PROJECT REPORT

TO: ENVIRONMENTAL EVALUATION COMMITTEE

AGENDA DATE: October 24, 2019

FROM: PLANNING & DEVELOPMENT SERVICES

AGENDA TIME 1:30 PM / No. 1

PROJECT TYPE: Orni 5-Truckhaven Geothermal Exploratory Wells & Seismic Testing Project - Initial Study #18-0025 SUPERVISOR DIST # 4

LOCATION: Salton Sea & Truck-haven Geothermal areas, APN: 017-340-003-, et.al

Salton Sea Areas, CA PARCEL SIZE: various

GENERAL PLAN (existing) Open Space / Salton Sea Urban Area Plan/ various

GENERAL PLAN (proposed)

ZONE (existing) S-1 Open Space/ State Lands/Parks/ Govt. /Federal ZONE (proposed) N/A

GENERAL PLAN FINDINGS ☒ CONSISTENT ☐ INCONSISTENT ☐ MAY BE/FINDINGS

PLANNING COMMISSION DECISION: HEARING DATE:

☐ APPROVED ☐ DENIED ☐ OTHER

PLANNING DIRECTORS DECISION: HEARING DATE:

☐ APPROVED ☐ DENIED ☐ OTHER

ENVIROMENTAL EVALUATION COMMITTEE DECISION: HEARING DATE: 10/24/2019

INITIAL STUDY: 18-0025

☐ NEGATIVE DECLARATION ☒ MITIGATED NEG. DECLARATION ☐ EIR

DEPARTMENTAL REPORTS / APPROVALS:

PUBLIC WORKS	☒ NONE	☐ ATTACHED
AG	☒ NONE	☐ ATTACHED
APCD	☒ NONE	☐ ATTACHED
E.H.S.	☒ NONE	☐ ATTACHED
FIRE / OES	☒ NONE	☐ ATTACHED
SHERIFF	☐ NONE	☒ ATTACHED
OTHER NAHC,		

REQUESTED ACTION:

(See Attached)

Planning & Development Services
801 MAIN ST., EL CENTRO, CA.., 92243 442-265-1736
(Jim Minnick, Director)
Db\017\340\003\EEC hearing\projrep

EEC ORIGINAL PKG

☒ MITIGATED NEGATIVE DECLARATION

Initial Study & Environmental Analysis
For:

Truckhaven Geothermal Exploration Well Project

Prepared By:

COUNTY OF IMPERIAL
Planning & Development Services Department
801 Main Street
El Centro, CA 92243
(442) 265-1736
www.icpds.com

November 2019

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SECTION 1
INTRODUCTION

A. PURPOSE

This document is a ☐ policy-level, ☒ project level Initial Study for evaluation of potential environmental impacts resulting with the proposed _project_ .

B. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REQUIREMENTS AND THE IMPERIAL COUNTY'S GUIDELINES FOR IMPLEMENTING CEQA

As defined by Section 15063 of the State California Environmental Quality Act (CEQA) Guidelines and Section 7 of the County's "CEQA Regulations Guidelines for the Implementation of CEQA, as amended", an **Initial Study** is prepared primarily to provide the Lead Agency with information to use as the basis for determining whether an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration would be appropriate for providing the necessary environmental documentation and clearance for any proposed project.

☐ According to Section 15065, an **EIR** is deemed appropriate for a particular proposal if the following conditions occur:

- The proposal has the potential to substantially degrade quality of the environment.
- The proposal has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The proposal has possible environmental effects that are individually limited but cumulatively considerable.
- The proposal could cause direct or indirect adverse effects on human beings.

☐ According to Section 15070(a), a **Negative Declaration** is deemed appropriate if the proposal would not result in any significant effect on the environment.

☒ According to Section 15070(b), a **Mitigated Negative Declaration** is deemed appropriate if it is determined that though a proposal could result in a significant effect, mitigation measures are available to reduce these significant effects to insignificant levels.

This Initial Study has determined that the proposed applications will not result in any potentially significant environmental impacts and therefore, a Negative Declaration is deemed as the appropriate document to provide necessary environmental evaluations and clearance as identified hereinafter.

This Initial Study and Negative Declaration are prepared in conformance with the California Environmental Quality Act of 1970, as amended (Public Resources Code, Section 21000 et. seq.); Section 15070 of the State & County of Imperial's Guidelines for Implementation of the California Environmental Quality Act of 1970, as amended (California Code of Regulations, Title 14, Chapter 3, Section 15000, et. seq.); applicable requirements of the County of Imperial; and the regulations, requirements, and procedures of any other responsible public agency or an agency with jurisdiction by law.

Pursuant to the County of Imperial Guidelines for Implementing CEQA, depending on the project scope, the County of Imperial Board of Supervisors, Planning Commission and/or Planning Director is designated the Lead Agency, in accordance with Section 15050 of the CEQA Guidelines. The Lead Agency is the public agency which has the principal responsibility for approving the necessary environmental clearances and analyses for any project in the County.

C. INTENDED USES OF INITIAL STUDY AND NEGATIVE DECLARATION

This Initial Study and Negative Declaration are informational documents which are intended to inform County of Imperial decision makers, other responsible or interested agencies, and the general public of potential environmental effects of the proposed applications. The environmental review process has been established to enable public agencies to evaluate environmental consequences and to examine and implement methods of eliminating or reducing any potentially adverse impacts. While CEQA requires that consideration be given to avoiding environmental damage, the Lead Agency and other responsible public agencies must balance adverse environmental effects against other public objectives, including economic and social goals.

The Initial Study and Negative Declaration, prepared for the project will be circulated for a period of 30 days for public and agency review and comments. At the conclusion, if comments are received, the County Planning & Development Services Department will prepare a document entitled "Responses to Comments" which will be forwarded to any commenting entity and be made part of the record within 10-days of any project consideration.

D. CONTENTS OF INITIAL STUDY & NEGATIVE DECLARATION

This Initial Study is organized to facilitate a basic understanding of the existing setting and environmental implications of the proposed applications.

