed applicable FTA criteria. Therefore, the Project's noise increases from operational traffic would have a less than significant impact.

Table 15 Operational Traffic Noise

Roadway	Nearest Sensitive Receiver	Distance from Roadway Centerline to Nearest Sensitive Receiver (feet)	Existing Traffic Noise (dBA L_{eq})	With-Operational Traffic Noise (dBA L_{eq})	Change in Traffic Noise (dBA L_{eq})	FTA Allowable Noise Exposure Increase (dBA L_{eq})
SR 14	Single-family residences in Kern County	300	54	54	<1	5
Phillips Road	Single-family residences in Kern County	80	53	54	1	5
Neuralia Road	Single-family residences in Kern County	105	52	52	<1	5

Vibration

Construction at Project Parcels

Construction at the Project parcels may require post driving and vibratory rollers and has the potential to result in temporary vibration impacts on structures and humans. Based on the potential site locations, post driving activities could occur within 3,250 feet of the nearest residence (22362 Guynemer Court) in California City. As impact pile drivers have higher vibration levels than vibratory pile drivers, the potential vibration impact calculations assume that impact pile drivers will be used. Other construction activities are less intensive than pile driving and would have lower PPV than pile driving. Therefore, vibration levels from pile driving are considered worst case for construction at the Project parcels. Caltrans vibration guidance provides the following equation[2] to calculate PPV at sensitive receptors:

$$\text{PPV Impact Pile Driver} = PPV_{Ref} (25/D)^{n} \times (E_{equip}/E_{Ref})^{0.5} \text{ (in./sec.)}$$

Where:

PPV_{Ref} = 0.65 in/sec for a reference pile driver at 25 feet

D = distance from pile driver to the receiver in feet

n = 1.1 is a value related to the vibration attenuation rate through ground

E_{equip} is rated energy of impact pile driver in ft-lbs

E_{Ref} is 36,000 ft-lb (rated energy of reference pile driver)

Using the referenced formula and an assumed 2,400 ft-lb rated energy[3] for the post driver and converting the in./sec. PPV values to in./sec. RMS, the Project would generate vibration levels of up to 0.0002 in./sec. RMS at the nearest California City residential structure, well below the 0.05 in./sec. RMS threshold. In addition, heavy construction activity involving pneumatic tools and graders also

[2] Equation is provided in Section 7.1.1, Equation 9 of Caltrans 2020.

[3] This would be a typical size for the type of post drivers that would be used to drive in the foundations for the arrays. An example is a Bradco Post Driver by Paladin with 2,400 ft-lb rated energy (https://www.paladinattachments.com/sites/default/files/prod_lit/SS%20-%20BR%20-%20post%20driver.pdf)

would not occur during nighttime hours. Therefore, vibration impacts associated with construction of the proposed Project would be less than significant.

Once constructed, the proposed PV facility would not have any components that would generate vibration levels. Thus, operation of the proposed Project would not result in any vibration and impacts would be less than significant.

Gen-tie Construction

Gen-tie construction may require the use of an auger drill rig that has the potential to result in temporary vibration impacts on structures and humans. Based on the potential site locations, auger drilling activities could occur within 8,300 feet of the nearest off-site residential structure in California City. Other than use of an auger drill rig, other construction activities at the gen-tie corridors are less intensive than auger drill rig and would have lower PPV than the auger drill rig. Therefore, vibration levels from the auger drill rig are considered worst case for the gen-tie construction. Caltrans vibration guidance provides the following equation to calculate PPV at sensitive receptors:

$$PPV\ Equipment = PPV_{Ref}\ (25/D)^{n}\ (in./sec.)$$ [4]

Where:

PPV_{Ref} = Equipment reference vibration level at 25 feet

D = distance from equipment to the receiver in feet

n = 1.1 is a value related to the vibration attenuation rate through ground

Caltrans vibration guidelines do not provide vibration levels specifically for an auger drill rig; however, the guidelines do provide vibration levels for caisson drilling of 0.089 in./sec. PPV. A caisson drill would typically drill a much larger hole than the type of bore performed for a solar foundation post (e.g., a caisson drill would be used to drill a bridge pier). Although a caisson drill is a more intensive activity that would result in greater vibration than an auger drill, it was used as a conservative reference for this analysis. Using the referenced formula and converting the in./sec. PPV values to in./sec. RMS, the Project would generate vibration levels of up to 0.00004 in./sec. RMS at the nearest California City residential structure, well below the 0.05 in./sec. PPV threshold. In addition, heavy construction activity involving drilling would not occur during nighttime hours. Therefore, vibration impacts associated with construction of the proposed Project would be less than significant.

Operation

Once constructed, the proposed PV facility would not have any components that would generate vibration levels. Thus, operation of the proposed Project would not result in any vibration and impacts would be less than significant.

[4] Equation is provided in Section 7.2, Equation 12 of Caltrans 2020.

4 Recommendations

Construction of the Project would temporarily increase ambient noise levels at noise-sensitive receptors near the Project site. The following recommendations would reduce noise impacts from the Project's construction activities. Measure 1 is recommended because although not necessary to comply with construction noise standards, it would prevent the physical environmental impact of exposing sensitive receptors to potentially disruptive noise levels during permitted construction hours. Measure 2 is necessary for nighttime construction activity to comply with Section 8.36.020 of the Kern County Code.

N-1 Construction Noise Reduction Measures

The applicant shall apply the following measures during active construction work of the Project occurring within 1,000 feet of an occupied, offsite noise-sensitive receptor.

Mufflers

Construction equipment shall be properly maintained and all internal combustion engine driven machinery with intake and exhaust mufflers and engine shrouds, as applicable, shall be in good condition and appropriate for the equipment. During construction, all equipment, fixed or mobile, shall be operated with closed engine doors and shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards.

Equipment Staging

All stationary equipment shall be staged as far away from noise-sensitive receptors as feasible.

Equipment Idling

Diesel-powered construction vehicles and equipment shall not be left idling for longer than five minutes when not in use, consistent with California Code of Regulations Title 13, Section 2485.

N-2 Construction Noise Outside of Permitted Hours Reduction Measures – Kern County

The applicant shall apply one of the following measures during active construction work for the Project occurring outside of permitted hours per Section 8.36.020 of the Kern County Code:

1) **Development Services Agency Director Approval.** The applicant shall obtain approval from the development services agency director or designated representative for Project construction activities occurring between the hours of 9:00 PM and 6:00 AM on weekdays and 9:00 PM and 8:00 AM on weekends, within 1,000 feet of an occupied residential building, if audible to a person with average hearing ability at a distance of 150 feet from a construction site. As a condition of approval for exempting construction activity outside of permitted hours, the applicant shall implement a noise control plan including appropriate noise-reduction measures to the satisfaction of the development services agency director or designated representative, which may include the measures listed in Recommended Measure N-1. In addition, the noise control plan may include a requirement to restrict the duration of construction activities outside of permitted hours within 1,000 feet of an occupied residential building.

2) **Restrict Construction Activity within 1,000 feet of Noise-Sensitive Receptors in Kern County.** Construction activities that are located within 1,000 feet of the nearest noise-sensitive receptors, and that would generate audible noise at a distance of 150 feet from the source between the hours of 9:00 PM and 6:00 AM on weekdays and the hours of 9:00 PM and 8:00 AM on weekends, shall be prohibited.

5 Conclusions

As discussed in Section 3, *Impact Analysis*, the Project would not generate construction traffic noise, construction vibration, on-site operational noise, or operational traffic noise exceeding applicable standards. However, construction activity would temporarily expose nearby residences to high daytime noise levels and could expose them to nighttime noise. Compliance with California City Municipal Code Section 5-1.412 to obtain a variance to conduct nighttime construction activities in California City limits would ensure that impacts would be less than significant. For construction in Kern County, implementation of the recommended Measure N-1 would be necessary to reduce the exposure of residences located within 1,000 feet of construction activity to potentially disruptive noise levels during permitted construction hours, to the extent feasible. In addition, implementation of the recommended Measure N-2 would provide for Kern County approval of nighttime noise outside of permitted construction hours or restrict nighttime construction activity near residences. Therefore, impacts to nearby sensitive receivers would be less than significant with mitigation.

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Appendix A

On-Site Noise Measurement Data

LT1

Data Logger 2
SET 240
A
SLOW
Range 30-90
L05 65.4
L10 62.8
L50 48.7
L90 31.6
L95 29.6
Max dB 85.2
2019/09/19 12:27:05
SEL 119.3
Leq 70.0

No.s	Date Time	dB
1	2019/09/18 12:28:03	36.9
2	2019/09/18 12:32:03	35.1
3	2019/09/18 12:36:03	45.7
4	2019/09/18 12:40:03	50.6
5	2019/09/18 12:44:03	51.4
6	2019/09/18 12:48:03	38.9
7	2019/09/18 12:52:03	48.2
8	2019/09/18 12:56:03	63.0
9	2019/09/18 13:00:03	52.8
10	2019/09/18 13:04:03	65.7
11	2019/09/18 13:08:03	61.7
12	2019/09/18 13:12:03	66.0
13	2019/09/18 13:16:03	55.6
14	2019/09/18 13:20:03	69.2
15	2019/09/18 13:24:03	68.9
16	2019/09/18 13:28:03	53.2
17	2019/09/18 13:32:03	55.5
18	2019/09/18 13:36:03	54.7
19	2019/09/18 13:40:03	59.5
20	2019/09/18 13:44:03	67.9
21	2019/09/18 13:48:03	55.1
22	2019/09/18 13:52:03	54.4
23	2019/09/18 13:56:03	56.5
24	2019/09/18 14:00:03	70.5
25	2019/09/18 14:04:03	53.0
26	2019/09/18 14:08:03	57.0
27	2019/09/18 14:12:03	56.5
28	2019/09/18 14:16:03	62.9
29	2019/09/18 14:20:03	60.6
30	2019/09/18 14:24:03	38.0
31	2019/09/18 14:28:03	58.3
32	2019/09/18 14:32:03	63.1
33	2019/09/18 14:36:03	64.2
34	2019/09/18 14:40:03	68.2
35	2019/09/18 14:44:03	54.2
36	2019/09/18 14:48:03	59.8
37	2019/09/18 14:52:03	60.6
38	2019/09/18 14:56:03	50.0
39	2019/09/18 15:00:03	59.9

40	2019/09/18 15:04:03	53.7
41	2019/09/18 15:08:03	61.1
42	2019/09/18 15:12:03	65.8
43	2019/09/18 15:16:03	65.8
44	2019/09/18 15:20:03	71.8
45	2019/09/18 15:24:03	63.5
46	2019/09/18 15:28:03	57.5
47	2019/09/18 15:32:03	66.1
48	2019/09/18 15:36:03	68.5
49	2019/09/18 15:40:03	68.1
50	2019/09/18 15:44:03	62.9
51	2019/09/18 15:48:03	58.3
52	2019/09/18 15:52:03	56.9
53	2019/09/18 15:56:03	55.0
54	2019/09/18 16:00:03	51.9
55	2019/09/18 16:04:03	64.2
56	2019/09/18 16:08:03	60.5
57	2019/09/18 16:12:03	56.0
58	2019/09/18 16:16:03	58.3
59	2019/09/18 16:20:03	56.8
60	2019/09/18 16:24:03	59.9
61	2019/09/18 16:28:03	52.2
62	2019/09/18 16:32:03	64.3
63	2019/09/18 16:36:03	62.6
64	2019/09/18 16:40:03	62.6
65	2019/09/18 16:44:03	64.6
66	2019/09/18 16:48:03	65.5
67	2019/09/18 16:52:03	60.9
68	2019/09/18 16:56:03	55.0
69	2019/09/18 17:00:03	63.7
70	2019/09/18 17:04:03	54.1
71	2019/09/18 17:08:03	60.1
72	2019/09/18 17:12:03	49.3
73	2019/09/18 17:16:03	49.2
74	2019/09/18 17:20:03	56.3
75	2019/09/18 17:24:03	50.7
76	2019/09/18 17:28:03	54.6
77	2019/09/18 17:32:03	59.3
78	2019/09/18 17:36:03	56.5
79	2019/09/18 17:40:03	64.7
80	2019/09/18 17:44:03	56.6
81	2019/09/18 17:48:03	68.5
82	2019/09/18 17:52:03	50.0
83	2019/09/18 17:56:03	56.3
84	2019/09/18 18:00:03	61.0
85	2019/09/18 18:04:03	54.7
86	2019/09/18 18:08:03	59.0
87	2019/09/18 18:12:03	53.1
88	2019/09/18 18:16:03	41.0
89	2019/09/18 18:20:03	44.5
90	2019/09/18 18:24:03	51.0
91	2019/09/18 18:28:03	44.8
92	2019/09/18 18:32:03	51.1
93	2019/09/18 18:36:03	41.7

94	2019/09/18 18:40:03	30.9
95	2019/09/18 18:44:03	43.8
96	2019/09/18 18:48:03	38.1
97	2019/09/18 18:52:03	64.1
98	2019/09/18 18:56:03	52.6
99	2019/09/18 19:00:03	41.6
100	2019/09/18 19:04:03	58.5
101	2019/09/18 19:08:03	59.9
102	2019/09/18 19:12:03	42.1
103	2019/09/18 19:16:03	49.3
104	2019/09/18 19:20:03	43.4
105	2019/09/18 19:24:03	51.1
106	2019/09/18 19:28:03	40.7
107	2019/09/18 19:32:03	39.1
108	2019/09/18 19:36:03	45.3
109	2019/09/18 19:40:03	37.2
110	2019/09/18 19:44:03	49.5
111	2019/09/18 19:48:03	30.2
112	2019/09/18 19:52:03	38.0
113	2019/09/18 19:56:03	35.1
114	2019/09/18 20:00:03	40.3
115	2019/09/18 20:04:03	43.6
116	2019/09/18 20:08:03	48.5
117	2019/09/18 20:12:03	54.6
118	2019/09/18 20:16:03	56.2
119	2019/09/18 20:20:03	44.3
120	2019/09/18 20:24:03	53.5
121	2019/09/18 20:28:03	50.8
122	2019/09/18 20:32:03	51.9
123	2019/09/18 20:36:03	47.0
124	2019/09/18 20:40:03	46.0
125	2019/09/18 20:44:03	48.4
126	2019/09/18 20:48:03	55.5
127	2019/09/18 20:52:03	41.8
128	2019/09/18 20:56:03	53.7
129	2019/09/18 21:00:03	52.4
130	2019/09/18 21:04:03	39.8
131	2019/09/18 21:08:03	47.8
132	2019/09/18 21:12:03	48.0
133	2019/09/18 21:16:03	29.7
134	2019/09/18 21:20:03	48.3
135	2019/09/18 21:24:03	41.4
136	2019/09/18 21:28:03	39.5
137	2019/09/18 21:32:03	48.0
138	2019/09/18 21:36:03	47.9
139	2019/09/18 21:40:03	36.5
140	2019/09/18 21:44:03	31.5
141	2019/09/18 21:48:03	36.2
142	2019/09/18 21:52:03	33.4
143	2019/09/18 21:56:03	40.0
144	2019/09/18 22:00:03	29.0
145	2019/09/18 22:04:03	62.2
146	2019/09/18 22:08:03	30.2
147	2019/09/18 22:12:03	37.7

148	2019/09/18 22:16:03	34.1
149	2019/09/18 22:20:03	28.4
150	2019/09/18 22:24:03	39.6
151	2019/09/18 22:28:03	27.0
152	2019/09/18 22:32:03	32.5
153	2019/09/18 22:36:03	29.0
154	2019/09/18 22:40:03	30.2
155	2019/09/18 22:44:03	52.1
156	2019/09/18 22:48:03	29.9
157	2019/09/18 22:52:03	33.2
158	2019/09/18 22:56:03	29.7
159	2019/09/18 23:00:03	49.6
160	2019/09/18 23:04:03	46.3
161	2019/09/18 23:08:03	33.7
162	2019/09/18 23:12:03	29.7
163	2019/09/18 23:16:03	27.9
164	2019/09/18 23:20:03	41.8
165	2019/09/18 23:24:03	46.3
166	2019/09/18 23:28:03	42.3
167	2019/09/18 23:32:03	41.5
168	2019/09/18 23:36:03	56.8
169	2019/09/18 23:40:03	36.7
170	2019/09/18 23:44:03	47.9
171	2019/09/18 23:48:03	52.2
172	2019/09/18 23:52:03	47.2
173	2019/09/18 23:56:03	58.1
174	2019/09/19 00:00:03	32.2
175	2019/09/19 00:04:03	53.1
176	2019/09/19 00:08:03	39.0
177	2019/09/19 00:12:03	35.8
178	2019/09/19 00:16:03	35.4
179	2019/09/19 00:20:03	29.5
180	2019/09/19 00:24:03	47.7
181	2019/09/19 00:28:03	55.6
182	2019/09/19 00:32:03	56.1
183	2019/09/19 00:36:03	36.8
184	2019/09/19 00:40:03	48.3
185	2019/09/19 00:44:03	66.5
186	2019/09/19 00:48:03	44.3
187	2019/09/19 00:52:03	48.8
188	2019/09/19 00:56:03	62.8
189	2019/09/19 01:00:03	60.7
190	2019/09/19 01:04:03	54.8
191	2019/09/19 01:08:03	42.8
192	2019/09/19 01:12:03	44.0
193	2019/09/19 01:16:03	27.6
194	2019/09/19 01:20:03	27.9
195	2019/09/19 01:24:03	27.8
196	2019/09/19 01:28:03	28.0
197	2019/09/19 01:32:03	28.8
198	2019/09/19 01:36:03	29.4
199	2019/09/19 01:40:03	29.5
200	2019/09/19 01:44:03	28.3
201	2019/09/19 01:48:03	31.7

202	2019/09/19	01:52:03	37.5
203	2019/09/19	01:56:03	33.6
204	2019/09/19	02:00:03	42.3
205	2019/09/19	02:04:03	49.2
206	2019/09/19	02:08:03	34.4
207	2019/09/19	02:12:03	34.0
208	2019/09/19	02:16:03	36.7
209	2019/09/19	02:20:03	31.5
210	2019/09/19	02:24:03	49.0
211	2019/09/19	02:28:03	56.0
212	2019/09/19	02:32:03	54.0
213	2019/09/19	02:36:03	55.6
214	2019/09/19	02:40:03	49.7
215	2019/09/19	02:44:03	55.9
216	2019/09/19	02:48:03	46.4
217	2019/09/19	02:52:03	49.4
218	2019/09/19	02:56:03	50.9
219	2019/09/19	03:00:03	50.2
220	2019/09/19	03:04:03	48.3
221	2019/09/19	03:08:03	48.0
222	2019/09/19	03:12:03	49.4
223	2019/09/19	03:16:03	38.0
224	2019/09/19	03:20:03	55.3
225	2019/09/19	03:24:03	46.1
226	2019/09/19	03:28:03	30.0
227	2019/09/19	03:32:03	52.7
228	2019/09/19	03:36:03	44.3
229	2019/09/19	03:40:03	47.8
230	2019/09/19	03:44:03	35.7
231	2019/09/19	03:48:03	47.8
232	2019/09/19	03:52:03	57.3
233	2019/09/19	03:56:03	51.4
234	2019/09/19	04:00:03	46.2
235	2019/09/19	04:04:03	48.6
236	2019/09/19	04:08:03	40.2
237	2019/09/19	04:12:03	47.6
238	2019/09/19	04:16:03	30.8
239	2019/09/19	04:20:03	36.6
240	2019/09/19	04:24:03	43.5
241	2019/09/19	04:28:03	50.2
242	2019/09/19	04:32:03	46.7
243	2019/09/19	04:36:03	38.0
244	2019/09/19	04:40:03	34.4
245	2019/09/19	04:44:03	32.7
246	2019/09/19	04:48:03	39.4
247	2019/09/19	04:52:03	30.4
248	2019/09/19	04:56:03	39.0
249	2019/09/19	05:00:03	31.1
250	2019/09/19	05:04:03	30.2
251	2019/09/19	05:08:03	51.5
252	2019/09/19	05:12:03	64.8
253	2019/09/19	05:16:03	37.5
254	2019/09/19	05:20:03	36.4
255	2019/09/19	05:24:03	47.3

256	2019/09/19 05:28:03	40.8
257	2019/09/19 05:32:03	44.1
258	2019/09/19 05:36:03	48.2
259	2019/09/19 05:40:03	56.7
260	2019/09/19 05:44:03	59.3
261	2019/09/19 05:48:03	45.1
262	2019/09/19 05:52:03	52.3
263	2019/09/19 05:56:03	47.3
264	2019/09/19 06:00:03	35.2
265	2019/09/19 06:04:03	34.8
266	2019/09/19 06:08:03	34.1
267	2019/09/19 06:12:03	36.4
268	2019/09/19 06:16:03	30.4
269	2019/09/19 06:20:03	32.3
270	2019/09/19 06:24:03	32.6
271	2019/09/19 06:28:03	36.6
272	2019/09/19 06:32:03	46.1
273	2019/09/19 06:36:03	42.5
274	2019/09/19 06:40:03	37.8
275	2019/09/19 06:44:03	32.7
276	2019/09/19 06:48:03	31.1
277	2019/09/19 06:52:03	31.2
278	2019/09/19 06:56:03	31.5
279	2019/09/19 07:00:03	32.0
280	2019/09/19 07:04:03	35.1
281	2019/09/19 07:08:03	46.1
282	2019/09/19 07:12:03	37.7
283	2019/09/19 07:16:03	48.4
284	2019/09/19 07:20:03	36.0
285	2019/09/19 07:24:03	35.8
286	2019/09/19 07:28:03	48.0
287	2019/09/19 07:32:03	49.4
288	2019/09/19 07:36:03	41.3
289	2019/09/19 07:40:03	49.0
290	2019/09/19 07:44:03	40.3
291	2019/09/19 07:48:03	31.2
292	2019/09/19 07:52:03	32.5
293	2019/09/19 07:56:03	47.6
294	2019/09/19 08:00:03	40.9
295	2019/09/19 08:04:03	33.9
296	2019/09/19 08:08:03	32.0
297	2019/09/19 08:12:03	42.0
298	2019/09/19 08:16:03	41.1
299	2019/09/19 08:20:03	45.5
300	2019/09/19 08:24:03	38.8
301	2019/09/19 08:28:03	38.9
302	2019/09/19 08:32:03	32.3
303	2019/09/19 08:36:03	49.0
304	2019/09/19 08:40:03	45.3
305	2019/09/19 08:44:03	54.6
306	2019/09/19 08:48:03	39.0
307	2019/09/19 08:52:03	45.1
308	2019/09/19 08:56:03	44.7
309	2019/09/19 09:00:03	50.2