SECTION 1

I. INTRODUCTION presents an introduction to the entire report. This section discusses the environmental process, scope of environmental review, and incorporation by reference documents.

SECTION 2

II. ENVIRONMENTAL CHECKLIST FORM contains the County's Environmental Checklist Form. The checklist form presents results of the environmental evaluation for the proposed applications and those issue areas that would have either a significant impact, potentially significant impact, or no impact.

PROJECT SUMMARY, LOCATION AND EVIRONMENTAL SETTINGS describes the proposed project entitlements and required applications. A description of discretionary approvals and permits required for project implementation is also included. It also identifies the location of the project and a general description of the surrounding environmental settings.

ENVIRONMENTAL ANALYSIS evaluates each response provided in the environmental checklist form. Each response checked in the checklist form is discussed and supported with sufficient data and analysis as necessary. As appropriate, each response discussion describes and identifies specific impacts anticipated with project implementation.

SECTION 3

III. MANDATORY FINDINGS presents Mandatory Findings of Significance in accordance with Section 15065 of the CEQA Guidelines.

IV. PERSONS AND ORGANIZATIONS CONSULTED identifies those persons consulted and involved in preparation of this Initial Study and Negative Declaration.

V. REFERENCES lists bibliographical materials used in preparation of this document.

VI. NEGATIVE DECLARATION – COUNTY OF IMPERIAL

E. SCOPE OF ENVIRONMENTAL ANALYSIS

For evaluation of environmental impacts, each question from the Environmental Checklist Form is summarized and responses are provided according to the analysis undertaken as part of the Initial Study. Impacts and effects will be evaluated and quantified, when appropriate. To each question, there are four possible responses, including:

1. **No Impact:** A "No Impact" response is adequately supported if the impact simply does not apply to the proposed applications.

2. **Less Than Significant Impact:** The proposed applications will have the potential to impact the environment. These impacts, however, will be less than significant; no additional analysis is required.

3. **Less Than Significant With Mitigation Incorporated:** This applies where incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact".

4. **Potentially Significant Impact:** The proposed applications could have impacts that are considered significant. Additional analyses and possibly an EIR could be required to identify mitigation measures that could reduce these impacts to less than significant levels.

F. POLICY-LEVEL or PROJECT LEVEL ENVIRONMENTAL ANALYSIS

This Initial Study and Negative Declaration will be conducted under a ☐ policy-level, ☒ project level analysis. Regarding mitigation measures, it is not the intent of this document to "overlap" or restate conditions of approval that are commonly established for future known projects or the proposed applications. Additionally, those other standard requirements and regulations that any development must comply with, that are outside the County's jurisdiction, are also not considered mitigation measures and therefore, will not be identified in this document.

G. TIERED DOCUMENTS AND INCORPORATION BY REFERENCE

Information, findings, and conclusions contained in this document are based on incorporation by reference of tiered documentation, which are discussed in the following section.

1. Tiered Documents

As permitted in Section 15152(a) of the CEQA Guidelines, information and discussions from other documents can be included into this document. Tiering is defined as follows:

"Tiering refers to using the analysis of general matters contained in a broader EIR (such as the one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project."

Tiering also allows this document to comply with Section 15152(b) of the CEQA Guidelines, which discourages redundant analyses, as follows:

"Agencies are encouraged to tier the environmental analyses which they prepare for separate but related projects including the general plans, zoning changes, and development projects. This approach can eliminate repetitive discussion of the same issues and focus the later EIR or negative declaration on the actual issues ripe for decision at each level of environmental review. Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general plan, policy or program to an EIR or negative declaration for another plan, policy, or program of lesser scope, or to a site-specific EIR or negative declaration."

Further, Section 15152(d) of the CEQA Guidelines states:

"Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to effects which:

(1) Were not examined as significant effects on the environment in the prior EIR; or

(2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means."

2. Incorporation By Reference

Incorporation by reference is a procedure for reducing the size of EIRs/MND and is most appropriate for including long, descriptive, or technical materials that provide general background information, but do not contribute directly to the specific analysis of the project itself. This procedure is particularly useful when an EIR or Negative Declaration relies on a broadly-drafted EIR for its evaluation of cumulative impacts of related projects (*Las Virgenes Homeowners Federation v. County of Los Angeles* [1986, 177 Ca.3d 300]). If an EIR or Negative Declaration relies on information from a supporting study that is available to the public, the EIR or Negative Declaration cannot be deemed unsupported by evidence or analysis (*San Francisco Ecology Center v. City and County of San Francisco* [1975, 48 Ca.3d 584, 595]). This document incorporates by reference appropriate information from the "Final Environmental Impact Report and Environmental Assessment for the "County of Imperial General Plan EIR" prepared by Brian F. Mooney Associates in 1993 and updates.

When an EIR or Negative Declaration incorporates a document by reference, the incorporation must comply with Section 15150 of the CEQA Guidelines as follows:

- The incorporated document must be available to the public or be a matter of public record (CEQA Guidelines Section 15150[a]). The General Plan EIR and updates are available, along with this document, at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 Ph. (442) 265-1736.

- This document must be available for inspection by the public at an office of the lead agency (CEQA Guidelines Section 15150[b]). These documents are available at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 Ph. (442) 265-1736.

- These documents must summarize the portion of the document being incorporated by reference or briefly describe information that cannot be summarized. Furthermore, these documents must describe the relationship between the incorporated information and the analysis in the tiered documents (CEQA Guidelines Section 15150[c]). As discussed above, the tiered EIRs address the entire project site and provide background and inventory information and data which apply to the project site. Incorporated information and/or data will be cited in the appropriate sections.

- These documents must include the State identification number of the incorporated documents (CEQA Guidelines Section 15150[d]). The State Clearinghouse Number for the County of Imperial General Plan EIR is SCH #93011023.

- The material to be incorporated in this document will include general background information (CEQA Guidelines Section 15150[f]). This has been previously discussed in this document.

II. *Environmental Checklist*

1. **Project Title**: Truckhaven Geothermal Exploration Well Project
2. **Lead Agency**: Imperial County Planning & Development Services Department
3. **Contact person and phone number**: __David Black__, Planner _IV_, (442)265-1736, ext. 1746__
4. **Address**: 801 Main Street, El Centro CA, 92243
5. **E-mail**: davidblack@co.imperial.ca.us
6. **Project location**: The Proposed Project area is within the Truckhaven Geothermal Exploration Area in western Imperial County, California. The proposed geophysical survey would occur over a 23.5-square mile area within the USGS Geologic Survey 7.5' quadrangle for Kane Springs NW (Figure 3). The exploratory well sites would be located in six parcels, listed below (Figure 2).

Well Site	Assessor's Parcel Number (APN)
32-5	017-970-001 (209.4 acres)
47-5	017-970-012 (50 acres)
18-32	017-010-053 (520 acres)
47-32	017-010-053 (520 acres)
14-4	017-340-003 (213.6 acres)
17-4	017-340-003 (213.6 acres)

7. **Project sponsor's name and address**:

ORNI 5

6225 Neil Road

Reno, NV 89511

8. **General Plan designation**:

Recreation/Open Space

9. **Zoning**:

S-1 Open Space/Recreational

10. **Description of project**:

The Applicant proposes to conduct a geophysical survey (survey) and drill and test up to six geothermal exploration wells (exploratory wells) on private and State lands in the Truckhaven Geothermal Exploration Area, located south-southwest of Salton City in western Imperial County, California. Each of the proposed geothermal exploration wells would be located on separate, individual well pads that would be constructed on lands under geothermal lease to the Applicant.

11. **Surrounding land uses and setting**: Briefly describe the project's surroundings:

Surrounding land uses include Light Industrial to the north and Open Space/Recreational to the east, south, and west.

12. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement.):

California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CDOGGR)

Imperial County Air Pollution Control District

California Regional Water Quality Control Board, Colorado River Basin Region

California Department of Fish and Wildlife
California State Parks

13. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.? Yes, the County sent formal AB 52 consultation letters to Torres - Martinez Tribes and Quechan Tribes on August 7th, 2019. To date no responses have been received by the County.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture and Forestry Resources	☐	Air Quality
☒	Biological Resources	☒	Cultural Resources	☐	Energy
☒	Geology /Soils	☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials
☐	Hydrology / Water Quality	☐	Land Use / Planning	☐	Mineral Resources
☒	Noise	☐	Population / Housing	☐	Public Services
☐	Recreation	☐	Transportation	☐	Tribal Cultural Resources
☐	Utilities/Service Systems	☐	Wildfire	☐	Mandatory Findings of Significance

ENVIRONMENTAL EVALUATION COMMITTEE (EEC) DETERMINATION

After Review of the Initial Study, the Environmental Evaluation Committee has:

☐ Found that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ Found that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ Found that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ Found that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ Found that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DE MINIMIS IMPACT FINDING: ☐ Yes ☒ No

EEC VOTES	YES	NO	ABSENT
PUBLIC WORKS	☐	☐	☐
ENVIRONMENTAL HEALTH SVCS	☐	☐	☐
OFFICE EMERGENCY SERVICES	☐	☐	☐
APCD	☐	☐	☐
AG	☐	☐	☐
SHERIFF DEPARTMENT	☐	☐	☐
ICPDS	☐	☐	☐

EEC ORIGINAL PKG

Jim Minnick, Director of Planning/EEC Chairman

10-26-19
Date:

PROJECT SUMMARY

The Applicant proposes to drill and test up to six geothermal exploration wells on private and State lands in the Truckhaven Geothermal Exploration Area, located south-southwest of Salton City in western Imperial County, California (see Figure 1). Each of the proposed geothermal exploration wells would be located on separate, individual well pads that would be constructed on lands under geothermal lease to the Applicant.

The purpose of the Proposed Project is to conduct a geophysical survey and drill, complete, test and monitor up to six proposed geothermal resource wells. The geophysical survey would construct a high-resolution image of the subsurface geologic features within the Truckhaven Geothermal Lease area to identify potential geothermal reservoirs of commercial quantity. The exploratory geothermal wells would drill into and flow test the anticipated underlying geothermal reservoir to confirm the characteristics of the geothermal reservoir and detect if the geothermal resource is commercially viable.

The well sites have been tentatively selected based on past geologic investigations going back to the 1980s, including geologic mapping, geophysical surveys and temperature gradient holes. Although the six geothermal exploration well targets have been selected as best as possible at the present time, as with all geothermal exploration, geothermal reservoir targets are often refilled (and geothermal exploration wells relocated) as more data are collected and analyzed. The proposed well sites are exploratory and may or may not identify a commercially viable geothermal resource area for future development.

A. Project Location:

The Proposed Project (see Figure 1) would be located in the "Truckhaven Geothermal Leasing Area" analyzed by the BLM in the "Final Environmental Impact Statement for the Truckhaven Geothermal Leasing Area" (October 2007). The proposed well sites (see Figures 2 and 3) are located in an area analyzed in the Geothermal Overlay Zone for Imperial County's "Final Programmatic Environmental Impact Report - Renewable Energy and Transmission Element Update" (July 2015). The six exploration wells would be built within the six parcels listed in Table 1. Each of the six exploration well pads would be approximately 400 feet by 400 feet, for a surface area of approximately 3.7 acres per well and a total surface area of approximately 22.2 acres. The geophysical survey would occur within a 23.5-square mile (15,040-acre) survey area in the Truckhaven Geothermal Leasing Area. The actual survey truck paths would be approximately 10 feet wide and 200 feet long, covering a total of approximately 189 acres.

Land uses surrounding the Proposed Project include Light Industrial to the north and Open Space/Recreational to the east, south, and west. The Ocotillo Wells State Vehicular Recreational Area borders the Proposed Project area on the southern and western edges. The proposed well sites are currently vacant, unirrigated, desert land that is sparsely vegetated and primarily flat. Tule Wash and Surprise Ditch flow northeast and eventually empty into the Salton Sea. The well sites were selected to minimize surface disturbance, reduce the potential for adverse environmental effects, and make the best use of existing access within the limitation of testing the targeted geothermal resource. To the degree possible existing roads, trails and disturbances are used for access.