310	2019/09/19 09:04:03	49.3
311	2019/09/19 09:08:03	66.1
312	2019/09/19 09:12:03	55.9
313	2019/09/19 09:16:03	63.8
314	2019/09/19 09:20:03	65.7
315	2019/09/19 09:24:03	54.2
316	2019/09/19 09:28:03	50.3
317	2019/09/19 09:32:03	46.9
318	2019/09/19 09:36:03	57.4
319	2019/09/19 09:40:03	33.5
320	2019/09/19 09:44:03	45.9
321	2019/09/19 09:48:03	64.3
322	2019/09/19 09:52:03	48.3
323	2019/09/19 09:56:03	48.6
324	2019/09/19 10:00:03	54.2
325	2019/09/19 10:04:03	69.8
326	2019/09/19 10:08:03	51.7
327	2019/09/19 10:12:03	63.9
328	2019/09/19 10:16:03	47.4
329	2019/09/19 10:20:03	54.7
330	2019/09/19 10:24:03	44.2
331	2019/09/19 10:28:03	51.9
332	2019/09/19 10:32:03	44.0
333	2019/09/19 10:36:03	46.0
334	2019/09/19 10:40:03	50.9
335	2019/09/19 10:44:03	58.5
336	2019/09/19 10:48:03	43.5
337	2019/09/19 10:52:03	64.8
338	2019/09/19 10:56:03	53.7
339	2019/09/19 11:00:03	58.2
340	2019/09/19 11:04:03	46.4
341	2019/09/19 11:08:03	45.5
342	2019/09/19 11:12:03	66.5
343	2019/09/19 11:16:03	55.9
344	2019/09/19 11:20:03	60.1
345	2019/09/19 11:24:03	68.3
346	2019/09/19 11:28:03	60.6
347	2019/09/19 11:32:03	61.9
348	2019/09/19 11:36:03	57.5
349	2019/09/19 11:40:03	54.9
350	2019/09/19 11:44:03	65.1
351	2019/09/19 11:48:03	64.9
352	2019/09/19 11:52:03	56.6
353	2019/09/19 11:56:03	61.0
354	2019/09/19 12:00:03	59.1
355	2019/09/19 12:04:03	62.8
356	2019/09/19 12:08:03	58.3
357	2019/09/19 12:12:03	44.0
358	2019/09/19 12:16:03	59.7
359	2019/09/19 12:20:03	58.5
360	2019/09/19 12:24:03	59.3

LT2

Data Logger 2
SET 240
A
SLOW
Range 30-90
L05 56.5
L10 53.5
L50 42.0
L90 30.5
L95 29.9
Max dB 91.4
2019/09/19 09:59:42
SEL 119.3
Leq 70.0

No.s	Date Time	dB
1	2019/09/18 11:31:39	37.1
2	2019/09/18 11:35:39	32.0
3	2019/09/18 11:39:39	43.5
4	2019/09/18 11:43:39	40.7
5	2019/09/18 11:47:39	46.4
6	2019/09/18 11:51:39	33.1
7	2019/09/18 11:55:39	62.1
8	2019/09/18 11:59:39	33.7
9	2019/09/18 12:03:39	31.4
10	2019/09/18 12:07:39	31.5
11	2019/09/18 12:11:39	34.5
12	2019/09/18 12:15:39	39.6
13	2019/09/18 12:19:39	34.7
14	2019/09/18 12:23:39	47.3
15	2019/09/18 12:27:39	36.6
16	2019/09/18 12:31:39	39.3
17	2019/09/18 12:35:39	31.8
18	2019/09/18 12:39:39	48.4
19	2019/09/18 12:43:39	33.4
20	2019/09/18 12:47:39	34.6
21	2019/09/18 12:51:39	47.1
22	2019/09/18 12:55:39	53.3
23	2019/09/18 12:59:39	46.9
24	2019/09/18 13:03:39	48.0
25	2019/09/18 13:07:39	36.1
26	2019/09/18 13:11:39	61.0
27	2019/09/18 13:15:39	43.5
28	2019/09/18 13:19:39	41.2
29	2019/09/18 13:23:39	36.8
30	2019/09/18 13:27:39	40.3
31	2019/09/18 13:31:39	57.1
32	2019/09/18 13:35:39	50.5
33	2019/09/18 13:39:39	34.1
34	2019/09/18 13:43:39	50.4
35	2019/09/18 13:47:39	59.1
36	2019/09/18 13:51:39	46.9
37	2019/09/18 13:55:39	40.9
38	2019/09/18 13:59:39	52.9
39	2019/09/18 14:03:39	40.5

40	2019/09/18 14:07:39	48.8
41	2019/09/18 14:11:39	39.0
42	2019/09/18 14:15:39	44.6
43	2019/09/18 14:19:39	33.3
44	2019/09/18 14:23:39	51.1
45	2019/09/18 14:27:39	40.2
46	2019/09/18 14:31:39	46.4
47	2019/09/18 14:35:39	40.4
48	2019/09/18 14:39:39	47.2
49	2019/09/18 14:43:39	35.2
50	2019/09/18 14:47:39	44.6
51	2019/09/18 14:51:39	37.9
52	2019/09/18 14:55:39	35.5
53	2019/09/18 14:59:39	62.6
54	2019/09/18 15:03:39	37.6
55	2019/09/18 15:07:39	40.0
56	2019/09/18 15:11:39	39.9
57	2019/09/18 15:15:39	39.1
58	2019/09/18 15:19:39	53.4
59	2019/09/18 15:23:39	48.1
60	2019/09/18 15:27:39	41.1
61	2019/09/18 15:31:39	46.7
62	2019/09/18 15:35:39	45.2
63	2019/09/18 15:39:39	51.6
64	2019/09/18 15:43:39	51.2
65	2019/09/18 15:47:39	37.8
66	2019/09/18 15:51:39	37.9
67	2019/09/18 15:55:39	41.4
68	2019/09/18 15:59:39	46.1
69	2019/09/18 16:03:39	50.1
70	2019/09/18 16:07:39	46.3
71	2019/09/18 16:11:39	49.5
72	2019/09/18 16:15:39	46.3
73	2019/09/18 16:19:39	54.3
74	2019/09/18 16:23:39	50.4
75	2019/09/18 16:27:39	47.1
76	2019/09/18 16:31:39	48.9
77	2019/09/18 16:35:39	54.6
78	2019/09/18 16:39:39	52.1
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81	2019/09/18 16:51:39	57.3
82	2019/09/18 16:55:39	52.0
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84	2019/09/18 17:03:39	47.7
85	2019/09/18 17:07:39	54.4
86	2019/09/18 17:11:39	57.6
87	2019/09/18 17:15:39	44.3
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89	2019/09/18 17:23:39	48.6
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93	2019/09/18 17:39:39	47.1

94	2019/09/18 17:43:39	48.4
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103	2019/09/18 18:19:39	42.5
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157	2019/09/18 21:55:39	36.5
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182	2019/09/18 23:35:39	66.3
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192	2019/09/19 00:15:39	39.0
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194	2019/09/19 00:23:39	36.3
195	2019/09/19 00:27:39	30.0
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197	2019/09/19 00:35:39	36.1
198	2019/09/19 00:39:39	50.4
199	2019/09/19 00:43:39	46.0
200	2019/09/19 00:47:39	43.5
201	2019/09/19 00:51:39	58.4

202	2019/09/19 00:55:39	36.5
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212	2019/09/19 01:35:39	31.3
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215	2019/09/19 01:47:39	30.6
216	2019/09/19 01:51:39	38.6
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221	2019/09/19 02:11:39	30.1
222	2019/09/19 02:15:39	30.0
223	2019/09/19 02:19:39	29.4
224	2019/09/19 02:23:39	30.3
225	2019/09/19 02:27:39	29.4
226	2019/09/19 02:31:39	32.4
227	2019/09/19 02:35:39	30.0
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233	2019/09/19 02:59:39	33.3
234	2019/09/19 03:03:39	30.1
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236	2019/09/19 03:11:39	30.2
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253	2019/09/19 04:19:39	30.8
254	2019/09/19 04:23:39	30.8
255	2019/09/19 04:27:39	32.7

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258	2019/09/19	04:39:39	39.5
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262	2019/09/19	04:55:39	51.4
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268	2019/09/19	05:19:39	32.2
269	2019/09/19	05:23:39	31.5
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271	2019/09/19	05:31:39	34.7
272	2019/09/19	05:35:39	36.9
273	2019/09/19	05:39:39	33.0
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275	2019/09/19	05:47:39	31.1
276	2019/09/19	05:51:39	32.9
277	2019/09/19	05:55:39	34.9
278	2019/09/19	05:59:39	32.5
279	2019/09/19	06:03:39	41.0
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281	2019/09/19	06:11:39	64.1
282	2019/09/19	06:15:39	33.5
283	2019/09/19	06:19:39	62.8
284	2019/09/19	06:23:39	48.3
285	2019/09/19	06:27:39	51.8
286	2019/09/19	06:31:39	33.8
287	2019/09/19	06:35:39	34.9
288	2019/09/19	06:39:39	36.3
289	2019/09/19	06:43:39	35.5
290	2019/09/19	06:47:39	49.5
291	2019/09/19	06:51:39	36.5
292	2019/09/19	06:55:39	52.6
293	2019/09/19	06:59:39	46.7
294	2019/09/19	07:03:39	33.5
295	2019/09/19	07:07:39	34.1
296	2019/09/19	07:11:39	33.0
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299	2019/09/19	07:23:39	39.1
300	2019/09/19	07:27:39	48.1
301	2019/09/19	07:31:39	35.4
302	2019/09/19	07:35:39	32.5
303	2019/09/19	07:39:39	44.0
304	2019/09/19	07:43:39	33.3
305	2019/09/19	07:47:39	70.5
306	2019/09/19	07:51:39	32.0
307	2019/09/19	07:55:39	54.8
308	2019/09/19	07:59:39	50.4
309	2019/09/19	08:03:39	33.0

310	2019/09/19 08:07:39	38.5
311	2019/09/19 08:11:39	34.0
312	2019/09/19 08:15:39	35.7
313	2019/09/19 08:19:39	33.0
314	2019/09/19 08:23:39	64.7
315	2019/09/19 08:27:39	32.3
316	2019/09/19 08:31:39	33.8
317	2019/09/19 08:35:39	49.6
318	2019/09/19 08:39:39	53.2
319	2019/09/19 08:43:39	64.1
320	2019/09/19 08:47:39	51.4
321	2019/09/19 08:51:39	53.2
322	2019/09/19 08:55:39	52.3
323	2019/09/19 08:59:39	48.8
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327	2019/09/19 09:15:39	44.5
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330	2019/09/19 09:27:39	34.2
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333	2019/09/19 09:39:39	49.7
334	2019/09/19 09:43:39	60.9
335	2019/09/19 09:47:39	39.9
336	2019/09/19 09:51:39	39.3
337	2019/09/19 09:55:39	67.0
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339	2019/09/19 10:03:39	41.1
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341	2019/09/19 10:11:39	49.9
342	2019/09/19 10:15:39	46.8
343	2019/09/19 10:19:39	50.8
344	2019/09/19 10:23:39	42.0
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346	2019/09/19 10:31:39	46.7
347	2019/09/19 10:35:39	41.9
348	2019/09/19 10:39:39	55.8
349	2019/09/19 10:43:39	51.2
350	2019/09/19 10:47:39	53.7
351	2019/09/19 10:51:39	53.8
352	2019/09/19 10:55:39	49.2
353	2019/09/19 10:59:39	50.0
354	2019/09/19 11:03:39	50.7
355	2019/09/19 11:07:39	39.5
356	2019/09/19 11:11:39	45.2
357	2019/09/19 11:15:39	50.6
358	2019/09/19 11:19:39	58.5
359	2019/09/19 11:23:39	52.7
360	2019/09/19 11:27:39	44.4

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 30-90
- Max dB : 73.2 - 2019/09/18 12:36:28
- Level Range : 30-90
- SEL : 80.7
- Leq : 51.2
-

ST1

No.s	Date Time	(dB)
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3	2019/09/18 12:31:06	28.9
4	2019/09/18 12:31:09	41.3
5	2019/09/18 12:31:12	37.4
6	2019/09/18 12:31:15	33.1
7	2019/09/18 12:31:18	28.3
8	2019/09/18 12:31:21	30.6
9	2019/09/18 12:31:24	29.8
10	2019/09/18 12:31:27	32.7
11	2019/09/18 12:31:30	33.7
12	2019/09/18 12:31:33	31.3
13	2019/09/18 12:31:36	35.3
14	2019/09/18 12:31:39	34.6
15	2019/09/18 12:31:42	37.3
16	2019/09/18 12:31:45	30.3
17	2019/09/18 12:31:48	27.3
18	2019/09/18 12:31:51	30.4
19	2019/09/18 12:31:54	28.7
20	2019/09/18 12:31:57	28.7
21	2019/09/18 12:32:00	26.8
22	2019/09/18 12:32:03	41.3
23	2019/09/18 12:32:06	30.3
24	2019/09/18 12:32:09	31.4
25	2019/09/18 12:32:12	27.7
26	2019/09/18 12:32:15	34.9
27	2019/09/18 12:32:18	38.1
28	2019/09/18 12:32:21	27.9
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31	2019/09/18 12:32:30	30.1
32	2019/09/18 12:32:33	33.0
33	2019/09/18 12:32:36	31.8
34	2019/09/18 12:32:39	27.0
35	2019/09/18 12:32:42	38.2
36	2019/09/18 12:32:45	40.5
37	2019/09/18 12:32:48	30.3
38	2019/09/18 12:32:51	39.9
39	2019/09/18 12:32:54	33.6
40	2019/09/18 12:32:57	29.2
41	2019/09/18 12:33:00	25.3
42	2019/09/18 12:33:03	32.3
43	2019/09/18 12:33:06	27.5
44	2019/09/18 12:33:09	25.7
45	2019/09/18 12:33:12	31.2
46	2019/09/18 12:33:15	32.1
47	2019/09/18 12:33:18	27.5
48	2019/09/18 12:33:21	34.0
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59	2019/09/18 12:33:54	32.0
60	2019/09/18 12:33:57	34.1
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66	2019/09/18 12:34:15	54.2
67	2019/09/18 12:34:18	46.7
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69	2019/09/18 12:34:24	45.0
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73	2019/09/18 12:34:36	27.4
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75	2019/09/18 12:34:42	24.8
76	2019/09/18 12:34:45	26.4
77	2019/09/18 12:34:48	25.3
78	2019/09/18 12:34:51	27.7
79	2019/09/18 12:34:54	37.5
80	2019/09/18 12:34:57	33.2
81	2019/09/18 12:35:00	28.2
82	2019/09/18 12:35:03	27.7
83	2019/09/18 12:35:06	40.6
84	2019/09/18 12:35:09	29.8
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100	2019/09/18	12:35:57	28.8
101	2019/09/18	12:36:00	31.6
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110	2019/09/18	12:36:27	69.7
111	2019/09/18	12:36:30	60.6
112	2019/09/18	12:36:33	51.3
113	2019/09/18	12:36:36	44.2
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120	2019/09/18	12:36:57	33.8
121	2019/09/18	12:37:00	29.4
122	2019/09/18	12:37:03	34.0
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124	2019/09/18	12:37:09	34.2
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126	2019/09/18	12:37:15	34.5
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132	2019/09/18	12:37:33	32.1
133	2019/09/18	12:37:36	36.0
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135	2019/09/18	12:37:42	33.4
136	2019/09/18	12:37:45	33.0
137	2019/09/18	12:37:48	29.7
138	2019/09/18	12:37:51	28.6
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142	2019/09/18	12:38:03	26.9
143	2019/09/18	12:38:06	26.7
144	2019/09/18	12:38:09	26.4
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148	2019/09/18	12:38:21	28.4
149	2019/09/18	12:38:24	27.3
150	2019/09/18	12:38:27	29.2
151	2019/09/18	12:38:30	29.6
152	2019/09/18	12:38:33	27.2
153	2019/09/18	12:38:36	24.9
154	2019/09/18	12:38:39	27.4
155	2019/09/18	12:38:42	28.4
156	2019/09/18	12:38:45	31.7
157	2019/09/18	12:38:48	29.7
158	2019/09/18	12:38:51	34.0
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160	2019/09/18	12:38:57	26.1
161	2019/09/18	12:39:00	26.0
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163	2019/09/18	12:39:06	24.7
164	2019/09/18	12:39:09	25.7
165	2019/09/18	12:39:12	28.4
166	2019/09/18	12:39:15	27.0
167	2019/09/18	12:39:18	25.6
168	2019/09/18	12:39:21	27.1
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170	2019/09/18	12:39:27	25.1
171	2019/09/18	12:39:30	24.9
172	2019/09/18	12:39:33	30.8
173	2019/09/18	12:39:36	30.9
174	2019/09/18	12:39:39	26.1
175	2019/09/18	12:39:42	24.8
176	2019/09/18	12:39:45	24.8
177	2019/09/18	12:39:48	26.7
178	2019/09/18	12:39:51	27.0
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180	2019/09/18	12:39:57	34.6
181	2019/09/18	12:40:00	39.4
182	2019/09/18	12:40:03	41.5
183	2019/09/18	12:40:06	45.5
184	2019/09/18	12:40:09	48.2

185	2019/09/18	12:40:12	44.2
186	2019/09/18	12:40:15	45.7
187	2019/09/18	12:40:18	37.8
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191	2019/09/18	12:40:30	29.4
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193	2019/09/18	12:40:36	26.2
194	2019/09/18	12:40:39	24.8
195	2019/09/18	12:40:42	27.9
196	2019/09/18	12:40:45	26.5
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204	2019/09/18	12:41:09	26.7
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240	2019/09/18	12:42:57	38.5
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252	2019/09/18	12:43:33	45.5
253	2019/09/18	12:43:36	44.8
254	2019/09/18	12:43:39	41.7
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282	2019/09/18	12:45:03	41.3
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299	2019/09/18	12:45:54	36.2
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ST2

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 30-90
- Max dB : 71.4 - 2019/09/18 11:37:49
- Level Range : 30-90
- SEL : 81.9
- Leq : 52.4
-

No.s	Date Time	(dB)
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2	2019/09/18 11:32:16	42.5
3	2019/09/18 11:32:19	33.4
4	2019/09/18 11:32:22	27.5
5	2019/09/18 11:32:25	26.6
6	2019/09/18 11:32:28	26.4
7	2019/09/18 11:32:31	30.0
8	2019/09/18 11:32:34	32.6
9	2019/09/18 11:32:37	28.0
10	2019/09/18 11:32:40	28.4
11	2019/09/18 11:32:43	27.0
12	2019/09/18 11:32:46	27.3
13	2019/09/18 11:32:49	45.6
14	2019/09/18 11:32:52	35.7
15	2019/09/18 11:32:55	28.9
16	2019/09/18 11:32:58	31.3
17	2019/09/18 11:33:01	35.4
18	2019/09/18 11:33:04	39.0
19	2019/09/18 11:33:07	42.5
20	2019/09/18 11:33:10	38.3
21	2019/09/18 11:33:13	30.8
22	2019/09/18 11:33:16	38.6
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24	2019/09/18 11:33:22	27.6
25	2019/09/18 11:33:25	27.8
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29	2019/09/18 11:33:37	27.2
30	2019/09/18 11:33:40	26.8
31	2019/09/18 11:33:43	27.9
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277	2019/09/18	11:46:01	35.9
278	2019/09/18	11:46:04	41.1
279	2019/09/18	11:46:07	42.7
280	2019/09/18	11:46:10	42.6
281	2019/09/18	11:46:13	47.1
282	2019/09/18	11:46:16	43.8
283	2019/09/18	11:46:19	46.8

284	2019/09/18	11:46:22	42.9
285	2019/09/18	11:46:25	41.5
286	2019/09/18	11:46:28	43.0
287	2019/09/18	11:46:31	45.0
288	2019/09/18	11:46:34	39.7
289	2019/09/18	11:46:37	41.8
290	2019/09/18	11:46:40	43.9
291	2019/09/18	11:46:43	46.4
292	2019/09/18	11:46:46	50.2
293	2019/09/18	11:46:49	57.3
294	2019/09/18	11:46:52	65.3
295	2019/09/18	11:46:55	64.7
296	2019/09/18	11:46:58	63.7
297	2019/09/18	11:47:01	57.1
298	2019/09/18	11:47:04	55.6
299	2019/09/18	11:47:07	55.5
300	2019/09/18	11:47:10	55.8

ST3

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 30-90
- Max dB : 75.5 - 2019/09/18 13:46:06
- Level Range : 30-90
- SEL : 84.2
- Leq : 54.7
-