Primary highway access to the proposed well sites are off State Highway 86 to Airpark Drive or County Dump Road (see Figure 2). Existing access roads would be utilized to the extent practical. The access roads would be constructed or improved with gravel and/or maintained as needed to safely accommodate the traffic required for the exploration well drilling activities. Road beds would typically be approximately twenty (20) feet across. Table 1 shows the land ownership and general information for access to each well site.

Table 1: Project Well Land Ownership and Access Information – Geothermal Wells

Well Site	Assessor's Parcel Number (APN)	Surface Land Owner	Geothermal Rights Owner	Well Site Access	Nearest Residence
32-5	017-970-001 (209.4 acres)	Burrtec Waste Industries	Burrtec Waste Industries	Airpark Drive to Dessert Air Court.	0.34 mile
47-5	017-970-012 (50 acres)	Burrtec Waste Industries	Burrtec Waste Industries	From Dump Road	0.44 mile
18-32	017-010-053 (520 acres)	ORNI 5	State of California	Airpark Drive to Skywalk Drive to La Guardia Ave to Starlight Drive	0.40 mile
47-32	017-010-053 (520 acres)	ORNI 5	State of California	Airpark Drive to Skywalk Drive	0.20 mile
14-4	017-340-003 (213.6 acres)	State of California	State of California	Airpark Drive to Skywalk Drive	0.28 mile
17-4	017-340-003 (213.6 acres)	State of California	State of California	New driveway from County Dump Road	0.58 mile

Additionally, the geophysical survey will occur within a 23.5-square mile (15,040-acre) survey area covering over 200 parcels in the Truckhaven Geothermal Leasing Area as shown in Figure 3, with township and range sections noted.

B. Project Summary:

The Proposed Project includes a geophysical survey and drilling and testing of up to six geothermal exploration wells on private and State lands.

Geophysical Survey

A 23.5-square-mile, three-dimensional (3D) geophysical survey would be conducted in conjunction with vibration monitoring and drilling activities, described below. The purpose of the geophysical survey is to construct a high-resolution image of the subsurface geologic features within the Truckhaven Geothermal Lease area. This image would allow ORNI 5 to effectively verify and/or supplement the existing geologic data to design a more predictive geologic model which could be used to identify potential geothermal reservoirs of commercial quantity. Additionally, the predictive geologic model would reduce future environmental impacts by minimizing "hit and miss" exploration activities.

The survey would include approximately 3,168 receiver points distributed over approximately 119.09 linear miles of receiver lines and 3,243 source points distributed over approximately 121.97 linear miles of source lines. Two approximately 60,000-pound peak force truck-mounted vibrators equipped with hydraulically lowered pads would be used as the energy source.

Two sets of two Vibroseis trucks (four in total) would operate in tandem to travel along the GPS-established geophysical lines, stopping at given points to lower the vibrator pads centered under each vehicle. The vibrator pad would lift the truck; and source generation would be triggered from a central control truck stationed at the Salton Sea Airport (Airport), causing all trucks to vibrate in unison; this creates the energy source, which sends selected vibration signals propagating though the ground. The resulting energy wave would be recorded by the receivers and transmitted wirelessly to the data collection point located at the Airport. Source generation from vibrators will occur between 3 and 5-minute intervals, depending on access, detours, and terrain. Approximately 301 receiver channels may be actively collecting data at any given time.

Placement of receivers, consisting of six geophones each, will occur by helicopter during the data acquisition operations. A helicopter would move cache bags containing four to six receivers along parallel receiver lines. The cache bags will be suspended from a helicopter with a long line and deposited one at a time to predetermined GPS locations provided by the civil surveyors. Field survey crew members will walk to the placed cache bags to prepare and connect the transmitter station and geophones. Cables and attached geophones will be laid out by hand around each station in a predetermined pattern. Each geophone will be mounted on a 3-inch spike and placed into the soil using

foot pressure. In areas of rock outcrops, battery-operated hand drills may be used to provide a pilot hole for the geophone spike if they cannot be coupled to the ground sufficiently. Staggered deployment and pick-up of receiving stations would occur as the source sequence proceeds during data acquisition.

Field data acquisition with the use of Vibroseis trucks and receiver equipment would take an estimated 12 to 14 days.

Vibration Monitoring

Similar seismic technology will be employed for vibration monitoring conducted prior to the drilling activities. Specifically, vibration monitoring services will be conducted to collect peak particle velocity (PPV) measurements while a Vibroseis truck vibrates the ground surface (referred to as a "sweep").

The vibration monitoring would use a Blastmate III vibration monitor (data logger) with a tricomponent (transverse, longitudinal, and vertical) sensor. The sensor would be installed at two locations during vibration monitoring: 25 feet and 50 feet from the Vibroseis truck vibration pad. The sensor would be secured to the ground surface with 3-inch long pins and leveled. The longitudinal axis would be oriented toward the Vibroseis truck (parallel to the length of the truck). Two different operating capacities of the Vibroseis truck would be tested; the Vibroseis truck operating at 70% capacity and at 35-percent capacity. This allows for a PPV comparison relative to operating capacities of the Vibroseis truck. Several Vibroseis sweeps, which would span approximately 12 seconds with a frequency bandwidth of 6 to 96 Hertz (Hz), would be conducted and monitored.

The vibration monitor is programmed to monitor, record, and save the data internally. The collected data would be later downloaded to a laptop computer. Several roughly 12-second long sweeps would be monitored at each station location. The PPV and corresponding frequency would be stored and the peak vector sum (PVS) calculated. The PVS is the resultant magnitude of the peak particle velocity for the three sensor components (calculated by squaring and adding the magnitudes of the individual components and taking the square root).

Results would be presented for the three components (transverse, vertical and longitudinal) during the multiple sweeps and the corresponding frequency, as well as the PVS. It should be noted that prior to conducting the sweeps, a sample of the background vibrations would be performed. It is assumed for a remote location that the background value would be very low.