No.s	Date Time	(dB)
1	2019/09/18 13:43:23	49.6
2	2019/09/18 13:43:26	48.9
3	2019/09/18 13:43:29	54.5
4	2019/09/18 13:43:32	53.2
5	2019/09/18 13:43:35	51.6
6	2019/09/18 13:43:38	45.5
7	2019/09/18 13:43:41	46.0
8	2019/09/18 13:43:44	42.4
9	2019/09/18 13:43:47	43.0
10	2019/09/18 13:43:50	57.8
11	2019/09/18 13:43:53	50.6
12	2019/09/18 13:43:56	53.0
13	2019/09/18 13:43:59	58.1
14	2019/09/18 13:44:02	60.3
15	2019/09/18 13:44:05	52.2
16	2019/09/18 13:44:08	54.9
17	2019/09/18 13:44:11	53.1
18	2019/09/18 13:44:14	52.0
19	2019/09/18 13:44:17	56.4
20	2019/09/18 13:44:20	54.2
21	2019/09/18 13:44:23	48.0
22	2019/09/18 13:44:26	49.8
23	2019/09/18 13:44:29	47.5
24	2019/09/18 13:44:32	40.7
25	2019/09/18 13:44:35	51.4
26	2019/09/18 13:44:38	51.4
27	2019/09/18 13:44:41	51.5
28	2019/09/18 13:44:44	41.5
29	2019/09/18 13:44:47	38.0
30	2019/09/18 13:44:50	39.6
31	2019/09/18 13:44:53	49.7
32	2019/09/18 13:44:56	40.8
33	2019/09/18 13:44:59	43.7
34	2019/09/18 13:45:02	44.9
35	2019/09/18 13:45:05	48.5
36	2019/09/18 13:45:08	54.3
37	2019/09/18 13:45:11	54.5
38	2019/09/18 13:45:14	51.4
39	2019/09/18 13:45:17	51.9
40	2019/09/18 13:45:20	49.3
41	2019/09/18 13:45:23	43.6
42	2019/09/18 13:45:26	38.0
43	2019/09/18 13:45:29	54.2
44	2019/09/18 13:45:32	52.1
45	2019/09/18 13:45:35	48.7
46	2019/09/18 13:45:38	51.0
47	2019/09/18 13:45:41	45.3
48	2019/09/18 13:45:44	52.8
49	2019/09/18 13:45:47	51.7
50	2019/09/18 13:45:50	50.7
51	2019/09/18 13:45:53	47.8
52	2019/09/18 13:45:56	51.4
53	2019/09/18 13:45:59	50.2
54	2019/09/18 13:46:02	63.0
55	2019/09/18 13:46:05	72.2
56	2019/09/18 13:46:08	60.4
57	2019/09/18 13:46:11	53.2
58	2019/09/18 13:46:14	55.8
59	2019/09/18 13:46:17	53.1
60	2019/09/18 13:46:20	60.7
61	2019/09/18 13:46:23	55.6
62	2019/09/18 13:46:26	52.7
63	2019/09/18 13:46:29	53.2
64	2019/09/18 13:46:32	51.1
65	2019/09/18 13:46:35	52.1
66	2019/09/18 13:46:38	50.1
67	2019/09/18 13:46:41	46.0
68	2019/09/18 13:46:44	41.6
69	2019/09/18 13:46:47	41.4
70	2019/09/18 13:46:50	47.4
71	2019/09/18 13:46:53	58.7
72	2019/09/18 13:46:56	55.6
73	2019/09/18 13:46:59	53.9
74	2019/09/18 13:47:02	55.2
75	2019/09/18 13:47:05	53.8
76	2019/09/18 13:47:08	54.1
77	2019/09/18 13:47:11	53.5
78	2019/09/18 13:47:14	54.4
79	2019/09/18 13:47:17	54.3
80	2019/09/18 13:47:20	53.1
81	2019/09/18 13:47:23	57.5
82	2019/09/18 13:47:26	53.8
83	2019/09/18 13:47:29	46.7
84	2019/09/18 13:47:32	47.8
85	2019/09/18 13:47:35	41.7

86	2019/09/18	13:47:38	39.7
87	2019/09/18	13:47:41	41.1
88	2019/09/18	13:47:44	42.6
89	2019/09/18	13:47:47	51.0
90	2019/09/18	13:47:50	46.8
91	2019/09/18	13:47:53	56.4
92	2019/09/18	13:47:56	48.3
93	2019/09/18	13:47:59	49.0
94	2019/09/18	13:48:02	51.9
95	2019/09/18	13:48:05	46.9
96	2019/09/18	13:48:08	53.4
97	2019/09/18	13:48:11	48.1
98	2019/09/18	13:48:14	41.3
99	2019/09/18	13:48:17	53.3
100	2019/09/18	13:48:20	51.3
101	2019/09/18	13:48:23	48.2
102	2019/09/18	13:48:26	50.7
103	2019/09/18	13:48:29	44.1
104	2019/09/18	13:48:32	47.1
105	2019/09/18	13:48:35	48.1
106	2019/09/18	13:48:38	41.4
107	2019/09/18	13:48:41	42.3
108	2019/09/18	13:48:44	41.2
109	2019/09/18	13:48:47	54.1
110	2019/09/18	13:48:50	53.6
111	2019/09/18	13:48:53	52.8
112	2019/09/18	13:48:56	57.6
113	2019/09/18	13:48:59	54.9
114	2019/09/18	13:49:02	47.7
115	2019/09/18	13:49:05	58.5
116	2019/09/18	13:49:08	53.3
117	2019/09/18	13:49:11	47.5
118	2019/09/18	13:49:14	50.8
119	2019/09/18	13:49:17	46.8
120	2019/09/18	13:49:20	45.6
121	2019/09/18	13:49:23	47.5
122	2019/09/18	13:49:26	53.3
123	2019/09/18	13:49:29	53.4
124	2019/09/18	13:49:32	60.3
125	2019/09/18	13:49:35	60.3
126	2019/09/18	13:49:38	67.9
127	2019/09/18	13:49:41	57.6
128	2019/09/18	13:49:44	62.7
129	2019/09/18	13:49:47	55.2
130	2019/09/18	13:49:50	57.2
131	2019/09/18	13:49:53	52.9
132	2019/09/18	13:49:56	47.8
133	2019/09/18	13:49:59	46.9
134	2019/09/18	13:50:02	47.2
135	2019/09/18	13:50:05	48.1
136	2019/09/18	13:50:08	41.5
137	2019/09/18	13:50:11	55.7
138	2019/09/18	13:50:14	52.9
139	2019/09/18	13:50:17	44.9
140	2019/09/18	13:50:20	50.6
141	2019/09/18	13:50:23	45.7
142	2019/09/18	13:50:26	41.2
143	2019/09/18	13:50:29	40.8
144	2019/09/18	13:50:32	47.0
145	2019/09/18	13:50:35	49.5
146	2019/09/18	13:50:38	43.0
147	2019/09/18	13:50:41	40.4
148	2019/09/18	13:50:44	49.1
149	2019/09/18	13:50:47	44.0
150	2019/09/18	13:50:50	43.7
151	2019/09/18	13:50:53	48.8
152	2019/09/18	13:50:56	50.2
153	2019/09/18	13:50:59	45.3
154	2019/09/18	13:51:02	42.8
155	2019/09/18	13:51:05	46.2
156	2019/09/18	13:51:08	47.7
157	2019/09/18	13:51:11	51.0
158	2019/09/18	13:51:14	49.2
159	2019/09/18	13:51:17	49.0
160	2019/09/18	13:51:20	52.0
161	2019/09/18	13:51:23	44.9
162	2019/09/18	13:51:26	51.2
163	2019/09/18	13:51:29	51.3
164	2019/09/18	13:51:32	48.5
165	2019/09/18	13:51:35	46.1
166	2019/09/18	13:51:38	47.6
167	2019/09/18	13:51:41	46.0
168	2019/09/18	13:51:44	47.0
169	2019/09/18	13:51:47	39.2
170	2019/09/18	13:51:50	38.8
171	2019/09/18	13:51:53	42.4
172	2019/09/18	13:51:56	48.7
173	2019/09/18	13:51:59	41.8
174	2019/09/18	13:52:02	38.9
175	2019/09/18	13:52:05	38.5
176	2019/09/18	13:52:08	35.7
177	2019/09/18	13:52:11	34.9
178	2019/09/18	13:52:14	49.7
179	2019/09/18	13:52:17	41.9
180	2019/09/18	13:52:20	42.4
181	2019/09/18	13:52:23	57.0
182	2019/09/18	13:52:26	48.0
183	2019/09/18	13:52:29	49.0
184	2019/09/18	13:52:32	46.9

185	2019/09/18	13:52:35	45.2
186	2019/09/18	13:52:38	42.8
187	2019/09/18	13:52:41	43.0
188	2019/09/18	13:52:44	39.8
189	2019/09/18	13:52:47	39.3
190	2019/09/18	13:52:50	40.7
191	2019/09/18	13:52:53	49.1
192	2019/09/18	13:52:56	49.2
193	2019/09/18	13:52:59	43.9
194	2019/09/18	13:53:02	58.6
195	2019/09/18	13:53:05	49.0
196	2019/09/18	13:53:08	54.9
197	2019/09/18	13:53:11	52.1
198	2019/09/18	13:53:14	56.9
199	2019/09/18	13:53:17	56.2
200	2019/09/18	13:53:20	49.6
201	2019/09/18	13:53:23	49.5
202	2019/09/18	13:53:26	42.6
203	2019/09/18	13:53:29	54.6
204	2019/09/18	13:53:32	47.7
205	2019/09/18	13:53:35	50.3
206	2019/09/18	13:53:38	48.7
207	2019/09/18	13:53:41	43.1
208	2019/09/18	13:53:44	53.3
209	2019/09/18	13:53:47	54.8
210	2019/09/18	13:53:50	56.2
211	2019/09/18	13:53:53	51.3
212	2019/09/18	13:53:56	50.0
213	2019/09/18	13:53:59	49.5
214	2019/09/18	13:54:02	50.1
215	2019/09/18	13:54:05	44.8
216	2019/09/18	13:54:08	42.0
217	2019/09/18	13:54:11	51.6
218	2019/09/18	13:54:14	57.6
219	2019/09/18	13:54:17	58.4
220	2019/09/18	13:54:20	48.1
221	2019/09/18	13:54:23	54.4
222	2019/09/18	13:54:26	53.4
223	2019/09/18	13:54:29	45.6
224	2019/09/18	13:54:32	50.6
225	2019/09/18	13:54:35	42.8
226	2019/09/18	13:54:38	40.6
227	2019/09/18	13:54:41	42.8
228	2019/09/18	13:54:44	46.8
229	2019/09/18	13:54:47	38.2
230	2019/09/18	13:54:50	39.4
231	2019/09/18	13:54:53	38.2
232	2019/09/18	13:54:56	40.6
233	2019/09/18	13:54:59	49.0
234	2019/09/18	13:55:02	54.6
235	2019/09/18	13:55:05	54.3
236	2019/09/18	13:55:08	48.4
237	2019/09/18	13:55:11	43.8
238	2019/09/18	13:55:14	42.0
239	2019/09/18	13:55:17	55.9
240	2019/09/18	13:55:20	60.1
241	2019/09/18	13:55:23	56.2
242	2019/09/18	13:55:26	58.8
243	2019/09/18	13:55:29	60.1
244	2019/09/18	13:55:32	53.5
245	2019/09/18	13:55:35	48.4
246	2019/09/18	13:55:38	61.3
247	2019/09/18	13:55:41	53.4
248	2019/09/18	13:55:44	58.6
249	2019/09/18	13:55:47	51.9
250	2019/09/18	13:55:50	47.4
251	2019/09/18	13:55:53	43.8
252	2019/09/18	13:55:56	52.3
253	2019/09/18	13:55:59	47.4
254	2019/09/18	13:56:02	46.6
255	2019/09/18	13:56:05	46.9
256	2019/09/18	13:56:08	47.4
257	2019/09/18	13:56:11	48.6
258	2019/09/18	13:56:14	46.6
259	2019/09/18	13:56:17	54.5
260	2019/09/18	13:56:20	61.4
261	2019/09/18	13:56:23	61.7
262	2019/09/18	13:56:26	56.7
263	2019/09/18	13:56:29	56.2
264	2019/09/18	13:56:32	57.4
265	2019/09/18	13:56:35	55.2
266	2019/09/18	13:56:38	56.1
267	2019/09/18	13:56:41	54.6
268	2019/09/18	13:56:44	46.9
269	2019/09/18	13:56:47	45.1
270	2019/09/18	13:56:50	41.3
271	2019/09/18	13:56:53	41.9
272	2019/09/18	13:56:56	51.9
273	2019/09/18	13:56:59	53.1
274	2019/09/18	13:57:02	54.8
275	2019/09/18	13:57:05	60.1
276	2019/09/18	13:57:08	51.4
277	2019/09/18	13:57:11	57.4
278	2019/09/18	13:57:14	53.9
279	2019/09/18	13:57:17	44.4
280	2019/09/18	13:57:20	57.2
281	2019/09/18	13:57:23	55.2
282	2019/09/18	13:57:26	51.3
283	2019/09/18	13:57:29	45.6

284	2019/09/18	13:57:32	53.2
285	2019/09/18	13:57:35	51.0
286	2019/09/18	13:57:38	46.8
287	2019/09/18	13:57:41	51.5
288	2019/09/18	13:57:44	51.4
289	2019/09/18	13:57:47	48.5
290	2019/09/18	13:57:50	50.0
291	2019/09/18	13:57:53	42.9
292	2019/09/18	13:57:56	39.6
293	2019/09/18	13:57:59	40.7
294	2019/09/18	13:58:02	49.9
295	2019/09/18	13:58:05	59.0
296	2019/09/18	13:58:08	58.4
297	2019/09/18	13:58:11	57.8
298	2019/09/18	13:58:14	57.1
299	2019/09/18	13:58:17	56.2
300	2019/09/18	13:58:20	55.8

ST4

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 30-90
- Max dB : 86.8 - 2019/09/18 13:06:01
- Level Range : 30-90
- SEL : 92.3
- Leq : 62.8
-

No.s	Date Time	(dB)
1	2019/09/18 13:01:59	57.4
2	2019/09/18 13:02:02	59.1
3	2019/09/18 13:02:05	55.3
4	2019/09/18 13:02:08	54.7
5	2019/09/18 13:02:11	50.7
6	2019/09/18 13:02:14	50.9
7	2019/09/18 13:02:17	50.5
8	2019/09/18 13:02:20	51.4
9	2019/09/18 13:02:23	51.3
10	2019/09/18 13:02:26	55.4
11	2019/09/18 13:02:29	55.4
12	2019/09/18 13:02:32	56.7
13	2019/09/18 13:02:35	52.0
14	2019/09/18 13:02:38	48.2
15	2019/09/18 13:02:41	48.1
16	2019/09/18 13:02:44	51.9
17	2019/09/18 13:02:47	49.2
18	2019/09/18 13:02:50	49.4
19	2019/09/18 13:02:53	54.8
20	2019/09/18 13:02:56	57.0
21	2019/09/18 13:02:59	53.1
22	2019/09/18 13:03:02	51.6
23	2019/09/18 13:03:05	57.8
24	2019/09/18 13:03:08	57.0
25	2019/09/18 13:03:11	55.4
26	2019/09/18 13:03:14	59.0
27	2019/09/18 13:03:17	52.5
28	2019/09/18 13:03:20	47.4
29	2019/09/18 13:03:23	48.6
30	2019/09/18 13:03:26	51.5
31	2019/09/18 13:03:29	50.8
32	2019/09/18 13:03:32	49.0
33	2019/09/18 13:03:35	48.5
34	2019/09/18 13:03:38	52.9
35	2019/09/18 13:03:41	52.7
36	2019/09/18 13:03:44	52.3
37	2019/09/18 13:03:47	50.3
38	2019/09/18 13:03:50	46.4
39	2019/09/18 13:03:53	49.2
40	2019/09/18 13:03:56	47.3
41	2019/09/18 13:03:59	43.7
42	2019/09/18 13:04:02	48.1
43	2019/09/18 13:04:05	45.0
44	2019/09/18 13:04:08	46.8
45	2019/09/18 13:04:11	48.0
46	2019/09/18 13:04:14	52.2
47	2019/09/18 13:04:17	47.5
48	2019/09/18 13:04:20	52.8
49	2019/09/18 13:04:23	51.9
50	2019/09/18 13:04:26	54.0
51	2019/09/18 13:04:29	55.7
52	2019/09/18 13:04:32	53.5
53	2019/09/18 13:04:35	53.0
54	2019/09/18 13:04:38	52.9
55	2019/09/18 13:04:41	56.1
56	2019/09/18 13:04:44	54.0
57	2019/09/18 13:04:47	48.5
58	2019/09/18 13:04:50	50.4
59	2019/09/18 13:04:53	52.1
60	2019/09/18 13:04:56	50.2
61	2019/09/18 13:04:59	48.9
62	2019/09/18 13:05:02	53.3
63	2019/09/18 13:05:05	49.2
64	2019/09/18 13:05:08	51.9
65	2019/09/18 13:05:11	55.3
66	2019/09/18 13:05:14	55.9
67	2019/09/18 13:05:17	56.7
68	2019/09/18 13:05:20	54.2
69	2019/09/18 13:05:23	53.9
70	2019/09/18 13:05:26	50.8
71	2019/09/18 13:05:29	48.0
72	2019/09/18 13:05:32	51.2
73	2019/09/18 13:05:35	47.8
74	2019/09/18 13:05:38	51.5
75	2019/09/18 13:05:41	51.9
76	2019/09/18 13:05:44	61.2
77	2019/09/18 13:05:47	75.0
78	2019/09/18 13:05:50	63.0
79	2019/09/18 13:05:53	56.5
80	2019/09/18 13:05:56	63.2
81	2019/09/18 13:05:59	86.7
82	2019/09/18 13:06:02	75.2
83	2019/09/18 13:06:05	63.0
84	2019/09/18 13:06:08	55.6
85	2019/09/18 13:06:11	52.9

86	2019/09/18	13:06:14	53.4
87	2019/09/18	13:06:17	54.0
88	2019/09/18	13:06:20	52.5
89	2019/09/18	13:06:23	53.6
90	2019/09/18	13:06:26	52.3
91	2019/09/18	13:06:29	50.3
92	2019/09/18	13:06:32	46.8
93	2019/09/18	13:06:35	41.1
94	2019/09/18	13:06:38	42.5
95	2019/09/18	13:06:41	39.7
96	2019/09/18	13:06:44	37.9
97	2019/09/18	13:06:47	47.9
98	2019/09/18	13:06:50	47.1
99	2019/09/18	13:06:53	44.5
100	2019/09/18	13:06:56	39.8
101	2019/09/18	13:06:59	45.4
102	2019/09/18	13:07:02	40.5
103	2019/09/18	13:07:05	38.8
104	2019/09/18	13:07:08	45.5
105	2019/09/18	13:07:11	46.7
106	2019/09/18	13:07:14	46.1
107	2019/09/18	13:07:17	53.0
108	2019/09/18	13:07:20	51.4
109	2019/09/18	13:07:23	51.9
110	2019/09/18	13:07:26	47.7
111	2019/09/18	13:07:29	44.7
112	2019/09/18	13:07:32	43.9
113	2019/09/18	13:07:35	49.3
114	2019/09/18	13:07:38	52.8
115	2019/09/18	13:07:41	53.6
116	2019/09/18	13:07:44	61.7
117	2019/09/18	13:07:47	54.4
118	2019/09/18	13:07:50	50.0
119	2019/09/18	13:07:53	52.5
120	2019/09/18	13:07:56	51.8
121	2019/09/18	13:07:59	55.3
122	2019/09/18	13:08:02	58.6
123	2019/09/18	13:08:05	55.4
124	2019/09/18	13:08:08	52.3
125	2019/09/18	13:08:11	57.9
126	2019/09/18	13:08:14	79.4
127	2019/09/18	13:08:17	67.2
128	2019/09/18	13:08:20	56.7
129	2019/09/18	13:08:23	49.8
130	2019/09/18	13:08:26	56.2
131	2019/09/18	13:08:29	55.1
132	2019/09/18	13:08:32	55.0
133	2019/09/18	13:08:35	50.7
134	2019/09/18	13:08:38	55.0
135	2019/09/18	13:08:41	55.8
136	2019/09/18	13:08:44	51.1
137	2019/09/18	13:08:47	47.9
138	2019/09/18	13:08:50	49.6
139	2019/09/18	13:08:53	44.6
140	2019/09/18	13:08:56	42.1
141	2019/09/18	13:08:59	46.5
142	2019/09/18	13:09:02	46.2
143	2019/09/18	13:09:05	46.2
144	2019/09/18	13:09:08	52.3
145	2019/09/18	13:09:11	52.2
146	2019/09/18	13:09:14	56.8
147	2019/09/18	13:09:17	57.8
148	2019/09/18	13:09:20	50.9
149	2019/09/18	13:09:23	51.5
150	2019/09/18	13:09:26	46.1
151	2019/09/18	13:09:29	49.1
152	2019/09/18	13:09:32	48.6
153	2019/09/18	13:09:35	53.2
154	2019/09/18	13:09:38	51.2
155	2019/09/18	13:09:41	50.9
156	2019/09/18	13:09:44	54.6
157	2019/09/18	13:09:47	53.8
158	2019/09/18	13:09:50	52.4
159	2019/09/18	13:09:53	48.1
160	2019/09/18	13:09:56	70.1
161	2019/09/18	13:09:59	65.1
162	2019/09/18	13:10:02	54.8
163	2019/09/18	13:10:05	46.7
164	2019/09/18	13:10:08	47.1
165	2019/09/18	13:10:11	75.5
166	2019/09/18	13:10:14	66.7
167	2019/09/18	13:10:17	57.2
168	2019/09/18	13:10:20	58.6
169	2019/09/18	13:10:23	54.4
170	2019/09/18	13:10:26	52.0
171	2019/09/18	13:10:29	53.4
172	2019/09/18	13:10:32	58.9
173	2019/09/18	13:10:35	55.5
174	2019/09/18	13:10:38	54.8
175	2019/09/18	13:10:41	53.6
176	2019/09/18	13:10:44	50.6
177	2019/09/18	13:10:47	50.7
178	2019/09/18	13:10:50	53.0
179	2019/09/18	13:10:53	50.8
180	2019/09/18	13:10:56	50.2
181	2019/09/18	13:10:59	47.5
182	2019/09/18	13:11:02	46.9
183	2019/09/18	13:11:05	48.6
184	2019/09/18	13:11:08	53.9

185	2019/09/18	13:11:11	54.7
186	2019/09/18	13:11:14	54.1
187	2019/09/18	13:11:17	51.5
188	2019/09/18	13:11:20	53.4
189	2019/09/18	13:11:23	57.2
190	2019/09/18	13:11:26	55.5
191	2019/09/18	13:11:29	53.6
192	2019/09/18	13:11:32	57.0
193	2019/09/18	13:11:35	56.1
194	2019/09/18	13:11:38	52.5
195	2019/09/18	13:11:41	53.3
196	2019/09/18	13:11:44	51.1
197	2019/09/18	13:11:47	53.4
198	2019/09/18	13:11:50	70.7
199	2019/09/18	13:11:53	69.3
200	2019/09/18	13:11:56	57.3
201	2019/09/18	13:11:59	48.5
202	2019/09/18	13:12:02	47.3
203	2019/09/18	13:12:05	52.0
204	2019/09/18	13:12:08	50.5
205	2019/09/18	13:12:11	52.7
206	2019/09/18	13:12:14	53.4
207	2019/09/18	13:12:17	53.0
208	2019/09/18	13:12:20	48.2
209	2019/09/18	13:12:23	45.8
210	2019/09/18	13:12:26	50.9
211	2019/09/18	13:12:29	45.7
212	2019/09/18	13:12:32	45.2
213	2019/09/18	13:12:35	43.7
214	2019/09/18	13:12:38	45.6
215	2019/09/18	13:12:41	47.5
216	2019/09/18	13:12:44	47.4
217	2019/09/18	13:12:47	44.7
218	2019/09/18	13:12:50	46.2
219	2019/09/18	13:12:53	51.0
220	2019/09/18	13:12:56	46.9
221	2019/09/18	13:12:59	49.9
222	2019/09/18	13:13:02	44.6
223	2019/09/18	13:13:05	44.0
224	2019/09/18	13:13:08	41.0
225	2019/09/18	13:13:11	39.5
226	2019/09/18	13:13:14	40.9
227	2019/09/18	13:13:17	42.5
228	2019/09/18	13:13:20	45.7
229	2019/09/18	13:13:23	54.0
230	2019/09/18	13:13:26	57.2
231	2019/09/18	13:13:29	55.5
232	2019/09/18	13:13:32	53.9
233	2019/09/18	13:13:35	50.3
234	2019/09/18	13:13:38	55.1
235	2019/09/18	13:13:41	48.8
236	2019/09/18	13:13:44	46.8
237	2019/09/18	13:13:47	49.5
238	2019/09/18	13:13:50	53.1
239	2019/09/18	13:13:53	54.5
240	2019/09/18	13:13:56	48.7
241	2019/09/18	13:13:59	45.1
242	2019/09/18	13:14:02	47.8
243	2019/09/18	13:14:05	49.9
244	2019/09/18	13:14:08	52.4
245	2019/09/18	13:14:11	53.1
246	2019/09/18	13:14:14	53.2
247	2019/09/18	13:14:17	53.3
248	2019/09/18	13:14:20	53.6
249	2019/09/18	13:14:23	52.3
250	2019/09/18	13:14:26	51.5
251	2019/09/18	13:14:29	55.8
252	2019/09/18	13:14:32	54.9
253	2019/09/18	13:14:35	55.5
254	2019/09/18	13:14:38	54.7
255	2019/09/18	13:14:41	55.6
256	2019/09/18	13:14:44	53.8
257	2019/09/18	13:14:47	50.7
258	2019/09/18	13:14:50	50.0
259	2019/09/18	13:14:53	53.5
260	2019/09/18	13:14:56	53.2
261	2019/09/18	13:14:59	52.4
262	2019/09/18	13:15:02	55.3
263	2019/09/18	13:15:05	50.8
264	2019/09/18	13:15:08	50.2
265	2019/09/18	13:15:11	53.2
266	2019/09/18	13:15:14	49.5
267	2019/09/18	13:15:17	48.9
268	2019/09/18	13:15:20	51.4
269	2019/09/18	13:15:23	47.9
270	2019/09/18	13:15:26	51.5
271	2019/09/18	13:15:29	51.8
272	2019/09/18	13:15:32	52.2
273	2019/09/18	13:15:35	50.1
274	2019/09/18	13:15:38	44.5
275	2019/09/18	13:15:41	50.2
276	2019/09/18	13:15:44	52.8
277	2019/09/18	13:15:47	52.7
278	2019/09/18	13:15:50	55.6
279	2019/09/18	13:15:53	52.2
280	2019/09/18	13:15:56	54.0
281	2019/09/18	13:15:59	64.5
282	2019/09/18	13:16:02	66.8
283	2019/09/18	13:16:05	55.8

284	2019/09/18	13:16:08	49.9
285	2019/09/18	13:16:11	50.7
286	2019/09/18	13:16:14	46.7
287	2019/09/18	13:16:17	49.3
288	2019/09/18	13:16:20	46.3
289	2019/09/18	13:16:23	40.6
290	2019/09/18	13:16:26	41.5
291	2019/09/18	13:16:29	41.6
292	2019/09/18	13:16:32	42.1
293	2019/09/18	13:16:35	45.2
294	2019/09/18	13:16:38	57.0
295	2019/09/18	13:16:41	69.7
296	2019/09/18	13:16:44	57.6
297	2019/09/18	13:16:47	48.6
298	2019/09/18	13:16:50	45.6
299	2019/09/18	13:16:53	48.3
300	2019/09/18	13:16:56	47.4

Appendix B

Roadway Construction Noise Model (RCNM) Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/11/2019
Case Descripti Bellefield Solar - Construction on Parcels

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Residential	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1300	0
Backhoe	No	40		77.6	1300	0
Compactor (ground)	No	20		83.2	1300	0
Concrete Mixer Truck	No	40		78.8	1300	0
Crane	No	16		80.6	1300	0
Dozer	No	40		81.7	1300	0
Dump Truck	No	40		76.5	1300	0
Excavator	No	40		80.7	1300	0
Flat Bed Truck	No	40		74.3	1300	0
Front End Loader	No	40		79.1	1300	0
Generator	No	50		80.6	1300	0
Grader	No	40	85		1300	0
Pickup Truck	No	40		75	1300	0
Pneumatic Tools	No	50		85.2	1300	0
Roller	No	20		80	1300	0
Scraper	No	40		83.6	1300	0
Warning Horn	No	5		83.2	1300	0
Welder / Torch	No	40		74	1300	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Auger Drill Rig	56.1	49.1
Backhoe	49.3	45.3
Compactor (ground)	54.9	47.9
Concrete Mixer Truck	50.5	46.5
Crane	52.3	44.3
Dozer	53.4	49.4
Dump Truck	48.2	44.2
Excavator	52.4	48.4
Flat Bed Truck	46	42
Front End Loader	50.8	46.8

Generator	52.3	49.3
Grader	56.7	52.7
Pickup Truck	46.7	42.7
Pneumatic Tools	56.9	53.9
Roller	51.7	44.7
Scraper	55.3	51.3
Warning Horn	54.9	41.9
Welder / Torch	45.7	41.7
Total	56.9	60.9

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/11/2019
Case Descriptio Kudu Solar - Construction on Parcels

				---- Receptor #1 ----			
		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
Residential	Residential	75	75	75			

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	3250	0
Backhoe	No	40		77.6	3250	0
Compactor (ground)	No	20		83.2	3250	0
Concrete Mixer Truck	No	40		78.8	3250	0
Crane	No	16		80.6	3250	0
Dozer	No	40		81.7	3250	0
Dump Truck	No	40		76.5	3250	0
Excavator	No	40		80.7	3250	0
Flat Bed Truck	No	40		74.3	3250	0
Front End Loader	No	40		79.1	3250	0
Generator	No	50		80.6	3250	0
Grader	No	40	85		3250	0
Pickup Truck	No	40		75	3250	0
Pneumatic Tools	No	50		85.2	3250	0
Roller	No	20		80	3250	0
Scraper	No	40		83.6	3250	0
Warning Horn	No	5		83.2	3250	0
Welder / Torch	No	40		74	3250	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Auger Drill Rig	48.1	41.1
Backhoe	41.3	37.3
Compactor (ground)	47	40
Concrete Mixer Truck	42.5	38.6
Crane	44.3	36.3
Dozer	45.4	41.4
Dump Truck	40.2	36.2
Excavator	44.5	40.5
Flat Bed Truck	38	34
Front End Loader	42.9	38.9

Generator	44.4	41.4
Grader	48.7	44.8
Pickup Truck	38.7	34.8
Pneumatic Tools	48.9	45.9
Roller	43.7	36.8
Scraper	47.3	43.3
Warning Horn	46.9	33.9
Welder / Torch	37.7	33.8
Total	48.9	52.9

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/11/2019
Case Description: Bellefield Solar - Gen Tie Construction

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Residential	Residential	75	75	75

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	50	0
Front End Loader	No	40		79.1	50	0
Grader	No	40	85		50	0
Pickup Truck	No	40		75	50	0
Crane	No	16		80.6	50	0
Concrete Mixer Truck	No	40		78.8	50	0

Calculated (dBA)

Equipment	*Lmax	Leq
Auger Drill Rig	84.4	77.4
Front End Loader	79.1	75.1
Grader	85	81
Pickup Truck	75	71
Crane	80.6	72.6
Concrete Mixer Truck	78.8	74.8
Total	85	84.4

*Calculated Lmax is the Loudest value.

Appendix K-1
Traffic Impact Analysis

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Kudu Solar Farm Traffic Impact Analysis

California City & Kern County

September 4, 2020

Prepared for:

69SV 8ME LLC
c/o 8minute Solar Energy
250 Sutter Street, Suite 600
San Francisco, CA 94108

Prepared by:

Stantec Consulting Services Inc.

This document entitled Kudu Solar Farm Traffic Impact Analysis was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of 69SV 8me LLC (the "Client").

Prepared by _____
(signature)

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(949)-923-6074

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(signature)

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(949)-923-6058

Reviewed by _____
(signature)

Caitlin Barns

Project Manager

(805)-341-2743

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Acronyms and Abbreviations

AADT	annual average daily traffic
AC	alternating current
ADT	average daily traffic
Applicant	69SV 8me LLC
Caltrans	California Department of Transportation
Client	69SV 8me LLC
CUP	conditional use permit
EB	eastbound
ESS	energy storage system
gen-tie	generation tie
HCM	Highway Capacity Manual
I-5	Interstate 5
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LOS	level of service
MP	Mile Post
MW	megawatt
NB	Northbound
O&M	operations and maintenance
PCE	Passenger car equivalent
PHV	peak hour volume
Project	Kudu Solar Farm Project
PV	photovoltaic
SB	southbound
SR	State Route
Stantec	Stantec Consulting Services Inc.
WB	westbound

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has performed a traffic impact analysis for the Kudu Solar Farm Project (project), the proposed construction and operation of a 500-megawatt (MW) alternating current (AC) utility-scale solar farm with an energy storage system (ESS) located in unincorporated Kern County and California City, California. 69SV 8me LLC (Applicant) is seeking approval of a conditional use permit (CUP) for the project. The purpose of the analysis is to determine the amount of traffic generated by the project during construction and operation and to identify potential traffic-related significant impacts on the affected portions of the circulation system.

1.1 PROPOSED PROJECT

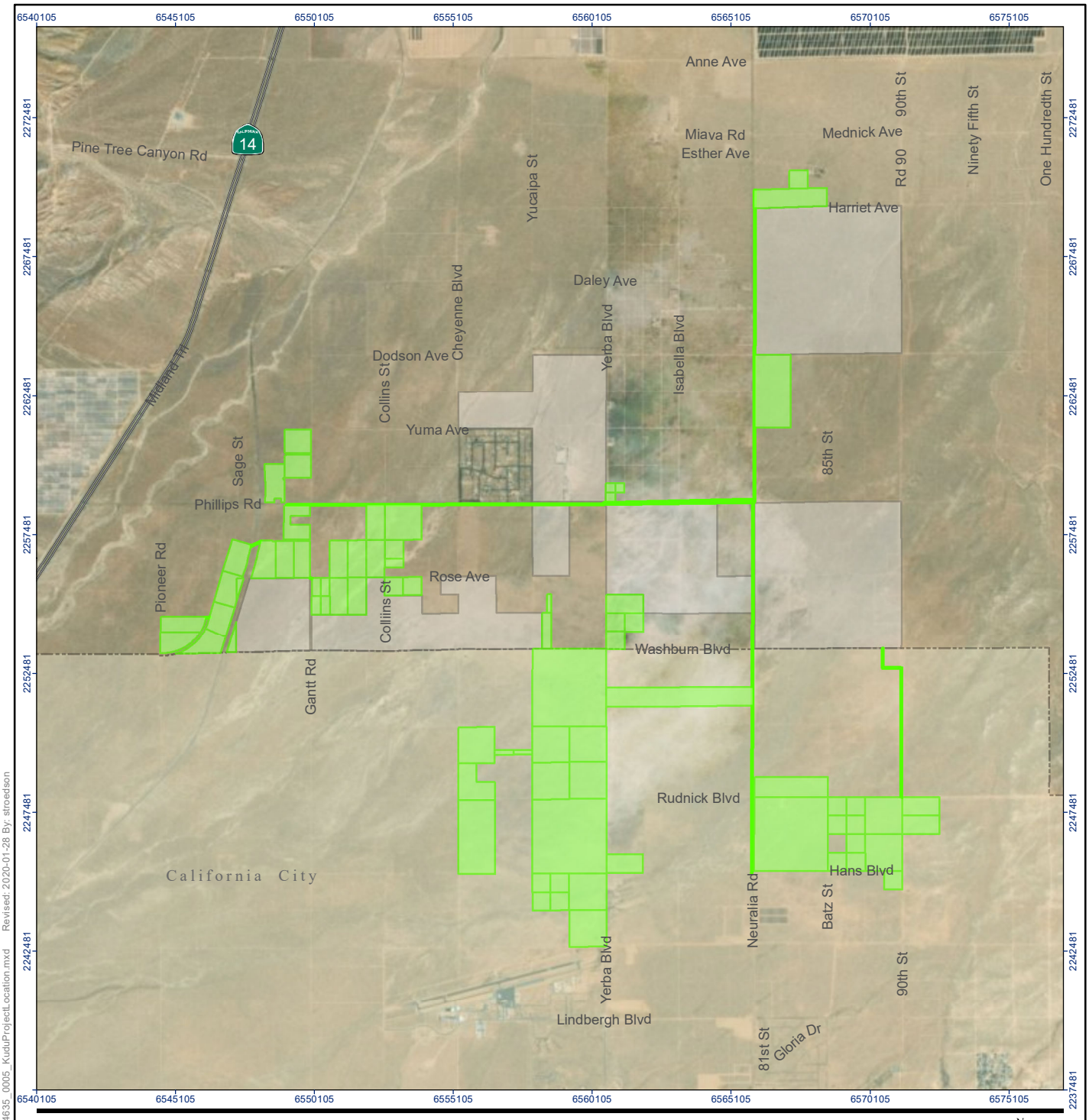
The project area is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. The majority of the project area is bisected by Washburn Boulevard (which is also the California City Boundary) and Neuralia Road. See Figure 1 for Project Location Map.

The project comprises 75 assessor's parcels (project area) totaling approximately 1,955 gross acres. See Table 1 for the list of Kudu parcels. The permanent disturbance acreage associated with the development of the solar facility and associated infrastructure (project site) would be less than the gross acreage of the project area. The project area is adjacent to the approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 solar farms and southeast of the Los Angeles Department of Water and Power (LADWP) Beacon Solar Facility. The topography of the project area is relatively flat.

Power generated by the project would be collected using up to 230-kilovolt (kV) collector lines that run underground and/or overhead to a dedicated project substation, or to the Eland 1 Substation. The project may also share the Eland 1 generation tie (gen-tie) line facilities, or gen-tie rights-of-way. The Eland 1 substation and gen-tie line have gone through environmental analysis and subsequent approval by Kern County and are not part of the project. Additionally, the project may share an operations and maintenance (O&M) building, substations, ESS, and/or transmission facilities, as necessary, with one or more nearby solar projects and may be remotely operated. Any unused O&M, substations, and/or transmission facility areas onsite could be occupied by solar panels under such scenarios.

The project would require an operational staff of up to 20 full-time employees (includes both day and night shifts). Typically, the majority of the staff would work during the day shift (sunrise to sunset), and the remainder would work during the night shifts and weekend. It is possible that the project would share O&M, substation, ESS, and/or transmission facilities, as necessary, with one or more nearby solar projects, and may be remotely operated. In such a scenario, the projects would share personnel and thereby could reduce onsite staff.

After the useful life of the project, the panels would be disassembled from the mounting frames and the project area would be restored to its pre-development condition.



Kudu Collector Route
Kudu Solar Project
Eland 1 Solar Project

0 0.5 1 Miles

(At original document size of 8.5x11)
1:63,360

N

Stantec

8MINUTE SOLAR ENERGY

Project Location
North of California City
Kern County, CA

Prepared by SET on 2020-01-28
TR by CS on 2020-01-28
IR by CB on 2020-01-28

Client/Project
185704635_0005
8 Minute Solar Energy
Kudu Solar Project

Figure No.
1

Title
Kudu Solar Project Location

Notes
1. Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
2. Project Data Sources: 8 Minute Solar Energy and Stantec
3. Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

V:\18577\Active\185704635_Kudu_Bellefield\03_data\gis_cad\gis\185704635_0005_KuduProjectLocation.mxd Revised: 2020-01-28 By: stroedson

Table 1: Kudu Parcels

APN	Gross Acreage
Kern County Parcels	
469-170-10	10.02
469-170-18	39.49
470-020-08	2.31
470-020-19	4.38
470-030-01	79.22
470-080-15	20.27
470-080-16	10.07
470-080-17	10.10
470-080-32	10.07
470-151-09	19.62
470-151-15	20.23
470-151-16	20.40
470-151-17	19.98
470-152-01	39.32
470-152-18	10.32
470-152-19	4.93
470-302-24	2.59
470-302-25	2.62
470-302-26	2.52
470-322-13	2.39
470-322-15	9.96
470-330-01	5.06
470-330-02	4.77
470-330-03	19.86
470-330-04	20.15
470-330-06	9.95
470-330-07	10.02
470-330-14	4.89
470-330-15	5.23
470-350-04	18.65
470-350-05	18.91
470-350-06	18.89
470-350-07	18.57
470-350-08	19.93

APN	Gross Acreage
470-360-01	18.43
470-360-02	17.85
470-360-05	21.15
470-380-01	19.92
470-380-04	21.35
470-380-05	17.34
470-380-06	19.88
470-380-07	21.95
Kern County Acres	**673.55**
California City Parcels	
302-020-08	40.17
302-020-09	80.09
302-020-11	163.68
302-020-14	40.99
302-020-15	10.52
302-020-16	10.15
302-020-17	9.59
302-020-18	9.98
302-290-03	83.58
302-305-15	43.54
302-321-01	160.93
302-322-01	10.10
302-322-02	10.09
302-322-04	10.24
302-322-05	10.28
302-322-06	40.04
302-322-08	10.33
302-322-09	40.50
302-322-10	10.27
302-322-11	10.29
302-325-49	9.74
302-330-33	20.21
302-330-37	20.38
302-341-29	168.79
302-342-01	40.23
302-342-11	2.67
302-342-12	2.66

APN	Gross Acreage
302-342-19	29.69
302-342-25	40.77
302-342-26	39.89
302-342-27	40.29
302-342-28	40.68
302-470-14	20.20
California City Acres	**1,281.51**
Total Acres	**1,955.06**

Note:
APN = Assessor Parcel Number

1.1.1 Project Components

The project includes the following components:

- Photovoltaic (PV) module configuration,
- Inverter stations,
- ESS,
- Substation,
- Transmission line,
- Water usage/storage,
- O&M building, and
- Project site lighting

The project may include an O&M building of approximately 40 feet by 80 feet in size with associated onsite parking. The O&M building would be steel framed with metal siding and roof panels. The O&M building may include the following:

- Office,
- Repair building/parts storage
- Control room,
- Restroom, and
- Septic tank and leach field

Roads, driveways, and parking lot entrances would be constructed in accordance with Kern County and California City improvement standards. Parking spaces and walkways would be constructed in conformance with all California accessibility regulations.

1.1.2 Construction Activities

The construction period for the project, from site preparation through construction, testing, and commercial operation, is expected to commence as early as the fourth quarter of 2021 and would extend for approximately 12 to 18 months. Construction of the facility would include the following activities:

- Site preparation
- Grading and earthwork
- Concrete foundations
- Structural steel work
- Electrical/instrumentation work
- Collector line installation
- Architecture and landscaping

No roadways would be permanently affected by the project. During construction, traffic would access the site from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 project site. Up to 1,000 workers per day (during peak construction periods) would be required during construction of the project.

Heavy construction is expected to occur between 6:00 AM and 5:00 PM, Monday through Friday. Additional hours may be necessary to offset schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, 7 days per week. Low-level noise activities may potentially occur between the hours of 10:00 PM and 7:00 AM. Nighttime activities could potentially include but are not limited to refueling equipment, staging material for the following day's construction activities, quality assurance and control, and commissioning.

Materials and supplies would be delivered to the project area by truck. Truck deliveries would normally occur during daylight hours. There could be offloading and transporting to the project area on weekends and during evening hours.

Earthmoving activities are expected to be limited to the construction of the access roads, O&M building, substation, ESS(s), and any stormwater protection or storage (detention) facilities. Final grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas.

1.1.3 Workforce

Once the project is constructed, maintenance would generally be limited to the following:

- Cleaning the PV panels,
- Monitoring electricity generation,
- Providing site security, and
- Facility maintenance, including replacing or repairing inverters, wiring, and PV modules.

The project would require an operational staff of up to 20 full-time employees. As mentioned earlier, it is possible that the Project would share O&M, substation, ESS, and/or transmission facilities with any future energy projects nearby. In such a scenario, the projects would share personnel and thereby potentially reduce onsite staff. The facility would operate 7 days a week, 24 hours a day and would generate electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur 7 days a week, 24 hours a day to ensure PV panel output when solar energy is available.

2.0 TRANSPORTATION SETTING

This section describes the traffic and transportation conditions in the vicinity of the proposed project site, including the operating condition of the roadways (streets and highways) that could be affected by the project.

2.1 EXISTING ROADWAY SYSTEM

State Route (SR) 14 is a four-lane divided highway adjacent to and west of the project site. For regional travel, residents of California City and other nearby communities rely primarily on SR 14, which carries traffic south to Lancaster and other major routes. SR 14 connects to SR 58 and SR 138 before reaching Interstate 5 (I-5) near Santa Clarita; I-5 provides access to Los Angeles.