The California Department of Transportation (Caltrans) Transportation and Construction Vibration Manual (September 2013) and the USBM OSMRE Blasting Guidance Manual (March 1987) provide velocity attenuation relationships that can be used to estimate PPV at various distances and site conditions. Also included in these Manuals are vibration criteria and standards related to potential impacts from vibrations on structures and people.

The vibration monitoring would be conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area.

Restoration of the Geophysical Survey Area

Once seismic testing activities associated with the geophysical survey and vibration monitoring are complete, areas of disturbance will be restored to be consistent with conditions prior to the project activities. If any vegetation is removed during the seismic testing activities, it will be restored to match pre-project conditions.

Well Pad Layout and Construction

One well pad will be constructed for each of the six drill sites. Each exploration well pad will be approximately 400 feet by 400 feet for a surface area of about 3.7 acres per well pad and 22.2 acres for six wells total.

Well pad preparation activities would include clearing, earthwork, drainage and other improvements necessary for efficient and safe operation. The site selection process included minimizing cut and fill requirements. Additionally, the

applicant would implement Applicant Prepared Measure (APM) 1, which requires the preparation of an erosion control plan, which would identify site-specific best management practices to reduce erosion impacts, before grading to adequately control erosion during construction. However, it should be noted that the well pads would be constructed to conduct drainage to the cellar where it will be pumped to the containment basin. No off-site soil erosion is anticipated.

Construction of each well will occur sequentially so that wells are constructed one at a time. Each proposed well site would be prepared to create a level pad for the drill rig, and a graded gravel (if needed) surface for the support equipment. Runoff from undisturbed areas around the constructed sites would be directed into ditches and energy dissipaters (if needed) around the proposed well site, consistent with California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB) and Imperial County, as appropriate, best management practices for stormwater. All machinery, drilling platforms, and oil and fuel storage would be in areas tributary to the containment basin in order to prevent the movement of storm water from these areas off of the construction site. The proposed well site would be graded to direct runoff from the pad into the cellar which would be pumped to the containment basin.

The proposed well sites would be graded to direct runoff from the pad into the cellar which would be pumped to the containment basin. Containment basins would be constructed at each proposed well site for the containment and temporary storage of drilling mud and cuttings and stormwater runoff from the construction site. Each containment basin would be approximately 100 feet by 250 feet by 7 feet deep and would hold roughly 420,000 gallons with a 2-foot freeboard. Each containment basin would be lined with a 40-milimeter synthetic liner, in accordance with requirements of the CRWQCB. Compliance with California construction stormwater notification and permitting requirements would be performed for each proposed wellsite and new access road (Figure 2).

Well Drilling

The hole will be drilled with a mud rotary drilling rig, as previously used in the Imperial Valley. The rig will be equipped with diesel engines, storage tanks, mud pumps, and other typical auxiliary equipment. During drilling, if necessary)the top of the derrick will be approximately 175 feet above ground level.

The hole will be drilled using a gel- or polymer-based drilling fluid (drill mud). This fluid circulates the rock cuttings out of the bore hole and into the surface tanks or a reserve pit, where they are separated from the mud and collected. The mud is then recirculated. Underbalanced drilling may also be utilized in an effort to minimize water needs and to reduce risk of formation damage from drilling mud.

To construct the well, a 42-inch-diameter hole is first drilled to approximately ±80 feet below ground level (101 feet KB), and a 30-inch conductor is cemented in place. The rotary rig is then rigged up, a 30-inch rotating head is welded on the conductor, and a 26-inch hole is drilled to approximately ±360 feet KB. The 22-inch casing is cemented in place, and blowout prevention equipment (BOPE) is installed.

After testing the BOPE, a 20-inch hole will be drilled to approximately ±2,200 feet and 16-inch casing cemented in place. Following installation and testing of the BOPE, a 14-1/4-inch hole will be directionally drilled utilizing underbalanced drilling to a total depth of approximately 4,200 feet. A slotted 13-3/8-inch liner will be hung from ±2,200 feet to 4,150 feet.

At the conclusion of drilling, a short flow test will be conducted to clean the hole and provide reservoir information. Both reservoir temperature and pressure will be measured during and after this test. The collected cuttings and drill mud will then be tested prior to being transported off site for disposal. Depending on the analytical results, the materials will be disposed at either a landfill or another approved disposal site.

Geothermal well drilling would be conducted from the constructed well pads described above. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 days to complete. The drilling operation would employ about 25 people in 6-person shifts. Well pad construction and drilling would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12 to 16 small trucks/service vehicles/worker vehicles). It is assumed the Proposed Project would require four off-highway trucks (Vibroseis trucks)

operating eight hours per day, six vendor trucks per day to deliver equipment, and 20 worker trips per day.

The California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CDOGGR) regulates geothermal well drilling operations on private and state lands in California. CDOGGR authorizes the drilling of the wells under a Notice of Intent. CDOGGR reviews and approves the drilling program for each well including the blowout prevention equipment (BOPE) to ensure the drilling operations are safe, protect the community, and protect land and water resources. BOPE includes a 30-inch weld-on rotating head (diverter) that would be used to drill the surface hole to ±360 feet. An API 2M CSO blind ram, pipe rams, and annular preventer with rotating head will be used below ±360 feet to total depth. BOPE testing will be witnessed by the State of California's Division of Oil, Gas, and Geothermal Resources or their designated agent.

Standard geothermal well drilling equipment and well drilling operations (listed below) would be used for the Proposed Project. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Equipment Registration Program (PERP). The wells would be drilled with water- or gel-based drilling mud to circulate the drill cuttings to the surface. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface (including non-LED aircraft safety lighting), and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and pipe stands; draw works; derrick; drill pipe; trailers; drilling mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared well pad on approximately 40 or more large tractor-trailer trucks. The placement of this equipment on each prepared well pad would depend on rig-specific requirements and site-specific conditions.