SR 58 is a four-lane divided highway located approximately 8 miles south of the project site. SR 58 provides regional access to Bakersfield to the west and communities such as Barstow to the east.

Access to the project site from SR 14 would be via two-way, stop-controlled intersections. Some locations, such as Philips Road, have auxiliary right and left turn lanes.

2.2 EXISTING TRAFFIC VOLUMES

This section summarizes existing traffic volumes on roadways that could be affected by the project. All data were obtained from the California Department of Transportation (Caltrans) Traffic Census Program for the most recent available year (Caltrans 2017).

Segment Volumes

The 24-hour annual average daily traffic (AADT) volumes at five study locations along SR 14 and SR 58 are shown in Table 2. Also shown in Table 2 are peak month average daily traffic (ADT) volumes, which show variations in traffic volume on the roadway segments over the course of the year.

- SR 14 at SR 58 south of project site,
- SR 14 near project site,
- SR 14 at SR 178 north of project site,
- SR 58 at Randsburg Cut-Off Road, and
- SR 58 at Boron Avenue.

Table 2. Annual ADT Volumes on Potentially Affected Roadway Segments

Roadway Segment	AADT (Peak Month ADT)
SR 14 MP 16.07 - South junction with SR 58	10,700 (11,300)
SR 14 MP 21.29 - North of Randsburg Cutoff Road to California City (near Project Site)	5,900 (6,900)
SR 14 MP 57.77 - South of Freeman junction with SR 178 (2-lane)	6,500 (7,200)
SR 58 MP 107.47 - Randsburg Cut-off Road	19,600 (20,700)
SR 58 MP 142.88 - Boron Avenue	15,350 (16,100)

Source: 2017 Traffic Volumes, Caltrans Traffic Census Program.

Notes:

ADT = average daily traffic

AADT = annual average daily traffic

MP = Mile Post

SR = State Route

Peak Hour Segment Volumes

The peak hour volumes (PHVs) in the peak direction for the five study locations on SR 14 and SR 58 are shown in Table 3. Also shown are the “K” and “D” factors. The “K” factor represents the percentage of the annual ADT for both directions of travel during the peak hour. The “D” factor represents the percentage of the peak hour traffic in the peak direction.

Table 3. Peak Hour Traffic Volumes on Potentially Affected Roadway Segments

Roadway Segment	PHV	%K	%D
SR 14 MP 16.07 – South junction with SR 58	630 (NB PM)	8.56	68.46
SR 14 MP 21.29 – North of Randsburg Cutoff Road to California City (near Project Site)	600 (NB PM)	18.38	55.00
SR 14 MP 57.77 – South of Freeman junction with SR 178 (2-lane)	630 (SB PM)	13.08	74.59
SR 58 MP 107.47 – Randsburg Cut-off Road	1,060 (WB PM)	8.90	60.53
SR 58 MP 142.88 – Boron Avenue	850 (EB PM)	8.43	65.39

Source: 2017 Peak Hour Volume Data, Caltrans Traffic Census Program.

Notes:

EB = eastbound

MP = Mile Post

NB = northbound

PHV = peak hour volume

SB = southbound

SR = State Route

WB = westbound

Level of Service Methodology

Level of service (LOS) is a qualitative index of the performance of an element of a transportation system. LOS is a rating scale from A to F, with A indicating no congestion and F indicating severe congestion and delays.

The Highway Capacity Manual, a standard reference published by the Transportation Research Board, contains specific criteria and methods for assessing LOS. The Generalized Daily Service Volume Methodology was used to calculate the Allowable Daily Service Volume used in determining LOS. The LOS for multilane highways is calculated based on traffic density and the speed travelled. The LOS for two-lane highways is calculated based on vehicle mobility, which is estimated based upon travel speed and the ability of vehicles to pass slow-moving vehicles in the traffic stream.

Significance Criteria

Kern County uses a threshold of LOS D for the minimum acceptable operation of its transportation facilities. Facilities under the jurisdiction of Caltrans include freeway segments, ramps, ramp terminals, and arterials. Although Caltrans has not designated a LOS standard, Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) indicates attempts to maintain the LOS of a state highway facility between the LOS "C/D" threshold (Caltrans 2002).

For the purpose of this analysis, a LOS threshold of C was used to determine the significance of project impacts on traffic and transportation. The project would be considered to have a significant impact on traffic and transportation if it would cause the operation of a transportation facility to worsen from LOS C or better to LOS D or worse.

3.0 EXISTING TRAFFIC CONDITIONS

This section assesses traffic conditions in the study area without the project.

3.1 LEVEL OF SERVICE

Existing traffic conditions for the five roadway segments shown in Table 2 were evaluated based on LOS criteria and the Generalized Daily Service Volume methodology of the HCM for estimating LOS. The roadway capacities were estimated and compared to observed traffic volumes.

The maximum daily traffic volumes that would allow the highway segments to maintain an acceptable LOS are shown in Table 4. As shown, all the multilane highway segments currently operate at an acceptable LOS of C or better. The LOS was determined by calculating allowable daily service volume using the Generalized Daily Service Volume Methodology of the HCM as well as using HCS software. See Appendix A for HCS worksheets. The LOS for the two-lane highway segment (SR 14 near MP 57.77) is calculated using the Generalized Daily Service Volume Methodology of the HCM. This segment is expected to operate at LOS D. All five roadway segments meet the Caltrans target threshold of LOS C except the roadway segment south of Freeman junction route SR 178. See Appendix B for detailed calculations of Allowable Daily Service Volumes.

Table 4. Existing LOS of Study Segments

Roadway Segment	Facility Type	Allowable Daily Service Volume (LOS C)	ADT	LOS
SR 14 MP 16.07 – South junction with SR 58	Multilane Highway	39,200	10,700	A
SR 14 MP 21.29 – North of Randsburg Cut-off Road to California City (near project site)	Multilane Highway	22,700	5,900	A
SR 14 MP 57.77 – South of Freeman junction with SR 178 (two-lane)	Two-lane Highway	<5100	6,500	D
SR 58 MP 107.47 – Randsburg Cut-off Road	Multilane Highway	42,700	19,600	B
SR 58 MP 142.88 – Boron Avenue	Multilane Highway	41,700	15,350	A

Notes:

ADT = average daily traffic

LOS = level of service

MP = Mile Post

SR = State Route

Source: HCM. See Appendix A for multi-lane highway LOS calculations and Appendix B for two-lane highway calculations

The Allowable Daily Service Volume was calculated for each location based on the unique peaking factors obtained from Caltrans. The Generalized Daily Service Volume Methodology does not provide for estimating a LOS A.

4.0 TRIP GENERATION AND TRUCK ROUTING

This section discusses trip generation and truck routing for the project.

4.1 CONSTRUCTION TRIP GENERATION

Trip generation is defined as the number of vehicle trips produced by a particular type of land use or project. A trip is defined as vehicle movement in one direction. The total number of trips generated by each land use or project includes both inbound and outbound trips.

The proposed Kudu Solar Farm would cover approximately 1,955 acres. Construction of the project is expected to be completed in the following five phases:

- Phase 1: Site preparation & Grading
- Phase 2: Tracker Foundations (Piles)
- Phase 3: Underground Cabling
- Phase 4: Mechanical Installation
- Phase 5: Electrical/Instrumentation Work

The analysis of construction trip generation was prepared based on the average daily volume of construction traffic. The time period with the highest construction trip generation was found to be during the overlap of phases 1 and 2[1]. The highest construction trip generation for the project is shown in Table 5. Appendix C shows the trip generation estimate in relation to the project's construction schedule.

As shown, the project is expected to generate a total passenger car equivalent (PCE) volume of approximately 1,959 ADT, which includes 1,710 passenger car trips and 249 heavy vehicle PCE trips (115 heavy vehicle trips are converted to PCE). Heavy vehicles consist of light-, medium-, and heavy-duty trucks, including heavy-duty diesel construction trucks. Heavy vehicles are approximated as more than one passenger car due to their physical and mechanical characteristics, such as slower acceleration and stopping. A factor of 2.16 was used to convert heavy vehicles to PCE.

Table 5. Highest Construction Trip Generation

	Acreage	ADT		
		Passenger Cars	Heavy Vehicles	Total Trips
Kudu Total	1,955	1,710	249*	1,959

Notes:
*115 heavy truck trips x 2.16 PCE factor = 249 PCE
PCE Source: average of light duty trucks PCE of 1.5, medium duty trucks PCE of 2.0, and heavy-duty trucks PCE of 3.0
ADT = average daily traffic

[1] Based upon a synthesis of the construction schedule for the Kudu Solar Farm and trip generation rates based on other 69SV 8me LLC solar farm projects.

4.2 OPERATIONS TRIP GENERATION

Once constructed, the solar facility would have up to 20 full-time employees, and the majority of the staff would work during the day shift. To be conservative, assuming all employees work during the day shift, there would be approximately 50 trips per day for the full facility based on an average trip rate of 2.5 trips per employee.

4.3 CONSTRUCTION TRUCK ROUTING

The routing of trucks during construction of the project would be on SR 14 and SR 58 depending on the type of construction activity. No direct access from either SR 14 or SR 58 is proposed. Upon exiting SR 14, construction traffic would access the project site from Philips Road, Gantt Road and Neuralia Road, or through the Eland 1 project site. The specific locations where construction traffic would access the highway has not yet been determined. It is recommended that the contractor prepare traffic control plans for access to the public roadway for review and approval by the applicable agency.

5.0 EXISTING PLUS CONSTRUCTION CONDITIONS

This section describes the potential impacts of the Project on traffic and transportation.

5.1 LEVEL OF SERVICE

Similar to the analysis of existing traffic conditions, the existing plus construction conditions for the roadway segments were evaluated based on LOS criteria and the Generalized Daily Service Volume methodology of the HCM for estimating LOS. The roadway capacities were estimated and compared to the existing plus construction traffic volumes.

For this analysis, to evaluate the most conservative scenario for each roadway segment, 100 percent of the construction trips were assigned to each roadway segment individually as a worst-case scenario, except for the less traveled segment of SR 14 north of the project site where a conservative assumption of 50 percent construction trips is evaluated.

For the multilane highway segments, given the “K” and “D” factors previously discussed, the maximum daily traffic volume accommodated by the roadway to maintain the target LOS is shown in Table 6. All the multilane highway segments, with the most conservative scenario construction traffic added, operate at an acceptable LOS C or better.

The LOS for the two-lane highway segment (SR 14 near MP 57.77) is expected to continue to operate at LOS D under the worst-case construction traffic scenario as the project would not be expected to add more than 3,000 vehicles, which is the additional volume that would be required to cause LOS E. As the construction traffic would not be expected to worsen the operations to LOS E, the impacts would be considered less than significant.

Since the capacity analysis indicates that there would be no significant impacts on roadway segments based on the conservative assumption regarding construction trips, the impact of construction trips would be less than significant.

Table 6. Existing plus Construction Traffic LOS of Study Segments

Roadway Segment	Facility Type	Allowable Daily Service Volume (LOS C)	Allowable Daily Service Volume (LOS D)	Existing ADT	Project ADT	Existing + Project ADT	LOS
SR 14 MP 16.07 – South junction with SR 58	Multilane Highway	39,200	-	10,700	1,959	12,659	A
SR 14 MP 21.29 – North of Randsburg Cut-off Road to California City (near Project Site)	Multilane Highway	22,700	-	5,900	1,959	7,859	A
SR 14 MP 57.77 – South of Freeman junction with SR 178 (2-lane)	Two-lane Highway	<5,100	<8,200	6,500	980	7,480	D
SR 58 MP 107.47 – Randsburg Cut-off Road	Multilane Highway	42,700	-	19,600	1,959	21,559	B
SR 58 MP 142.88 – Boron Avenue	Multilane Highway	41,700	-	15,350	1,959	17,309	A

Notes:

ADT = average daily traffic

MP = Mile Post

SR = State Route

See Appendix A for multi-lane highway LOS calculations and Appendix B for two-lane highway calculations

The Allowable Daily Service Volume was calculated for each location based on the unique peak factors obtained from Caltrans. The Generalized Daily Service Volume Methodology does not provide for estimating a LOS A. Allowable Daily Service Volume for LOS D is shown only where applicable to the roadway volumes.

6.0 VMT ANALYSIS

The following analysis evaluates Project-related vehicle miles traveled (VMT) and complies with the updated California Environmental Quality Act (CEQA) guidelines that incorporate the requirements of Senate Bill 743 (SB 743). SB 743 requires the Governor's Office of Planning and Research (OPR) to establish recommendations for identifying and mitigating transportation impacts under CEQA. Generally, SB 743 moves away from using delay-based level-of-service (LOS) as the metric for identifying a project's significant impact and instead uses VMT. The final Technical Advisory released by OPR in December 2018 provides guidance on evaluating transportation impacts and VMT and is the guidance on which this analysis is based.

Prior to undertaking a detailed VMT analysis, the Technical Advisory recommends that lead agencies conduct a screening process "to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study". The Technical Advisory suggests that lead agencies may screen out VMT impacts using project size criteria, maps of low VMT areas, transit availability, and provision of affordable housing. For this Project, the screening criteria related to project size is applicable in regard to the amount of traffic that is generated.

The OPR Technical Advisory recommends that absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.

The Project is consistent with the County's General Plan and SCS. And as discussed in Section 4.2, a conservative estimate of the Project's daily trip generation is approximately 50 trips per day for the full facility based on an average trip rate of 2.5 trips per employee. Therefore, the Project would generate substantially fewer than the 110-trip-per-day threshold and can be assumed to cause a less-than-significant transportation impact.

Construction-related VMT is addressed in the context of air quality and greenhouse gas (GHG) as part of a separate study. Construction VMT is temporary, and therefore is not applicable to the transportation thresholds of significance recommended in the OPR Technical Advisory, which are based on a measurement of the operational average VMT per capita.

7.0 CONCLUSIONS

Based on the results of the analysis, the following is a summary of our findings:

7.1 EXISTING TRAFFIC CONDITIONS

- All the multilane highway study segments operate at better than the target LOS C threshold.
- The two-lane highway segment of SR 14 at MP 57.77 (south of Freeman Junction with SR 178) operates at LOS D under existing conditions, which is below Caltrans' target LOS threshold.

7.2 EXISTING PLUS CONSTRUCTION TRAFFIC CONDITIONS

- Truck traffic is expected to reach the project site via SR 14, SR 58, Philips Road, Gantt Road and Neuralia Road.
- The most conservative overall daily trip generation (ADT with PCE) during construction is estimated to be 1,959 trips using a PCE factor 2.16.
- Similar to the existing conditions, multilane highway study segments operate at better than the acceptable LOS C threshold.
- The two-lane highway study segment operates at LOS D under both existing and existing plus project conditions, which is below the Caltrans' target LOS threshold. However, because the LOS does not fall below LOS D due to the project, the impact is less than significant.
- Construction of the project is not expected to cause a significant impact to the surrounding transportation network.

7.3 VMT ANALYSIS

- The Project is consistent with the County's General Plan and SCS and generates substantially fewer daily operational trips than the 110 trip per day threshold of significance for VMT impact. Therefore, based on the OPR recommended screening criteria, the Project can be assumed to cause a less-than-significant transportation impact.
- VMT associated with construction of the project is addressed in the context of air quality and GHG as part of a separate study. Construction VMT is temporary and is not applicable to the transportation impact thresholds of significance.

8.0 REFERENCES

Caltrans. 2002. Caltrans' Guide for the Preparation of Traffic Impact Studies.

Caltrans. 2017. 2017 Traffic Volumes on California State Highways. Available at: https://dot.ca.gov/programs/traffic-operations/census/traffic-volumes/2017/route-11-15. Accessed on September 10, 2019.

Highway Capacity Manual. 2010. Transportation Research Board, National Research Council.

Governor's Office of Planning and Research. 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA

Appendix A HCS WORKSHEETS

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	
Agency or Company	*Stantec*
Date Performed	*10/1/2019*
Analysis Time Period	

Site Information

Highway/Direction of Travel	*SR 14*
From/To	*PM16.07 - junction with SR 58*
Jurisdiction	*Kern County*
Analysis Year	*2019*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*655*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*10700*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*68*		General Terrain:	*Level*
DDHV = AADT x K x D	*655*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*65.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*65.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*464*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*7.1*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst		Highway/Direction of Travel	*SR 514*
Agency or Company	*Stantec*	From/To	*PM 21.29 Randsburg Cutoff Road*
Date Performed	*10/1/2019*	Jurisdiction	*Kern County*
Analysis Time Period		Analysis Year	*2019*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*584*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*5900*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.18*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*584*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*2*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*65.0*	mph	FFS	*65.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*414*	pc/h/ln	Design LOS	
S	*65.0*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
D = v_p / S	*6.4*	pc/mi/ln	S	mph
LOS	*A*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst		Highway/Direction of Travel	*SR 58*
Agency or Company	*Stantec*	From/To	*PM 107.47 Randsburg Cut-off Rd*
Date Performed	*10/1/2019*	Jurisdiction	*Kern County*
Analysis Time Period		Analysis Year	*2019*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*1076*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*19600*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*61*		General Terrain:	*Level*
DDHV = AADT x K x D	*1076*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*2*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*65.0*	mph	FFS	*65.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*762*	pc/h/ln	Design LOS	
S	*65.0*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
D = v_p / S	*11.7*	pc/mi/ln	S	mph
LOS	*B*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	
Agency or Company	*Stantec*
Date Performed	*10/1/2019*
Analysis Time Period	

Site Information

Highway/Direction of Travel	*SR 58*
From/To	*PM 142.88 - Boron Avenue*
Jurisdiction	*Kern County*
Analysis Year	*2019*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*798*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*15350*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*65*		General Terrain:	*Level*
DDHV = AADT x K x D	*798*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*65.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*65.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*565*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*8.7*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst		Highway/Direction of Travel	*SR 14*
Agency or Company	*Stantec*	From/To	*PM16.07 - junction with SR 58*
Date Performed	*10/1/2019*	Jurisdiction	*Kern County*
Analysis Time Period		Analysis Year	*Existing with Project*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*775*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*12659*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*68*		General Terrain:	*Level*
DDHV = AADT x K x D	*775*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*2*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*65.0*	mph	FFS	*65.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*549*	pc/h/ln	Design LOS	
S	*65.0*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
D = v_p / S	*8.4*	pc/mi/ln	S	mph
LOS	*A*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst		Highway/Direction of Travel	*SR 514*
Agency or Company	*Stantec*	From/To	*PM 21.29 Randsburg Cutoff Road*
Date Performed	*10/1/2019*	Jurisdiction	*Kern County*
Analysis Time Period		Analysis Year	*Existing with Project*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*778*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*7859*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.18*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*55*		General Terrain:	*Level*
DDHV = AADT x K x D	*778*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*2*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*65.0*	mph	FFS	*65.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*551*	pc/h/ln	Design LOS	
S	*65.0*	mph	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
D = v_p / S	*8.5*	pc/mi/ln	S	mph
LOS	*A*		D = v_p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst		Highway/Direction of Travel	*SR 58*
Agency or Company	*Stantec*	From/To	*PM 107.47 Randsburg Cut-off Rd*
Date Performed	*10/1/2019*	Jurisdiction	*Kern County*
Analysis Time Period		Analysis Year	*Existing with Project*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*1184*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*21559*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.09*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*61*		General Terrain:	*Level*
DDHV = AADT x K x D	*1184*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*65.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*65.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*839*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*12.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	
Agency or Company	*Stantec*
Date Performed	*10/1/2019*
Analysis Time Period	

Site Information

Highway/Direction of Travel	*SR 58*
From/To	*PM 142.88 - Boron Avenue*
Jurisdiction	*Kern County*
Analysis Year	*Existing with Project*

Project Description *Kudu Solar Farm TIA*

☑ Oper.(LOS) ☐ Des.(N) ☑ Planning Data

Flow Inputs

Volume, V	*900*	veh/h	Peak-Hour Factor, PHF	*0.88*
AADT	*17309*	veh/day	%Trucks and Buses, P_T	*12*
Peak-Hr Prop. of AADT, K	*0.08*		%RVs, P_R	*0*
Peak-Hr Direction Prop, D	*65*		General Terrain:	*Level*
DDHV = AADT x K x D	*900*	veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*0.85*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.943*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*2*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*65.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*65.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*638*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*9.8*	pc/mi/ln
LOS	*A*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

Appendix B**DAILY SERVICE VOLUME CALCULATIONS**

Roadway Segment (Multilane Highway)	MSF	N	fHV	fp	PHF	K	D	DSV	DSV Rounded
SR 14 MP 16.07 - South junction with SR 58	1,630	2	0.943	0.85	0.88	0.09	0.68	39,239	39,200
SR 14 MP 21.29 - North of Randsburg Cutoff Road to California City (near project site)	1,630	2	0.943	0.85	0.88	0.18	0.55	22,747	22,700
SR 58 MP 107.47 - Randsburg Cut-off Road	1,630	2	0.943	0.85	0.88	0.09	0.61	42,685	42,700
SR 58 MP 142.88 - Boron Avenue	1,630	2	0.943	0.85	0.88	0.08	0.65	41,715	41,700

Notes:

Daily Service Volume, DSV = (MSF x N x fHV x fp x PHF) / (K x D) (Source: HCM 2010, Chapter 10, Equation 10-5)

fp = 0.85

PHF = 0.88

fHV = 0.943

Max. Service Flow rate for Target LOS C, MSF = 1,630 (Source: HCM 2010, Chapter 11, Exhibit 11-17)

K, D (Source: Caltrans Traffic Census Program)

Roadway Segment (Two-lane Highway)		DSV
SR 14 MP 57.77 - South of Freeman junction with SR 178	For LOS C	<5,100
	For LOS D	<8,200

Notes:

Source: HCM 2010, Exhibit 15-30 Generalized Daily Service Volumes for Two-lane Highways

k factor - 0.14, D-factor - 65%, Class I - Level

Appendix C TRIP GENERATION

Kudu - Passenger Car ADT by Phase

Phase	Description	Work Days	2021			2022										
			Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov
1	Site Preparation & Grading	84	595	595	595											
2	Tracker Foundations	125			1115	1115	1115	1115	1115							
3	Undergound Cabling	125						40	40	40	40					
4	Mechanical Installation	146								40	40	40	40	40	40	
5	Electrical Installation	167									275	275	275	275	275	275
	Total	647	595	595	1710	1115	1115	1155	1155	80	355	315	315	315	315	275

Kudu - Heavy Vehicle ADT by Phase

Phase	Description	Work Days	2021			2022										
			Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov
1	Site Preparation & Grading	84	55	55	55											
2	Tracker Foundations	125			60	60	60	60	60							
3	Undergound Cabling	125						8	8	8	8					
4	Mechanical Installation	146								8	8	8	8	8	8	
5	Electrical Installation	167									20	20	20	20	20	20
	Total	647	55	55	115	60	60	68	68	16	36	28	28	28	28	20

Note:

115 heavy vehicle trips x 2.16 = 249 heavy vehicle PCE trips; Passenge Car Equivalent (PCE) factor = 2.16;

Heavy vehicles consist of light-, medium-, and heavy-duty trucks, including heavy-duty diesel construction trucks. They are approximated as more than one passenger car due to their physical and mechanical characteristics, such as slower acceleration and stopping.