Standard Geothermal Well Drilling Equipment

- Rig floor and pipe stands
- Draw works
- Derrick
- Drill pipe
- Trailers
- Drilling mud
- Fuel and water tanks
- Diesel generators
- Air compressors

Each geothermal well would also be drilled and cased to the design depth of approximately 5,000 to 7,000 feet. A geothermal well drilling and completion program for each well would be submitted to CDOGGR. BOPE inspected and approved by CDOGGR would be utilized while drilling below the surface casing. Well casing (typically 20") would be cemented to a depth of approximately 1,800 feet below Kelly bushing (bkb). A slotted liner (typically 9 5/8 inch) would be hung from approximately 1,750 feet to near total depth. All these numbers are subject to change and would be formalized when the drilling programs are submitted to CDOGGR or BLM, as appropriate.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. A containment basin would be excavated and rock cuttings would be captured in the containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 5,000 to 7,000 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

Drill Pad and Access Road Aggregate

Aggregate required for well pad (estimated at 5,926 cubic yards per well pad) and access road construction would likely be purchased from the Aggregate Products Inc. Salton Sea quarry facility, located approximately 2 miles west of the town of Salton Sea Beach and 10 miles north-northwest of the Proposed Project. It is assumed the Proposed Project would require four off-highway trucks (Vibroseis trucks) operating eight hours per day, six vendor trucks per day to deliver equipment, and 20 worker trips per day.

Water Requirements and Sources

Water required for well pad and access road construction and well drilling would typically average about 50,000 gallons per day. Water necessary for these activities would be purchased from the Coachella Valley Water District via a fire hydrant. Water would be picked up from the source and delivered over existing roads to each construction location or drilling site by a water truck which would be capable of carrying approximately 4,000 gallons per load. This includes the water needed for road grading, construction and dust control.

Well Testing

Wells would be initially flow tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the containment basin. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam and noncondensable gasses, such as hydrogen sulfide and carbon dioxide, from the geothermal fluid would be discharged to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Following the short-term test(s), all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut-in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam and noncondensable gasses from the geothermal fluid would typically be discharged to the atmosphere. The remaining geothermal fluid would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed above ground along the well site access roads or, if following access roads is not feasible, along other previously disturbed routes (see Figure 2).

Geothermal Well Monitoring

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would typically consist of several valves on top of the surface casing; which would be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism. Pressure and temperature sensors may be installed in the hole at fixed depths to monitor any changes in these parameters over time. A temperature profile of the well may also be run. This monitoring may be continued indefinitely.

Abandonment Program

After drilling operations are completed on each well, the liquids from the containment basin would either be evaporated, pumped back down the well, and/or disposed of in accordance with the requirements of the CRWQCB or Imperial County Public Health Department, as applicable.

The solid contents remaining in each containment basin, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, would be tested as required by the CRWQCB. The solids would be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If allowed they may be used as daily cover at the nearby landfill. After the materials in the containment basins have been removed the containment basin area may be reclaimed depending on if there may be a need for its use in the future.

Upon the completion of each well drilled and flow-tested, a decision would be made by the Applicant regarding the commercial potential of each well. If a well is judged by the Applicant to have any commercial potential, well operations

would likely be suspended pending application for and receipt of regulatory approvals to place the well into commercial service through a new pipeline to a new geothermal power plant or direct use facility. The well would likely continue to be monitored while these approvals are being processed. If a well is judged to not have commercial potential, it may continue to be monitored, or it may be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The well head (and any other equipment) would be removed, and the casing cut off at least 6 feet below ground surface.

Following abandonment of the well, the well site itself would be reclaimed, typically by re-grading the entire well pad and access road area to approximately the same topography as existed prior to construction of the site, including the spreading the topsoil (if any) over the surface. Revegetation would be in conformance with the requirements of the surface managing agency.

Figure 1: Vicinity Map

Figure 2: Proposed Well Locations

Figure 3: Geophysical Survey Travel Paths

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.
   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and
   b) the mitigation measure identified, if any, to reduce the impact to less than significance

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

I. *AESTHETICS*

Except as provided in Public Resources Code Section 21099, would the project:

a) Have a substantial adverse effect on a scenic vista? ☐ ☐ ☒ ☐

a) Imperial County includes over 4,597 square miles between Riverside County to the north, Arizona to the east, Mexico to the south, and San Diego County to the west. The County's visual character varies greatly and includes natural scenic visual resources such as deserts, sand dunes, mountains, and the Salton Sea. Visual character within Imperial County is defined as low, moderate, and high. Areas with a moderate to high value for maintenance of visual quality could represent opportunities for conservation and open space areas. Two scenic viewpoints along the Borrego Salton Sea Way (S-22) overlook the Proposed Project area: Badlands Viewpoint and Calcite Mine Road Look Out. These viewpoints are approximately 10 miles northwest of the Proposed Project.

Geophysical Survey: Although the geophysical survey would occur within the viewsheds of two overlooks along S-22, the Imperial County General Plan identifies the proposed geophysical survey location as within an area of "Low Value" visual quality (County of Imperial 2016). Additionally, the survey is anticipated to deploy four vibrator trucks and a series of small, geophone sensors for a duration of 12 to 14 days; therefore, any visual impacts would be minor and temporary. All tire tracks generated by vibrator trucks would also be hand raked following the completion of the survey to blend the tracks into the surrounding soil surface. The geophysical survey associated with the Proposed Project would have a less than significant impact on a scenic vista.

Exploratory Wells: Although the exploratory wells would be constructed within the viewsheds of two overlooks along S-22, the Imperial County General Plan identifies the proposed well locations as within an area of "Low Value" visual quality (County of Imperial 2016). The drilling rig derrick would be as much as 175 feet above the ground surface and the rig floor would be 20 to 30 feet above the ground surface, but there is an radio tower associated with the Salton Sea Airport currently in the viewshed; thus, the drilling rig would be consistent with the existing view. Therefore, the exploratory wells associated with the Proposed Project would have a less than significant impact on a scenic vista.

b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway? ☐ ☐ ☐ ☒

b) The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the scenic corridor.

Geophysical Survey: No State scenic highways have been designated in Imperial County; therefore, no impact associated with a scenic highway would occur.

Exploratory Wells: No State scenic highways have been designated in Imperial County; therefore, no impact associated with a scenic highway would occur.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surrounding? (Public views are those that are experienced from publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? ☐ ☐ ☒ ☐

c) Geophysical Survey: The geophysical survey associated with the Proposed Project would occur in an undeveloped area of Imperial County. As described above, the geophysical survey would be within the viewshed of two overlooks along S-22, but the Imperial County General Plan identifies the proposed geophysical survey location as within an area of "Low Value" visual quality (County of Imperial 2016). The survey would last 12 to 14 days and involve minor, temporary impacts to the public views due to the presence of four vibration trucks and receiving equipment. The existing visual character of the area is not anticipated to change in the long-term, as all equipment and waste would be cleaned up by the crew concurrent with survey operations and the survey area would be continuously spot-checked for waste removal throughout each day. Tire tracks from vibrator trucks would also be hand raked at the completion of the survey to blend the tracks with surrounding soil surface. Visual conditions following the completion of the geophysical survey would be substantially similar to initial visual conditions. Furthermore, no scenic resources are found on the Proposed Project site. The geophysical survey associated with the Proposed Project would result in a less than significant impact to the existing visual character of the site.

Exploratory Wells: The Proposed Project involves the construction, drilling, and testing of six geothermal exploratory wells in an undeveloped area of Imperial County. As previously stated, the exploratory wells would be within the viewsheds of two overlooks along S-22, but the Imperial County General Plan identifies the proposed well locations as within an area of "Low Value" visual quality (County of Imperial 2016). The construction and drilling of the wells would involve temporary disturbance of the proposed well sites; however, these impacts would be short-term and are not anticipated to change the character of the area substantially. The Proposed Project

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

would result in a minor change in the existing visual character of portions of the Proposed Project area due to the construction of the drill pads; however, the Proposed Project area is located within the Truckhaven Geothermal Leasing Area and wells similar to the wells associated with the Proposed Project are currently active within the Proposed Project area. In addition, there are no existing scenic resources on the Proposed Project site. Therefore, the exploratory wells associated with the Proposed Project would result in a less than significant impact to the existing visual character or quality of the site and its surroundings.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? ☐ ☐ ☒ ☐

d) Geophysical Survey: The Proposed Project does not include the addition of substantial lighting or glare-producing components; the components of the geophysical survey include four trucks, a series of small, geophone sensors, and receiving equipment. Ambient lighting and glare in the nearby areas would not significantly increase above existing conditions due to the survey associated with the Proposed Project. The geophysical survey will occur during daytime hours, so nighttime views would not be affected, and it would occur over the duration of 12 to 14 days. Impact is less than significant.

Exploratory Wells: The Proposed Project does not include the addition of substantial lighting or glare producing components. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface; non-LED aircraft safety lighting would be located atop the drill rig derrick. Ambient lighting and glare in the nearby areas would not significantly increase above existing conditions. Additionally, temporary construction lighting would be used for illuminating the proposed well sites during construction. Following construction, any construction lighting would be disassembled and removed from the site. This impact is less than significant.

II. *AGRICULTURE AND FOREST RESOURCES*

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. --Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? ☐ ☐ ☐ ☒

a) Geophysical Survey: The geophysical survey area associated with the Proposed Project is not located in an area identified as Prime Farmland, Unique Farmland, of Farmland of Statewide Importance (California Department of Conservation 2019). No impact would occur.

Exploratory Wells: None of the proposed well sites are located in an area identified as Prime Farmland, Unique Farmland, of Farmland of Statewide Importance (California Department of Conservation 2019). No impact would occur.

b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract? ☐ ☐ ☐ ☒

b) Geophysical Survey: The geophysical survey area associated with the Proposed Project is not located within an area under a Williamson Act Contract (California Department of Conservation 2016). No impact would occur.

Exploratory Wells: None of the proposed well sites are located within an area under a Williamson Act Contract (California Department of Conservation 2016). No impact would occur.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))? ☐ ☐ ☐ ☒

c) Geophysical Survey: The proposed geophysical survey area is zoned Open Space/Recreational and is located within the Imperial County Geothermal Overlay Zone (County of Imperial 2016). Implementation of the Proposed Project would not result in a change to zoning at any of the proposed well sites. No impact would occur.

Exploratory Wells: The proposed well sites are zoned Open Space/Recreational and are located within the Imperial County Geothermal Overlay Zone (County of Imperial 2016). Implementation of the Proposed Project would not result in a change to zoning at any of the proposed well sites. No impact would occur.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

d) Geophysical Survey: As described in Impact c) above, the proposed geophysical survey area is zoned Open Space/Recreational and designated Recreation/Open Space; the proposed geophysical survey area is not located on land zoned or designated as forest land (Imperial County 2016). No impact would occur.

Exploratory Wells: As noted above in Impact c), the proposed well sites are zoned Open Space/Recreational and designated Recreation/Open Space; the proposed well sites are not located on land zoned or designated as forest land (Imperial County 2016). No impact would occur.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

e) Geophysical Survey: As noted above in Impact c) and d), the Proposed Project would not result in the rezoning or redesignation of the proposed geophysical survey area. Further, the proposed well sites are not located in areas zoned or designated for agriculture or forest use. No impact would occur.

Exploratory Wells: As noted above in Impact c) and d), the Proposed Project would not result in the re-zoning or re-designation of any of the proposed well sites. Further, the proposed well sites are not located in areas zoned or designated for agriculture or forest use. No impact would occur.

III. *AIR QUALITY*

This section describes the existing air quality setting and potential effects from project implementation on the site and its surrounding area. Construction-related air quality modeling was performed through use of the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. The model output is provided in Appendix A.

The proposed wells sites are located on the southwest side of Salton City, which is an unincorporated area located in the western portion of Imperial County. The proposed well sites are located within the Salton Sea Air Basin (Air Basin), and air quality regulation is administered by the Imperial County Air Pollution Control District (ICAPCD). The ICAPCD implements the programs and regulations required by the federal and state Clean Air Acts.