Kudu - Overall ADT with PCE trips by Phase

Phase	Description	Work Days	2021			2022										
			Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov
1	Site Preparation & Grading	84	714	714	714											
2	Tracker Foundations	125			1245	1245	1245	1245	1245							
3	Undergound Cabling	125						56	56	56	56					
4	Mechanical Installation	146								56	56	56	56	56	56	
5	Electrical Installation	167									318	318	318	318	318	318
	Total	647	714	714	1959	1245	1245	1301	1301	112	430	374	374	374	374	318

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Appendix K-2

Project Construction - SR 14 at
Phillips Road Intersection Evaluation

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Stantec

Memo

To:	Erec Devost 8minute Solar Energy 250 Sutter Street, Suite 600 San Francisco CA 94108	From:	Daryl Zerfass / Sandhya Perumalla 38 Technology Drive Irvine CA 92618
File:	185704635	Date:	September 3, 2021

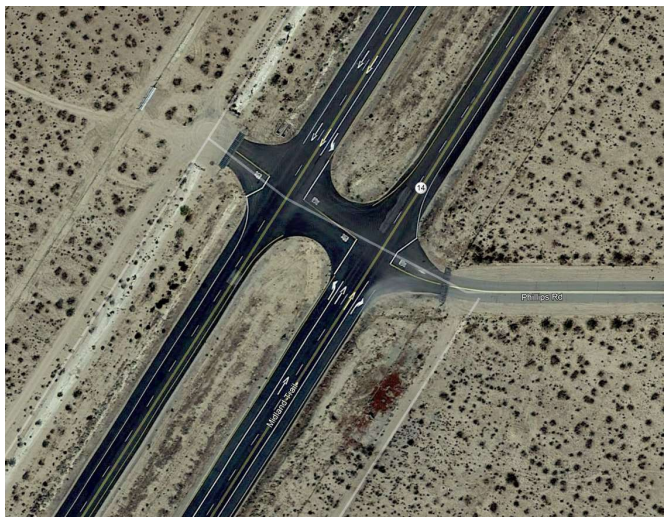
Reference: Kudu Solar Project Construction – SR-14 at Philips Road Intersection Evaluation

Traffic impacts along State Route 14 (SR 14) and SR 58 for the Kudu Solar Project (Project) were previously analyzed in a separate report[1] prepared by Stantec in September 2020. Construction of the overhead and/or underground gen-tie line for the Project is expected to occur along Philips Road and Neuralia Road. Also, construction traffic will utilize the SR 14 at Phillips Road at-grade intersection for access to the primary construction areas east of SR 14. This memo summarizes the potential construction-related effects on traffic circulation during construction of the Project in regard to the SR 14/Philips Road intersection.

Existing Conditions

Philips Road is a two-lane undivided roadway with dirt shoulders on both sides of the roadway, running in an east-west direction, between SR-14 to Neuralia Road in an unincorporated portion of Kern County. The paved portion of the road is approximately 4.56 miles long with a 55-mph speed limit. The paved portion of Philips Road ends at the 3-legged stop-controlled intersection at Neuralia Road. East of Neuralia Road, Philips Road continues as an unimproved dirt roadway. There's a railroad crossing, approximately 0.4 miles west of the Gantt Road intersection, controlled by a yield sign. A stop sign is provided for eastbound and westbound Philips Road at the SR-14 and Philip Road intersection. With the exception of the traffic controls mentioned above, the remaining section of Philips Road is uncontrolled. SR-14 at Philips Road consists of two-through lanes in each direction, approximately 385 feet and 365 feet left-turn pockets on the north and south leg, respectively, and 400 feet right turn pocket on the south leg (See Figure 1).

Figure 1 - SR 14 at Philips Road



[1] Kudu Solar Farm Traffic Impact Analysis, Stantec, September 4, 2020.

Reference: **Kudu Solar Project Construction – SR-14 at Philips Road Intersection Evaluation**

A small single-family residential development (approximately 50 single family residential units) is located adjacent to Philips Road approximately 2.5 miles east of SR 14. Existing traffic volumes on Philips Road would be considered low and nominal. The residential development has cross streets intersecting Philips Road between Cheyenne Boulevard and Yucaipa Street.

SR 14 at Philips Road At-Grade Intersection

Construction traffic access to the main construction areas east of SR 14 will primarily occur at the SR 14/Philips Road intersection, which is located at approximately SR 14 post-mile (PM) 27. As discussed in the Project's September 2020 traffic study referenced above, the construction period with the highest volume of construction traffic would occur during the overlap of construction phases 1 and 2. During that period, the Project is estimated to generate a maximum of 1,710 average daily passenger car trips and 115 average daily heavy vehicle trips, for a total of 1,959 average daily trips (ADT) based on a passenger car equivalent (PCE) factor of 2.16. Approximately 980 trips would be inbound to the Project site and approximately 980 trips would be outbound from the Project site each day.

Analysis of the SR 14 mainline is provided in the Project's September 2020 traffic study, which assumed a worst-case scenario of 100 percent of construction traffic on any given highway segment since the precise origin of construction related traffic is not known, except for the less traveled segment of SR 14 north of the Project site, where a conservative assumption of 50 percent of construction trips was evaluated.

The analysis determined that two of the three SR 14 highway segments would continue to operate at LOS A with the addition of construction traffic. At the segment of SR 14 north of the Project site, where a conservative assumption of 50 percent of construction trips was evaluated, the analysis determined that the two-lane highway segment would continue to operate at LOS D. At the SR 14/Philips Road intersection, existing condition (2019) traffic volume[2] is as follows:

- SR 14 at Philips Road - 7,700 ADT

Utilizing the same assumptions provided in the September 2020 traffic study, assuming a worst-case scenario of 100 percent of the construction traffic on the SR 14 at Philips Road, the daily traffic volume with construction traffic would be approximately 9,700 ADT. SR 14, near Philips Road intersection, is a four-lane highway with a daily capacity of approximately 22,700 at LOS C[3]. Therefore, with the addition of construction traffic the highway segment operates at an acceptable LOS C or better. Construction traffic would be distributed throughout the day, with the highest concentrations occurring outside the typical peak hours with construction starting in the early morning hours and ending before the typical PM peak hour.

Construction Traffic Routes

The Project site is spread out over several parcels east of SR 14 on both sides of the Philips Road, west of Santa Fe (BNSF) Railway tracks, and east of Neuralia Road. Access to each construction location is discussed in the following sections.

[2] Caltrans Traffic Census Program, https://dot.ca.gov/programs/traffic-operations/census, 2019-Traffic-Volumes.xlxs, accessed September 1, 2021.
[3] Table 6, Kudu Solar Farm Traffic Impact Analysis, Stantec, September 4, 2020.

Reference: **Kudu Solar Project Construction – SR-14 at Philips Road Intersection Evaluation**

Locations south of Philips Road

The main construction area is located east of SR 14, and construction traffic would use Philips Avenue to access the site. The paved roadway section of Philips Road spans the entire 4.56-mile segment east into the site to accommodate construction traffic. Construction traffic would access this area from SR 14 via the Philips Road intersection and travel along Gantt Road, Neuralia Road and through the Eland 1 Project site that is adjacent to the Project.

Location north of Philips Road

A small piece of the Project site is located north of Philips Road, east of the Santa Fe (BNSF) Railway tracks and west of Gantt Road. Construction traffic would access this area from SR 14 via the Philips Road intersection and travel along Gantt Road, north of Philips Road. This road is an existing dirt road and ends at Daley Avenue, which is also a dirt road. The volumes discussed above include construction traffic to this piece of the Project site.

Locations west of BNSF Railway Tracks

This part of the Project site located east of SR 14, west of the BNSF Railway tracks, and would be accessed from Philips Road, Gantt Road and through the Eland 1 Project site. Each of these are existing dirt roads.

Location east of Neuralia Road

This part of the Project site located east of Neuralia Road, would be accessed from SR 14 via Philips Road, Neuralia Road and through the Eland 1 Project site. Neuralia is a two-lane undivided roadway with dirt shoulders on both sides of the roadway, running in a north-south direction.

Construction Traffic Mitigation

As mentioned, construction traffic would access the Project site from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 Project site. To minimize potential effects from construction traffic on the roadway network, a construction traffic management plan is recommended to be prepared and implemented. The construction traffic management plan would include the following:

- Temporary traffic control devices in accordance with the California Manual on Uniform Traffic Control Devices (CA MUTCD) and notification to the Kern County Public Works Department to identify locations where construction is on-going, including:
    - signs warning of slow-moving vehicles
    - signs warning of merging trucks
    - barriers for separating non-construction vehicles from construction activities
    - traffic control flagmen
    - any additional measures required to manage non-construction traffic through construction areas.
- Scheduling of heavy vehicle traffic to the site during non-peak periods when feasible
- Scheduling of work shift changes to avoid the peak periods when feasible
- Encouraging carpooling among construction workers to reduce workers' passenger vehicle trips in the study area

Reference: **Kudu Solar Project Construction – SR-14 at Philips Road Intersection Evaluation**

- Coordinating with local emergency response agencies to provide information regarding emergency response vehicle routes affected by construction activities.

Conclusions

To access the main construction areas east of SR 14, the construction traffic would primarily access the State highway system at the SR 14/Philips Road at-grade intersection. Construction traffic would access the Project site from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 Project site. Existing traffic volumes are low and nominal on Philips Road. A worst-case scenario, assuming 100 percent of the construction traffic on SR 14, the daily traffic volume with construction traffic would be approximately 9,700 ADT. SR 14, near Philips Road intersection, is a four-lane highway with a daily capacity of approximately 22,700 at LOS C. With the addition of construction traffic the highway segment continues to operate at an acceptable LOS C or better. Construction traffic would be distributed throughout the day, with the highest concentrations occurring outside the typical peak hours with construction starting in the early morning hours and ending before the typical PM peak hour.

Prior to the start of construction, the Project would prepare a phased construction Traffic Management Plan (TMP) based on the specific construction routes and activities established at that time.

Stantec Consulting Services Inc.

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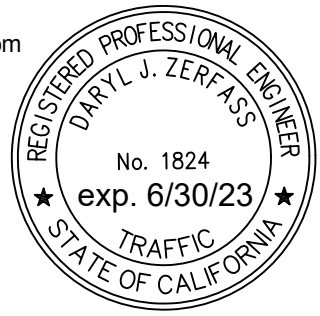
c. Caitlin Barns, Stantec



Appendix L
Water Supply Assessment

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Kudu Solar Farm Water Supply Assessment

September 1, 2020

Prepared for:

69SV 8me LLC
c/o 8minute Solar Energy
5455 Wilshire Boulevard, Suite 2010
Los Angeles, CA 90036

Prepared by:

Stantec Consulting Services Inc.
100 California Street, Suite1000
San Francisco, CA 94111

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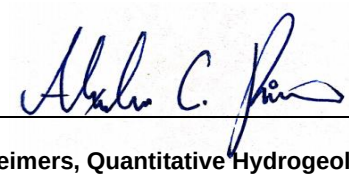
Prepared by 

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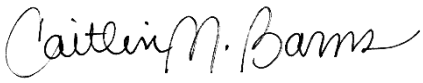
Approved by 

Caitlin Barns, Project Manager

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Executive Summary

Stantec Consulting Services Inc. (Stantec) completed a Water Supply Assessment (WSA) report on behalf of 69SV 8me LLC for the construction and operation of the Kudu Solar Farm (Kudu) Project (Project). This WSA was conducted in conformance with the requirements of the California Water Code, as amended in 2002 by the passage of Senate Bill (SB) 610, except as may have been modified by the scope of work and terms and conditions requested by 69SV 8me LLC.

The Project would consist of 75 parcels, totaling approximately 1,955 acres of predominantly vacant and undeveloped land in unincorporated Kern County and California City, California. The Project would lie south of Munsey Road, east and west of Neuralia Road, east of Highway 14, north and south of Philips Road, southeast of the unincorporated community of Cantil, and north of California City. The power generated by Kudu will be delivered through a 230-kilovolt overhead generation tie (gen-tie) originating from the Eland 1 substation and terminating at the Los Angeles Department of Water and Power Barren Ridge substation.

69SV 8me LLC is seeking approval of a conditional use permit for the construction of a 500-megawatt alternating current utility-scale solar photovoltaic energy plant. Stantec analyzed water supplies available to serve the Project, including the water demand anticipated during construction and through operation of the facility. According to the requirements of California Water Code (Water Code) Section 10910(c)(3) the WSA shall include a discussion of, "whether the public water system's total projected water supplies available will meet the projected water demand associated with proposed Project, in addition to the public water system's existing and planned future uses." In summary:

- The Project will be under environmental review pursuant to the requirements of California Environmental Quality Act (CEQA); therefore, the information contained in this assessment will be used to support the analysis contained in the CEQA document.
- The Project does not meet the definition of a "Project" under Water Code Section 10912(a).
- A 1281.51-acre portion of the Kudu Project is located within California City and will be served by the California City Water Department. The 673.55-acre portion of the Kudu Project located in unincorporated Kern County, that is, outside the California City boundaries, will not be served by a public water system. California City prepared an Urban Water Management Plan (UWMP) 2015 Update (California City, 2017), that did not account for the Project water demand.
- The Project estimates a water demand of 50 acre-feet per annum (afa) for operations includes water that would be used for washing the solar panels and other operation and maintenance (O&M) activities,
- Proposed water demand for the portion of the Kudu Project located within California City will be met by California City water supplies including local groundwater from wells and imported water from Antelope Valley-East Kern Water Agency (AVEK), and is estimated at 32.75 afa. The portion of the Kudu Project located in unincorporated Kern County would be met by local groundwater pumping estimated at 17.25 afa and is not considered a *de minimis* extraction under Section 10721 of the Water Code.

- The groundwater supply would be extracted from the Fremont Valley Groundwater Basin (FVGB). No Groundwater Sustainability Agency (GSA) has been formed to serve this basin, and management of this basin is assumed by Kern County. A Fremont Valley Groundwater Management Plan (FVGMP) has been prepared for California City, Mojave Public Utilities District (MPUD) and AVEK (Woodard & Curran, 2018a) which is intended to serve as a pre-Groundwater Sustainability Plan (GSP) document in the event the FVGB is required to prepare a GSP. The Antelope Valley Groundwater Basin to the south is adjudicated, but the FVGB is not.
- The FVGB has been designated as a “low” priority basin by the California Department of Water Resources (DWR) and a GSP is not required under the Sustainable Groundwater Management Act (SGMA).
- According to the FVGMP, groundwater production in the FVGB in 2020 is estimated to be 7,515 acre-feet (af) and is projected to be 9,894 af in 2040.
- According to the Fremont Valley Basin Salt and Nutrient Management Plan (FVSNMP; Woodard & Curran, 2018b), groundwater storage in the FVGB was estimated to be 4,800,000 af in 1975, but is currently estimated at 4,070,000 af due to a reduction in storage of about 738,000 af between 1958 and2017.
- According to the FVSNMP, average groundwater recharge to the FVGB is estimated to be 13,800 afa between 1998 and 2017.
- Average annual groundwater recharge exceeds current and projected (2040) groundwater production in the FVGB.
- Based on the large groundwater in storage remaining and average annual recharge that exceeds current and projected 2040 groundwater production in the FVGBThere is sufficient water supply available to serve the Kudu Project as proposed.

Abbreviations

°F	degrees Fahrenheit
AC	alternating electrical current
af	acre-feet
afa	acre-feet annually
APN	Assessor's Parcel Number
AVEK	Antelope Valley-East Kern Water Agency
AVGB	Antelope Valley Groundwater Basin
CASGEM	California State Groundwater Elevation Modeling
CEQA	California Environmental Quality Act
Applicant	69SV 8me LLC
CUP	conditional use permit
DC	direct electrical current
DWR	California Department of Water Resources
ESS	energy storage system
FVBGMP	Fremont Valley Basin Groundwater Management Plan
FVGB	Fremont Valley Groundwater Basin
FVSNMP	Fremont Valley Salt and Nutrient Management Plan
gen-tie	generation tie
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
In	inches
IRWMP	Integrated Regional Water Management Plan
Kudu	Kudu Solar Farm
kV	kilovolts
LADWP	Los Angeles Department of Water and Power
MW	megawatts
O&M	operations and maintenance

Project	Kudu Solar Farm Project
PV	photovoltaic
ROW	right-of-way
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act of 2014
Stantec	Stantec Consulting Services Inc.
UWMP	Urban Water Management Plan
Water Code	California Water Code
WSA	Water Supply Assessment

1.0 PROJECT DESCRIPTION

1.1 PROJECT INFORMATION

69SV 8me LLC (Applicant) is seeking approval of a conditional use permit (CUP) for the construction and operation of an up to 500 megawatt (MW)-alternating electrical current (AC) utility-scale solar farm with energy storage, known as the Kudu Solar Farm (Kudu or Project) in unincorporated Kern County and California City, California (Figure 1). The Applicant proposes to construct, own, and operate the Project and would secure CUPs from both Kern County and California City along with permits from other relevant agencies as required by law.

1.1.1 Project Site Information

The Project is comprised of 75 assessor's parcels (Project Area) totaling approximately 1,955 gross acres (Table 1). The permanent disturbance acreage associated with development of the solar facility and associated infrastructure (Project Site) within the Project Area would be less than the gross acreage of the Project Area. The Project Area is adjacent to the approved Eland 1 Solar Farm, south of the existing Springbok 1 & 2 Solar Farms, and southeast of the Los Angeles Department of Water and Power (LADWP) Beacon Solar facility. The topography of the Project Area is relatively flat.

1.1.2 Location

The Project Area is located in portions of unincorporated Kern County and California City, north of the California City Municipal Airport. The majority of the Project is bisected by Washburn Boulevard (which is also the California City boundary) and Neuralia Road (Figure 1).

Table 1: Kudu Parcels

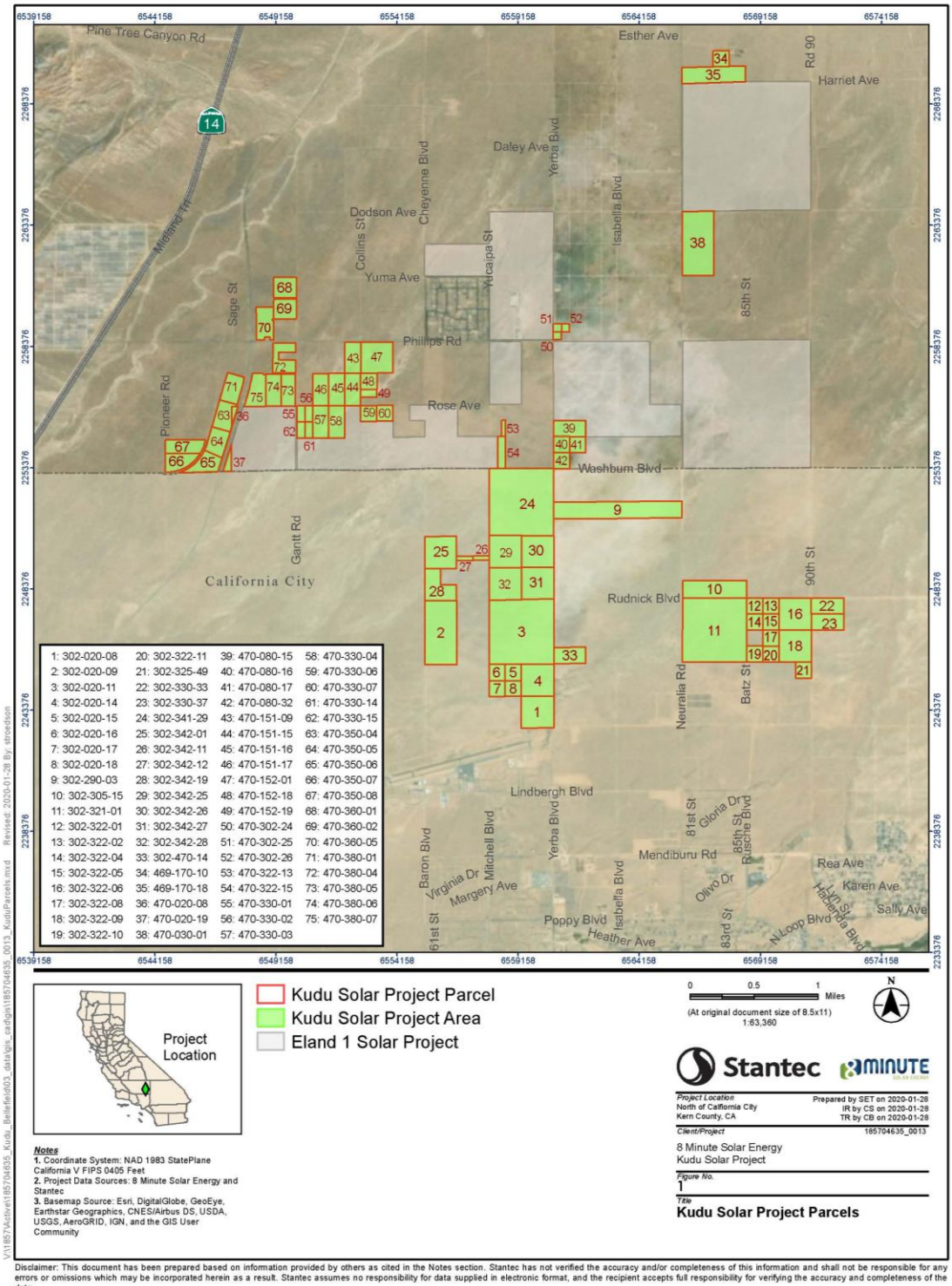
No.	APN	Acres
California City		
1	302-020-08	40.17
2	302-020-09	80.09
3	302-020-11	163.68
4	302-020-14	40.99
5	302-020-15	10.52
6	302-020-16	10.15
7	302-020-17	9.59
8	302-020-18	9.98
9	302-290-03	83.58
10	302-305-15	43.54
11	302-321-01	160.93
12	302-322-01	10.10

No.	APN	Acres
13	302-322-02	10.09
14	302-322-04	10.24
15	302-322-05	10.28
16	302-322-06	40.04
17	302-322-08	10.33
18	302-322-09	40.50
19	302-322-10	10.27
20	302-322-11	10.29
21	302-325-49	9.74
22	302-330-33	20.21
23	302-330-37	20.38
24	302-341-29	168.79
25	302-342-01	40.23
26	302-342-11	2.67
27	302-342-12	2.66
28	302-342-19	29.69
29	302-342-25	40.77
30	302-342-26	39.89
31	302-342-27	40.29
32	302-342-28	40.68
33	302-470-14	20.20
	California City Total	**1,281.51**
Unincorporated Kern County		
34	469-170-10	10.02
35	469-170-18	39.49
36	470-020-08	2.31
37	470-020-19	4.38
38	470-030-01	79.22
39	470-080-15	20.27
40	470-080-16	10.07
41	470-080-17	10.10
42	470-080-32	10.07
43	470-151-09	19.62
44	470-151-15	20.23
45	470-151-16	20.40
46	470-151-17	19.98
47	470-152-01	39.32

No.	APN	Acres
48	470-152-18	10.32
49	470-152-19	4.93
50	470-302-24	2.59
51	470-302-25	2.62
52	470-302-26	2.52
53	470-322-13	2.39
54	470-322-15	9.96
55	470-330-01	5.06
56	470-330-02	4.77
57	470-330-03	19.86
58	470-330-04	20.15
59	470-330-06	9.95
60	470-330-07	10.02
61	470-330-14	4.89
62	470-330-15	5.23
63	470-350-04	18.65
64	470-350-05	18.91
65	470-350-06	18.89
66	470-350-07	18.57
67	470-350-08	19.93
68	470-360-01	18.43
69	470-360-02	17.85
70	470-360-05	21.15
71	470-380-01	19.92
72	470-380-04	21.35
73	470-380-05	17.34
74	470-380-06	19.88
75	470-380-07	21.95
	Unincorporated Kern County Total	**673.55**
	Total	**1,955.06**

Note:
APN = Assessor Parcel Number

Figure 1: Kudu Solar Farm - Assessors Parcels



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

1.2 DESCRIPTION OF PROPOSED PROJECT

The Applicant proposes to develop a photovoltaic (PV) energy facility and energy storage system (ESS) within the Project Area that is capable of producing up to 500 MW of AC power, and 600 MW hours (MWh) of storage capacity. Power generated by the Project would be collected using up to 230 kilovolt (kV) collector lines which run underground and/or overhead to a dedicated Project substation, or to the Eland 1 Substation. The Project may also share the Eland 1 generation tie- (gen-tie) line facilities, or gen-tie rights-of-way. The Eland 1 substation and gen-tie line have gone through environmental analysis and subsequent approval by Kern County and are not part of the Project.

Additionally, the Project may share operations & maintenance (O&M) buildings, ESS, and/or transmission facilities, as necessary, with one or more nearby solar Projects, and/or may be remotely operated. Any unused O&M building, substation, and/or transmission facility areas onsite may be covered by solar panels under such scenarios.

The Applicant has considered the following in its selection of the Project site for detailed evaluation:

- Land availability (approximately 1,955 gross acres)
- Land use zoning: primarily agriculture located away from high-density residential developments
- Proximity to interconnecting substation (approximately 7 miles away) and ability to share facilities with other solar Projects

Up to 20 full-time employees would operate the Project. Typically, the majority of the staff would work during the day shift (sunrise to sunset), and the remainder would work during the night shifts and weekend. As noted earlier, it is possible that the Project would share O&M, substation, and/or transmission facilities with one or more nearby solar projects and may be remotely operated. In such scenarios, the Project's onsite staff could be reduced.

After the useful life of the Project, the panels would be disassembled from the mounting frames, and the Project site would be restored to its pre-development function.

1.2.1 PV Module Configuration

The Project would use PV panels or modules[1] on mounting frameworks to convert sunlight directly into electricity. Individual panels would be installed on either fixed-tilt or tracker mount systems (single- or dual- axis, using galvanized steel or aluminum). If the panels are configured for fixed tilt, they would be oriented toward the south. For tracking configurations, the panels would rotate to follow the sun over the course of the day. Although the panels could stand up to 20 feet high, depending on the mounting system used and county building codes, panels are expected to remain between 6 and 8 feet high.

The solar panel array would be arranged in groups called blocks, with inverter stations generally located centrally within the blocks. Blocks would produce direct electrical current (DC), which is converted to AC at the inverter stations.

[1] Including but not limited to bi-facial or concentrated photovoltaic (CPV) technology

Each PV module would be placed on a fixed-tilt or tracker mounting structure. The foundations for the mounting structures can extend up to 10 feet below ground, depending on the structure, soil conditions, and wind loads, and may be encased in concrete or use small concrete footings. Final solar panel layout and spacing would be optimized for Project Area characteristics and the desired energy production profile.

1.2.2 Inverter Stations

DC energy is delivered from the panels via cable to inverter stations, generally located near the center of each block. Inverter stations convert the DC energy to AC energy, which can be dispatched to the transmission system. Inverter stations are typically comprised of one or more inverter modules with a rated power of up to 2 MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear are housed in steel enclosures, while the inverter module(s) are housed in cabinets. Depending on the vendor selected, the inverter station may lie within an enclosed or canopied metal structure, typically on a skid or concrete mounted pad. No water demand is expected for the inverter stations.

1.2.3 Energy Storage System

The Project may include one or more ESS, located at or near a substation/switchyard (onsite or shared) and/or at the inverter stations, or elsewhere onsite. Such large-scale ESSs would be up to 600 MW AC in capacity and up to 25 acres in total area. ESSs consist of modular and scalable battery packs and battery control systems that conform to U.S. national safety standards. The ESS modules, which could include commercially available lithium or flow batteries, typically consist of International Organization of Standardization (ISO) standard containers (approximately 40 feet long by 8 feet wide by 8 feet high) housed in pad- or post-mounted, stackable metal structures, but may also be housed in a dedicated building(s) in compliance with applicable regulations. The maximum height of a dedicated structure is not expected to exceed 25 feet. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, and configuration chosen, as well as on offtaker/power purchase agreement requirements and on county building standards. The Project may share an ESS with one or more nearby solar Projects or may operate one or more standalone ESS facilities within the Project site. No water demand is expected for the ESS.

1.2.4 Substation

Output from the inverter stations would be transferred via electrical conduits and electrical conductor wires to one or more Project substations or switchyards (collectively referred to as substations herein), or the Eland 1 Substation. The Project and any associated ESS would have their own dedicated substation equipment located either within the Project site, or within the Eland 1 Substation footprint. Dedicated equipment may incorporate several components, including auxiliary power transformers, distribution cabinets, revenue metering systems, a microwave transmission tower, and voltage switch gear. Each substation would occupy an area of up to approximately 5 acres, secured separately by a chain-link fence. The final location(s) of each component would be determined before the issuance of building permits.

Substations typically include a small control building (roughly 500 square feet) standing approximately 10 feet tall. The building is either prefabricated concrete or steel housing, with rooms for the voltage switch gear and the metering equipment, a room for the station supply transformer, and a separate control technology room in which the main

computer, the intrusion detection system, and the main distribution equipment are housed. Components of this building (e.g., control technology room and intrusion detection system) may instead be located at an O&M building described later in this document. No water demand is expected for the substation.

1.2.5 Transmission Line

Power generated by the Project would be transmitted to the Los Angeles Department of Water and Power (LADWP) Barren Ridge Substation via a 230 kV overhead and/or underground gen-tie. The Project intends to share the Eland 1 gen-tie line and right-of-way, which may require stringing additional line on the Eland 1 transmission structures or increasing the capacity of the Eland 1 gen-tie by reconductoring the line with thicker cable. If the Project cannot share these facilities, a new gen-tie line would be developed within one of the routes previously analyzed in the Eland 1 Environmental Impact Report. No water demand is expected for the transmission lines.

1.2.6 Water Usage

Water demand for panel washing and O&M domestic use is not expected to exceed 50 acre-feet per annum (afa) based on water usage at existing, similarly sized solar facilities. Water usage during construction, primarily for dust-suppression purposes, is not expected to exceed 400 acre-feet (af). It is anticipated that water would be obtained from existing onsite wells located within Fremont Valley Groundwater Basin (FVGB). Alternatively, water may be obtained from one or more offsite municipal source(s) and delivered to the Project Area via truck. If offsite water is used, it would likely be obtained from one of the nearby Springbok Projects, the Eland 1 Project, or from a commercial source. If the Applicant determines that offsite water would be used, the Applicant would submit a Will Serve Letter from the proposed offsite water purveyor(s), specifically, the City, for those parcels located within California City. A small water treatment system may be installed to provide deionized water for panel washing.

1.2.7 Water Storage Tanks

One or more aboveground water storage tanks with a total capacity of up to 50,000 gallons may be placed onsite near the O&M building. The storage tank(s) near the O&M building would have the appropriate fire department connections to be used for fire suppression purposes.

1.2.8 Operations and Maintenance Building

The Project may include an O&M building approximately 40 feet by 80 feet in size, with associated onsite parking. The O&M building would be steel framed, with metal siding and roof panels. The O&M building may include the following:

1. Office
2. Repair building/parts storage
3. Control room
4. Restroom
5. Septic tank and leach field

Roads, driveways, and parking lot entrances would be constructed in accordance with Kern County and California City improvement standards. Parking spaces and walkways would be constructed in conformance with all California accessibility regulations.

As noted earlier, the Project may share O&M facilities and/or staff with one or more nearby solar Projects and may be remotely operated. Any unused O&M areas onsite may be covered by solar panels.

1.2.9 Project Site Security and Fencing

The Project site would be enclosed within a chain link fence with barbed wire measuring up to 8 feet in height from finished grade. An intrusion alarm system comprised of sensor cables would be integrated into the perimeter fence, intrusion detection cabinets placed approximately every 1,500 feet along the perimeter fence, and an intrusions control unit, located either in the substation control room or at the O&M building, or similar technology, may be installed. Additionally, the Project may include additional security measures including but not limited to barbed wire, low voltage fencing with warning reflective signage, controlled access points, security alarms, security camera systems, and security guard vehicle patrols to deter trespassing and/or unauthorized activities that could interfere with operation of the Project.

Controlled access gates would be maintained at the main entrances to the Project site. Project site access would be provided to offsite emergency response teams that respond in the event of an after-hours emergency. Enclosure gates would be manually operated with a key provided in an identified key box location.

1.2.10 Project Site Lighting

Project site lighting would be directed away from public rights-of-way. Lighting used onsite would be minimal. Site lighting may include motion sensor lights for security purposes. Lighting used onsite would be of the lowest intensity foot candle level, in compliance with any applicable regulations, measured at the property line after dark.

1.3 ANNUAL PRODUCTION

The Project would generate electrical power during daylight hours. Peak electricity demand in California corresponds with air conditioning use on summer afternoons when ambient temperatures are high. The Project's peak generating capacity corresponds to this time-period. There is no generating capacity between sunset and sunrise due to the lack of solar energy, though power may be released from the ESS at any time of day.

The Project would have a nominal output capacity of up to 500 MW AC and 600 MWh of storage capacity, sufficient to power roughly 240,000 homes and displacing 745,000 tons of carbon dioxide equivalent (CO_2e) per year when compared to a gas-fired power plant or 1,476,000 tons when compared to a coal-fired power plant.

1.4 CONSTRUCTION ACTIVITIES

The construction period for the Project, from site preparation through construction, testing, and commercial operation, is expected to commence as early as Q4 2021 and would extend for approximately 12 to 18 months.

Construction of the facility would include the following activities:

- Site preparation
- Grading and earthwork
- Concrete foundations

- Structural steel work
- Electrical/instrumentation work
- Collector line installation
- Architecture and landscaping

No roadways would be affected by the Project, except during the construction period. Construction traffic would access the site from Philips Road, Gantt Road, and Neuralia Road, or through the Eland 1 Project site. It is estimated that up to 1,000 workers per day (during peak construction periods) would be required during the construction of the Project.

Heavy construction is expected to occur between 6:00 AM and 5:00 PM, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Low-level noise activities may potentially occur between the hours of 10:00 PM and 7:00 AM. Nighttime activities could potentially include but are not limited to refueling equipment, staging material for the following day's construction activities, quality assurance and control, and commissioning.

Materials and supplies would be delivered to the Project Area by truck. Truck deliveries would normally occur during daylight hours. However, there would be offloading and/or transporting to the Project Area on weekends and during evening hours.

Earth-moving activities are expected to be limited to the construction of the access roads, O&M building, substation, ESS(s), and any stormwater protection or storage (detention) facilities. Final grading may include revegetation with low-lying grass or applying earth-binding materials to disturbed areas.

1.5 WORK FORCE

Once the Project is constructed, maintenance would generally be limited to the following:

1. Cleaning of PV panels
2. Monitoring electricity generation
3. Providing site security
4. Facility maintenance: replacing or repairing inverters, wiring, and PV modules

It is expected that the Project would require an operational staff of up to 20 full-time employees. As noted earlier, it is possible that the Project would share O&M, substation, ESS, and/or transmission facilities with one or more nearby Projects. In such a scenario, the Projects would share personnel, thereby potentially reducing the Project's on-site staff.

The facility would operate seven days a week, 24 hours a day, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

1.6 PROJECT FEATURES AND BEST MANAGEMENT PRACTICES

The following sections describe standard Project features and best management practices that would be applied during construction and long-term operation of the Project to maintain safety and minimize or avoid environmental impact.

1.6.1 Waste and Hazardous Materials Management

The Project would have minimal levels of materials onsite that have been defined as hazardous under 40 Code of Federal Regulations (CFR), Part 261. The following materials are expected to be used during the construction, operation, and long-term maintenance of the Project:

- Insulating oil: used for electrical equipment
- Lubricating oil: used for maintenance vehicles
- Various solvents and detergents: equipment cleaning
- Gasoline: used for maintenance vehicles

Hazardous materials and wastes would be managed, used, handled, stored, and transported in accordance with applicable local and state regulations. All hazardous wastes would be maintained at quantities below the threshold requiring a Hazardous Material Management Program (HMMP): one 55-gallon drum. Though not expected, should any onsite storage of hazardous materials exceed one 55-gallon drum, an HMMP would be prepared and implemented.

1.6.2 Spill Prevention and Containment

Less than 55 gallons of hazardous materials would be stored onsite. Spill prevention and containment for construction and operation of the Project would adhere to the Environmental Protection Agency's guidance on Spill Prevention Control and Countermeasures.

1.6.3 Wastewater/Septic System

A standard onsite septic tank and leach field may be used at the O&M building to dispose sanitary wastewater, designed to meet O&M guidelines required by Kern County laws, ordinances, regulations, and standards.

1.6.4 Inert Solids

Inert solid wastes resulting from construction activities may include recyclable items such as paper, cardboard, solid concrete and block, metals, wire, glass, type 1-4 plastics, drywall, wood, and lubricating oils. Non-recyclable items include insulation, other plastics, food waste, vinyl flooring and base, carpeting, paint containers, packing materials, and other construction wastes. A construction waste management plan would be prepared for review by the county and California City. Consistent with local regulations and the California Green Building Code, the plan would provide for diversion of a minimum of 50 percent of construction waste from landfill.

Chemical storage tanks (if any) would be designed and installed to meet applicable local and state regulations. Any wastes classified as hazardous, such as solvents, degreasing agents, concrete curing compounds, paints, adhesives,

chemicals, or chemical containers, would be stored in an approved storage facility/shed/structure and disposed of as required by local and state regulations. Material quantities of hazardous wastes are not expected.

1.6.5 Health and Safety

Safety precautions and emergency systems would be implemented as part of the design and construction of the Project to ensure safe and reliable operation. Administrative controls would include classroom and hands-on training in O&M procedures, general safety items, and a planned maintenance program. These would work with the system design and monitoring features to enhance safety and reliability.

The Project would have an emergency response plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies to provide aid in the event of an emergency.

1.7 CLIMATE

The northern Antelope Valley region is considered a “high desert” environment, with an arid climate that is characterized by hot, dry summers and cool winters with very little precipitation. Most of the annual precipitation occurs during the period from November through April. The average annual temperature is roughly 63.8 degrees Fahrenheit (°F), although it is not unusual for the temperature to exceed 100 °F in summer (Table 2).

Table 2: Average Monthly and Annual Evapotranspiration, Precipitation and Temperature

Month	Average Evapotranspiration (in)	Average Total Precipitation (mm/in)	Average Temperature (°F)
January	1.24	23/0.91	45
February	2.24	21/0.83	49.3
March	3.72	16/0.63	53.1
April	5.7	8/0.31	59.5
May	7.44	2/0.08	68
June	8.1	1/0.04	76.8
July	8.68	2/0.08	83.5
August	7.75	5/0.2	81.9
September	5.7	5/0.2	75.2
October	4.03	4/0.16	64.8
November	2.1	16/0.63	52.5
December	1.2	16/0.63	45
Annual	57.9	119/4.69	62.8

Notes:
°F = degrees Fahrenheit
in = inches
mm/in = millimeters AND inch
Source: climate-data.org

California has experienced three declared droughts in the last three decades. In 1976, the state received an average of only 7.4 inches of rain. Until recently, the drought of 1987–1992 was considered the most severe drought in California's history. However, the severity of that drought period has been eclipsed by the historic drought experienced from 2011–2016. Conversely, these drought periods are often offset by periods of intense rainfall that can lead to flooding. This extreme climatic variability is common throughout California.

2.0 WATER SUPPLY PLANNING UNDER SENATE BILL 610

Senate Bill (SB) 610 was passed into law on January 1, 2002. This legislation identified the need to incorporate water supply and demand analysis at the earliest possible stage in the planning process. SB 610 amended portions of the Water Code, including Section 10631, which contains the Urban Water Management Planning Act, as well as adding Sections 10910, 10911, 10912, 10913, and 10915, which describe the required elements of a WSA.

A Water Supply Assessment (WSA) is designed to build on the information that is typically contained in an Urban Water Management Plan (UWMP). The amendments to Water Code Section 10631 were designed to make WSAs and UWMPs consistent. A key difference between WSAs and UWMPs is that UWMPs are required to be revised every five years, in years ending with either zero or five, while WSAs are required as part of the environmental review process for each individually qualifying Project. Not all providers who prepare a WSA are required to prepare an UWMP.

A companion bill (SB 221) was also passed at the same time as SB 610. This law requires that approval by a city or county of certain residential subdivisions, as defined by California Government Code Section 66473.7(a)(1), must include an affirmative written verification of sufficient water supply. SB 221 is designed as a fail-safe mechanism to ensure that collaboration on identifying water supplies to serve a new large subdivision occurs early in the planning process. This verification must also include documentation of historical water deliveries for the previous 20 years, as well as a description of foreseeable impacts on the availability of water resources in the region of the proposed subdivision.

2.1 WATER SUPPLY ASSESSMENT

The WSA process involves answering the following questions:

- Is the Project subject to the CEQA?
- Is it a Project under SB 610?
- Is there a public water system?
- Is there current UWMP that accounts for the Project demand?
- Is groundwater a component of the supplies for the Project?
- Are there sufficient supplies available to serve the Project over the next 20 years?

2.1.1 Is the Project Subject to CEQA?

The first step in the WSA process is determining whether the Project is subject to CEQA. SB 610 amended Public Resources Code Section 21151.9 to read, “Whenever a city or county determines that a Project, as defined in Section 10912 of the Water Code, is subject to this division [i.e., CEQA], it shall comply with part 2.10 (commencing with Section 10910) of Division 6 of the Water Code.”

Conclusion: *The proposed Project will undergo environmental review pursuant to the requirements of CEQA; therefore, the information contained in this assessment would be used to support the analysis contained in the CEQA document.*

2.1.2 Is It a Project Under Senate Bill 610?

The second step in the SB 610 process is to determine if a Project meets the definition of a "Project" under Water Code Section 10912 (a). Under this section, a "Project" is defined as meeting any of the following criteria:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A commercial building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A hotel or motel with more than 500 rooms;
- A proposed industrial, manufacturing, or processing plant, or industrial park, planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;

In addition, , if a public water system has less than 5,000 service connections, the definition of a "Project" also includes any proposed residential, business, commercial, hotel, or motel, or industrial development that would account for an increase of 10 percent or more in the number of service connections for the public water system. In the portion of the proposed Project that lies within California City, in 2015, there were 4,430 active service connections serving 2,469 af of water (out of 3,606 af produced) to a population of 14,233 according to the Urban Water Management Plan (UWMP) 2015 Update (California City, 2017). The proposed Kudu Project will not increase service connections by more than 10%. Based on the foregoing, the Project does not include any development listed under Section 19012(a) of the Water Code.

Conclusion: *The proposed Kudu Project does not meet the definition of a "Project" under Water Code Section 10912(a).*

2.1.3 Is There a Public Water System?

The third step in the WSA process is determining if there is a "public water system" to serve the Project. Section 10912 (c) of the Water Code states, "[A] public water system means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections."

Conclusion: *California City operates and maintains a public water system (No. 1510032) that provides water service to most of its residential, commercial and industrial properties within its corporate boundaries (Quad Knopf, 2002; California City, 2017). Approximately 33 parcels in the proposed Kudu project which occupy an area of 1,281.51 acres are located within California City. The portion of the Kudu project that lies within California City will be served by the California City Water Department (personal communication, Jose "Joe" Barragan, Public Works Director, May 19, 2020). The 44 unincorporated parcels in the proposed Kudu project that occupy an area of 673.55 acres are not connected to a public water system and would use groundwater or truck water from nearby sources.*

2.1.4 Is There a Current UWMP That Accounts for the Project Demand?

Step four in the WSA process involves determining if there is a current UWMP that considers the projected water demand for the Project Area. The Water Code requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 afa, must prepare an UWMP, and this plan must be updated at least every 5 years on or before December 31, in the years ending in five and zero. Water Code Section 10910 (c) (2) states, "If the projected water demand associated with the proposed Project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the UWMP in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g) [i.e., the WSA]."

Conclusion: *The City prepared an UWMP 2015 Update (California City, 2017). According to the UWMP, California City had 4,430 active service connections in 2015 serving a population of 14,233. The portion of the Kudu project that lies within California City will be served by the California City Water Department (personal communication, Jose "Joe" Barragan, Public Works Director, May 19, 2020). . However, the UWMP does not account for delivery of water to the incorporated portion of the Kudu project. The portion of the Kudu project that lies outside California City in unincorporated Kern County would not be served by a public water system and there is no current UWMP that accounts for the unincorporated Kern County portion of the Kudu project water demand.*

2.1.5 Is Groundwater a Component of the Supplies of the Project?

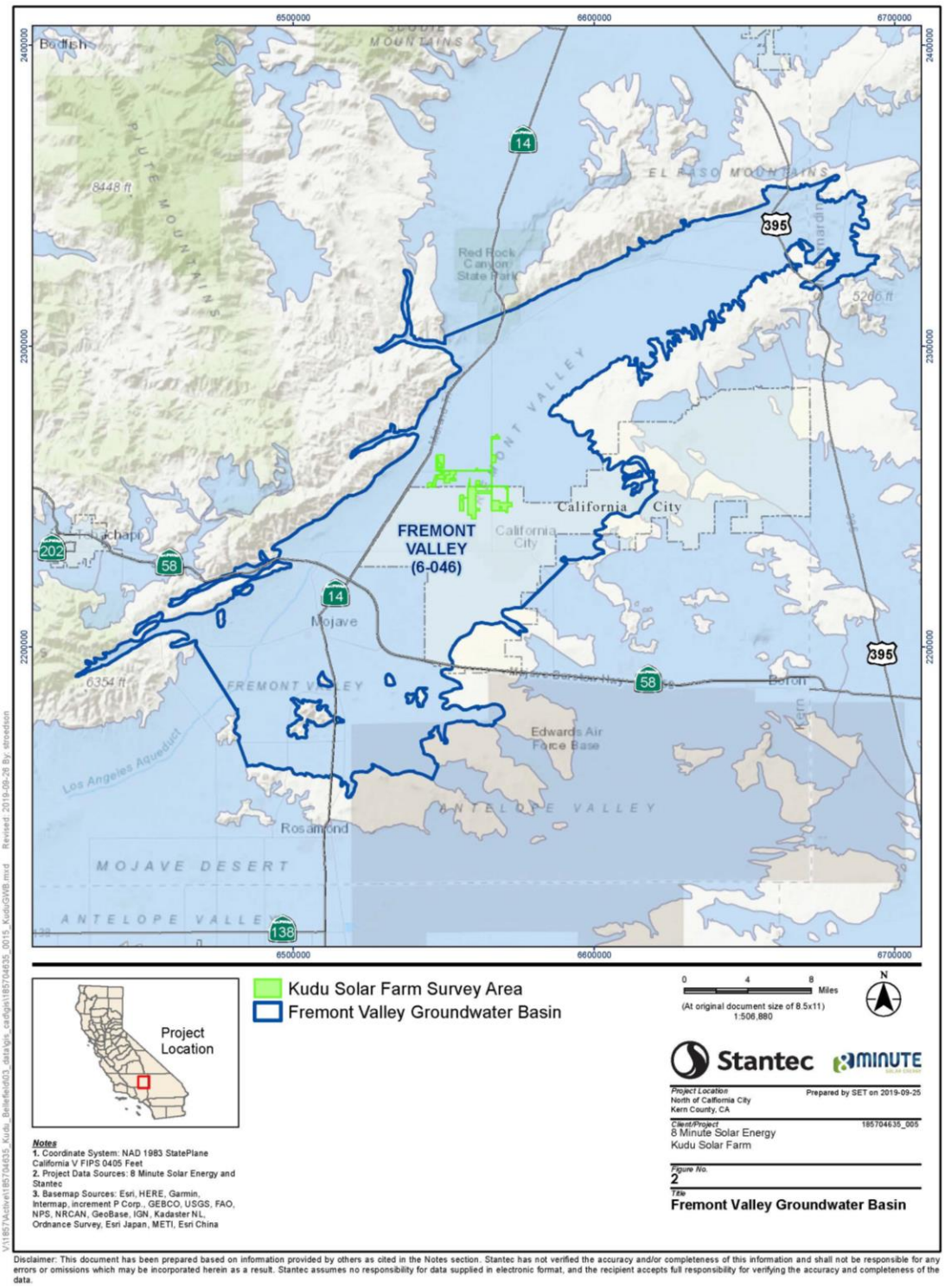
This section addresses the requirements of the Water Code Section 110910 (f), paragraphs 1 through 5, which apply if groundwater is a water source for a proposed Project. Pursuant to Water Code Section 10910 (f), the groundwater analysis presented in this analysis focuses on the Fremont Valley Groundwater Basin (Figure 2).

According to DWR (2004): The FVGB (Basin No. 6-046) underlies Fremont Valley in eastern Kern County and northwestern San Bernardino County. The basin is bounded on the northwest and north by the Garlock fault zone against impermeable crystalline rocks of the Sierra Nevada and El Paso Mountains.. This FVGB is bounded by the Summit Range, Rand Mountains, Red Mountain, Lava Mountains, Castle Butte, Bissel Hills, and Rosamond Hills.

The basin is bounded on the southwest by the Antelope Valley Groundwater Basin (AVGB) along a groundwater divide from the mouth of Oak Creek through Middle Butte to exposed basement rock near Gem Hill. Average annual rainfall in the Fremont Valley ranges from 4 to 12 inches. Surface water in Fremont Valley drains toward Koehn Lake; however, surface drainage overlying the southwestern part of the basin drains southward toward the town of Rosamond. Water demand for the 673.55-acre portion of the Project within unincorporated Kern County would be entirely met through the delivery of groundwater produced by onsite wells or water purchased from other nearby sources. The unincorporated Kern County portion of the Project occupies 34.5% of the total Project Area. The total operation demand for the Project would be approximately 50 afa, and the temporary demand during construction would be 400 af. The total operation and temporary construction water demand for the portion of the Project within unincorporated Kern County would be 17.25 afa and 37.75 afa, respectively.

Conclusion: *Groundwater production in the unincorporated portion of the Project is not considered a* de minimis *extraction under Section 10721 of the Water Code.*

Figure 2: Fremont Valley Groundwater Basin



Groundwater Basin Description

According to DWR (2004), “Both Quaternary alluvium and lacustrine deposits are water-bearing; however, the alluvium is the most important water-bearing material in the basin (DWR 1969). Alluvium is about 1,190 feet thick (Bader 1969; DWR 1964) along the margin of the basin and thins toward the middle of the basin, where it is interbedded with thick layers of lacustrine silt and clay near Koehn Lake. Groundwater in the alluvium is generally unconfined, although locally confined conditions occur near Koehn Lake (DWR 1964). Average well yield is about 530 gallons per minute (gpm) with a maximum yield of 2,580 gpm (DWR 1975).”

“The Garlock and El Paso fault zones, which extend along the foothills of the Sierra Nevada and El Paso Mountains, form restrictive groundwater barriers on the west and northwest sides of the basin (Dibblee 1967). The Cantil Valley fault traverses the northeast part of the basin, but its effect on groundwater is not known. The Muroc fault traverses the central part of the basin and forms a partial barrier to groundwater flow (DWR 1964). Natural recharge of the basin includes percolation of ephemeral streams that flow from the Sierra Nevada. The general groundwater flow direction is toward Koehn Lake at the center of the valley (Bader 1969, DWR 1964). There is no appreciable quantity of groundwater flowing out of the basin (Bader 1969).” The total storage capacity of the basin is calculated to be 4,800,000 af (DWR 2004) based on DWR (1975). However, a more recent analysis of groundwater storage is presented in the FVBSNMP (Woodard & Curran, 2018b), which is based on a comparison of groundwater contour maps in 1958 and 2017. The estimated change in storage during this period is -738,100 af, results inequivalent to a groundwater in storage of 4,070,000 af. Groundwater recharge in this analysis is estimated at 13,800 afa (Woodard & Curran, 2018b).

Groundwater quality within FVGB was assessed as part of the FVGMP (Woodard & Curran, 2018a) and FVBSNMP (Woodard & Curran, 2018b). Constituents showing elevated concentrations in the basin included Total Dissolved solids near Koehn Lake, as well as localized areas of arsenic, hexavalent chromium, and nitrate. Perchlorate has not been identified as an issue in the region (Woodard & Curran, 2018a).

Groundwater Management

In November 2009, the governor signed into law SBx7-6, which established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. Groundwater level data entered into DWR’s online CASGEM reporting system by monitoring entities beginning in January 2012 were used to establish groundwater basin prioritization as part of the enactment of the Sustainable Groundwater Management Act (SGMA) of 2014. Enactment of SGMA amended Water Code Section 10720 *et al*. in an effort to provide a statewide system for the sustainable management of groundwater. For medium- and high-priority groundwater basins, SGMA requires the designation of a Groundwater Sustainability Agency (GSA). GSAs have broad groundwater management powers. For example, GSAs may require groundwater well registration, measurement of groundwater extractions, and filing of annual extractions reports.

SGMA authorizes GSAs to regulate groundwater extractions by imposing well spacing requirements, limiting extractions, and establishing extraction allocations. The legislation does not apply to adjudicated groundwater basins that are managed by the courts or to basins deemed by DWR to be low priority. SGMA requires GSAs to adopt Groundwater Sustainability Plans (GSPs) for medium- and high-priority basins. These plans must set the groundwater basin on a course toward sustainable management to eliminate adverse groundwater conditions specified as undesirable results. The law allows a local agency that has, “water supply, water management, or land

use responsibilities within a groundwater basin, to elect to be a GSA." The AVGB, which borders the FVGB to the south and southwest is adjudicated but the FVGB is not.

Note: *No GSA has been formed to serve the FVGB; therefore, management is assumed by Kern County.*

Governance and Local Control

The SGMA requires that all high- and medium-priority groundwater basins must establish governance under one or more GSAs by June 30, 2017. GSAs for high- and medium-priority basins must adopt their GSP by January 31, 2022. Low-priority basins are not required to prepare a GSP.

The FVGB is designated under CASGEM as a "low priority" groundwater basin at this time; and as such, is not subject to SGMA GSA and GSP requirements.

In 2019, the Fremont Basin Integrated Regional Water Management Plan (IRWMP) was prepared on behalf of California City, Mojave Public Utilities District (MPUD) and AVEK; Woodard & Curran, 2019). As part of this document the FVGWMPWoodard & Curran, 2018a) and FVBSNNMP (Woodard & Curran, 2018b) were prepared as supplements to the IRWMP as Appendix B and C, respectively. According to the FVGMP, the intent of the FVGMP is…" to act as a "pre-GSP" document that will support and inform the future development of a GSP for the FVGB" (Woodard & Curran, 2018b, p. 1-3).

Conclusion: *The FVGB has been designated as a low-priority basin and is not required to prepare a GSP. A FVBGMP was prepared as a pre-GSP document in the event the FVGB is required to prepare a GSP at a future date.*

Groundwater Sustainability Plans

GSPs must include minimum thresholds and measurable objectives to achieve the goal of groundwater basin sustainability within 20 years of GSP implementation. The SGMA defines GSPs that achieve sustainable groundwater management by ensuring that the applicable basin is operated within the sustainable yield. Sustainable yield is defined as the maximum quantity of water that can be withdrawn over a period of years without causing an undesirable result. An undesirable result means one or more of the following effects cause by groundwater conditions occurring throughout the basin:

- Chronic lowering of groundwater levels;
- Significant and unreasonable reduction of groundwater storage;
- Significant and unreasonable seawater intrusion;
- Significant and unreasonably degraded water quality;
- Significant and unreasonable land subsidence that substantially interferes with surface land uses; and/or
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The GSP must include monitoring and management for the basin over a 50-year planning horizon, and plans must articulate measurable objectives to be achieved every 5 years. The DWR will review the plans and will have the power to request changes to a submitted plan. The plan must establish measurable objectives, as well as incremental milestones every 5 years in order to achieve the sustainability goals identified in the plan within 20 years.

As noted above, the FVBGMP was prepared in 2018 (Woodard & Curran, 2018a). The FVBGMP preliminarily addressed the six GSP undesirable results and developed a strategy for monitoring five of the six undesirable results. Seawater intrusion was dismissed owing to the land locked nature of the groundwater basin and distance from a saline water body (e.g., Pacific Ocean).

Conclusion: *The FVGB has been designated as a low priority basin. Therefore, no GSP is required. A FVBGMP was prepared as a pre-GSP document in the event the FVGB is required to prepare a GSP at a future date.*

2.1.6 Are There Sufficient Supplies to Serve the Project Over the Next Twenty Years?

The next step in the WSA process is to prepare the actual assessment of the available water supplies, including the availability of these supplies in all water-year conditions over a 20-year planning horizon and an assessment of how these supplies relate to Project-specific and cumulative demands over that same 20-year period. To be consistent, the analysis horizon of this WSA extends to 2041. Water Code Section 10910 (c)(4) states, "If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the Project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the Project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed Project, in addition to existing and planned future uses including agricultural and manufacturing uses." Tables 3 and 4 provide future water supply availability for the Project in the FVGB and California City, respectively. The estimated annual water demand in the FVGB in 2020 is 9,487 af and is expected to increase to 12,301 af in 2040 under baseline conditions (Woodard & Curran, 2018a). Current and projected groundwater production in the FVGB is estimated to be 7,515 af in 2020 and 9,894 af in 2040 (Woodard & Curran, 2018a). In addition, imported State Water Project (SWP) water purchased from and delivered to local water agencies by AVEK is estimated to be 1,190 af in 2020 and 1,420 af in 2040. Recycled water produced locally is estimated to be 783 af in 2020 and 988 af in 2040 (Woodard & Curran, 2018a).

Table 3: Future Water Supply Availability (2040) in the FVGB

Current Source	Average Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
Groundwater (FVGB)	9,894	9,894	9,894	9,894	9,894
Imported SWP Water (AVEK)	1,190	1,190	1,190	600	0
Total Supply	11,084	11,084	11,084	10,494	9,894

Current and projected groundwater production in California City is estimated to be 7,678 af in 2020 and 2040 (California City, 2017). In addition, imported State Water Project (SWP) water purchased from and delivered to California City by AVEK is estimated to be 962 af in 2020 and 2040. Recycled water produced locally, which is used to irrigate Tierra Del Sol Golf Course and maintain Central Park Lake, is estimated to be 761.4 af in 2020 and 962.4 af in 2040 (California City, 2017).

Table 4: Future Water Supply Availability (2040) in California City

Current Source (a)(b)	Average Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
Groundwater (c)	7,678	7,678	7,678	7,678	7,678
Imported SWP Water (AVEK)	1,071	1,071	1,071	1,071	1,071
Recycled Water	962	962	962	962	962
Total Supply	9,711	9,711	9,711	9,711	9,711

Notes:

(a) af = acre-feet

(b) Estimates from California City's UWMP 2015 Update (California City, 2017). Values converted from million gallons to acre-feet using 1 acre-foot = 325,850 gallons.

(c) Estimate based on 80% of total groundwater production capacity.

Conclusion: *According to Woodard & Curran (2018a), groundwater production in the FVGB is estimated to be 7,515 afa in 2020 and projected to be 9,894 afa in 2040 under baseline conditions. In the California City's UWMP 2015 Update (California City, 2017), groundwater production is estimated to be 7,678 afa in 2020 and 2040, with additional sources of supply including 1,071 afa of imported SWP water from AVEK in 2020 and 2040, and 761.4 afa and 962.4 afa of recycled water produced locally in 2020 and 2040, respectively.*

Project Site Demands

Since the mid to late 1970s, there has been little or no consumptive demand at the proposed Kudu Project site. The Project estimates an annual demand of 50 afa for all operations, which is based on water use at other, similarly sized solar project, and includes cleaning of the solar panels. It is anticipated that the annual demand will remain constant over the 20-year projection as shown in Table 5.

Table 5: Anticipated Future Project Water Demand (2040)

Land Use Category	Total Acres	Avg demand (afa/acre)	Estimated Total Demand (afa)
California City	1,281.51	0.026	32.75
Unincorporated Kern County	673.55	0.026	17.25
TOTAL	1,955.06	0.026	50

Note:

afa = acre-feet annually

Comparison of Available Water Supplies Versus Demand

Section 10910 (c)(3) of the Water Code states, "The water supply assessment for the Project shall include a discussion with regard to whether the public water system's total projected water supplies available for normal, dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed Project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses."

As described in the City's UWMP 2015 Update (California City, 2017), in 2015, the City operated and maintained six water wells with a production capacity of 5,100 gallons per minute (gpm) or 2,680.56 million gallons per annum (mga; 8,226.36 afa). In 2020, the City was projected to operate and maintain two additional wells increasing the total production capacity to 5,750 gpm or 3,127.32 mga (9,597.42 afa). In addition to groundwater, the City imports SWP water from AVEK which was 1,700 af in 2015 and is estimated to be 1,070 af in 2020. Between 2010 and 2015, groundwater pumped by the City averaged of 968.26 mga or 2,971.5 afa. During the same period, deliveries of imported SWP water from AVEK averaged 310.59 mga or 953.2 afa.

Tables 6 and 7 present future water supply demand at Project build-out in the FVGB and California City, respectively. As shown in the tables there is ample supply of water available to the portions of the Project within unincorporated Kern County in the FVGB and in California City, respectively.

Table 6: Future Water Supply Versus Project Water Demand at Build-Out in the FVGB

Current Source	Average Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
Groundwater (FVGB)	9,894	9,894	9,894	9,894	9,894
Imported SWP Water (AVEK)*	1,190	1,190	1,190	600	0
Total Demand (Kudu)	50	50	50	50	50
Estimated Surplus/ Shortfall	11,034	11,034	11,034	10,444	9,844

Note:
af = acre-feet
*estimates from 2040 projection.

Table 7: Future Water Supply Versus Project Demand at Build-Out in California City

Current Source (a)(b)	Average Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
Groundwater	7,678	7,678	7,678	7,678	7,678
Imported SWP Water (AVEK)	1,071	1,071	1,071	1,071	1,071
Total Demand (Kudu) (c)	32.8	32.8	32.8	32.8	32.8
Estimated Surplus/ Shortfall	8,716.2	8,716.2	8,716.2	8,716.2	8,716.2

Note:
(a) All units in afa
(b) Estimates from California City's UWMP 2015 Update (California City, 2017). Values converted from million gallons to acre-feet using 1 acre-foot = 325,850 gallons.
(c) Assumes only the portion of the Project within California City that will be served by the California City Water Department, or 65.5% x 50 afa = 32.8 afa.

Conclusion: *The estimated annual demand for the Project does not represent a* de minimis *use compared to existing available water supplies in the FVGB and the portion of the Kudu Project located within California City; however, there are adequate supplies available to serve the proposed Kudu Project under all water year conditions..*

2.1.7 Conclusions

According to the requirements of Water Code Section 10910(c)(3), the water supply assessment shall include a discussion of, "whether the public water system's total projected water supplies available will meet the projected water demand associated with proposed Project, in addition to the public water system's existing and planned future uses."

The following is a summary of the water supply assessment for this Project:

- The Project will be under environmental review pursuant to the requirements of CEQA; therefore, the information contained in this assessment will be used to support the analysis contained in the CEQA document.
- The Project does not meet the definition of a "Project" under Water Code Section 10912(a).
- A 1281.51-acre portion of the Kudu Project is located within California City and may be served by the California City Water Department. The 673.55-acre portion of the Kudu Project located in unincorporated Kern County will not be served by a public water system. California City prepared a UWMP 2015 Update (California City, 2017) that did not account for the Project water demand.
- Proposed water demand for the portion of the Kudu Project located within California City will be met by California City water supplies, but the portion of the Kudu Project located in unincorporated Kern County would be met by local groundwater pumping in an amount that is not considered a *de minimis* extraction under Section 10721 of the Water Code.The groundwater supply would be extracted from the FVGB. No Groundwater Sustainability Agency has been formed to serve this basin, and management of this basin is assumed by Kern County. A FVGMP has been prepared by California City, MPUD and AVEK (Woodard & Curran, 2018a) that is intended to serve as a pre-GSP document in the event the FVGB is required to prepare a GSP. The AVGBto the south is adjudicated, but the FVGB is not.
- The FVGB has been designated as a "low" priority basin by the DWR, and a GSP is not required under the SGMA.
- According to the FVGMP (Woodard & Curran, 2018a), groundwater production in the FVGB in 2020 is estimated to be 7,515 af and projected to be 9,894 af in 2040.
- According to the FVBSNMP (Woodard & Curran, 2018b), groundwater storage in the FVGB was estimated to be 4,800,000 af in 1975, but is currently estimated at 4,070,000 af due to a reduction in storage of about 738,000 af between 1958 and 2017.
- According to the FVSNMP, average groundwater recharge to the FVGB is estimated to be 13,800 afa between 1998 and 2017.

- Average annual groundwater recharge exceeds current and projected (2040) groundwater production in the FVGB.

Based on the large groundwater storage remaining and average annual recharge that exceeds current and projected 2040 groundwater production in the FVGB, there is sufficient water supply available to serve the Kudu Project as proposed.ProjectBased on the Based on the esults of the assessment, sufficient water supply is available to serve the Kudu Project within the unincorporated Kern County portion of the FVGB and California City as proposed, and no further analysis should be required.

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