Atmospheric Setting

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographical features. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with physical features of the landscape to determine their movement and dispersal, and consequently, their effect on air quality. The combination of topography and inversion layers generally prevents dispersion of air pollutants in the Air Basin. The following description of climate of Imperial County was obtained from *Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter less than 10 Microns in Diameter*, prepared by ICAPCD, October 23, 2018.

The climate of Imperial County is governed by the large-scale sinking and warming of air in the semi-permanent high-pressure zone of the eastern Pacific Ocean. The high-pressure ridge blocks out most mid-latitude storms, except in the winter, when it is weakest and located farthest south. The coastal mountains prevent the intrusion of any cool, damp air found in California coastal areas. Because of the barrier and weakened storms, Imperial County experiences clear skies, extremely hot summers, mild winters, and little rainfall. The sun shines, on the average, more in Imperial County than anywhere else in the United States.

Winters are mild and dry with daily average temperatures ranging between 65- and 75-degrees Fahrenheit (°F). During winter months it is not uncommon to record maximum temperatures of up to 80 °F. Summers are extremely hot with daily average temperatures ranging between 104 and 115 °F. It is not uncommon to record maximum temperatures of 120 °F during summer months.

The flat terrain of the valley and the strong temperature differentials created by intense solar heating, produce moderate winds and deep thermal convection. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. Rainfall is highly variable with precipitation from a single heavy storm able to exceed the entire annual total during a later drought condition. The average annual rainfall is just over three inches with most of it occurring in late summer or mid-winter.

Humidity is low throughout the year, ranging from an average of 28 percent in summer to 52 percent in winter. The large daily oscillation of temperature produces a corresponding large variation in the relative humidity. Nocturnal humidity rises to 50 to 60 percent but drops to about 10 percent during the day.

The wind in Imperial County follows two general patterns. Wind statistics indicate prevailing winds are from the west-northwest through southwest; a secondary flow maximum from the southeast is also evident. The prevailing winds from the west and northwest occur seasonally from fall through spring and are known to be from the Los Angeles area. Occasionally, Imperial County experiences periods of extremely high wind speeds. Wind speeds can exceed 31 miles per hour (mph) and this occurs most frequently during the months of April and May. However, speeds of less than 6.8 mph account for more than one-half of the observed wind measurements.

Regulatory Setting

The Proposed Project site lies within the Air Basin, which is managed by the ICAPCD. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) have been established for the following criteria pollutants: carbon monoxide (CO), ozone, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide, and visibility.

Areas are classified under the Federal Clean Air Act as either "attainment" or "nonattainment" areas for each criteria pollutant, based on whether the NAAQS have been achieved or not. Attainment relative to the state standards is determined by the California Air Resources Board (CARB). The Air Basin has been designated by the Federal Environmental Protection Agency (EPA) as a nonattainment area for ozone, PM_{10}, and $PM_{2.5}$. Currently, the Air Basin is in attainment with the NAAQS for CO, SO_2, and NO_2. Table 2 presents the designations and classifications applicable to the Proposed Project area.

Table 2: Designations/Classifications for the Project Area

Pollutant	National Classification	California Standards[2]
Ozone (O_3) - 2008 Standard	Non-Attainment (Moderate)	Non-Attainment
Particulate Matter (PM_{10})	Non-Attainment (Serious)	Non-Attainment
Fine Particulate Matter ($PM_{2.5}$)	Non-Attainment (Moderate)	Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment

Sources: https://ww3.arb.ca.gov/desig/adm/adm.htm; and https://ww3.arb.ca.gov/planning/sip/planarea/imperial/staffreport121318.pdf

The ICAPCD has addressed each of three nonattainment pollutants in separate State Implementation Plans (SIPs). For ozone the most current SIP is the *Imperial County 2017 State Implementation Plan for the 2008 8-Hour Ozone Standard* (2017 Ozone SIP), prepared by IPACD, September 2017, which was prepared to detail measures to reduce ozone precursors (i.e. ROG and NOx) within the County in order to meet the 2008 NAAQS for 8-hour ozone standard of 0.075 parts per million (ppm) by July 20, 2018. Although the Ozone 2017 SIP demonstrates that the County met the 8-hour ozone standard 0.075 ppm by the July 20, 2018, requirement, it should be noted that in 2015 the EPA further strengthened its 8-hour ozone standard to 0.070 ppm, which will require an updated SIP for the County to meet the new ozone standard.

Since PM_{10} in the County has met the 24-hour NAAQS other than for exceptional events that include storms as well as from substantial PM_{10} concentrations blowing into the County from Mexico, the most current PM_{10} plan is the *Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter less than 10 Microns in Diameter* (2018 PM_{10} Plan), prepared by ICAPCD, October 23, 2018. The 2018 PM10 Plan shows that the monitoring of PM10 in the County found that other than exceptional events, no violation of the 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$ occurred over the 2014 to 2016 time period. As such, the ICAPCD has requested the EPA to redesignate the Air Basin to maintenance. The redesignation is anticipated to occur sometime in the year 2020.

For $PM_{2.5}$ the most current SIP is the *Imperial County 2018 Annual Particulate Matter less than 2.5 Microns in Diameter State Implementation Plan* (2018 $PM_{2.5}$ SIP), prepared by ICAPCD, April 2018, which was prepared to detail measures to meet the 2012 NAAQS for annual $PM_{2.5}$ standard of 12 $\mu g/m^3$ by the end of 2021 for the portion of Imperial County (approximately from Brawley to Mexico border) that is designated nonattainment. The $PM_{2.5}$ Plan found that the only monitoring station in the County that has recorded an exceedance of $PM_{2.5}$ is the Calexico Monitoring Station that is likely caused by the transport of $PM_{2.5}$ across the Mexico border. It is anticipated that the ICAPCD will submit a redesignation request for $PM_{2.5}$ in the near future.

Although ICAPCD is responsible for air quality planning efforts in the County, it does not have the authority to directly regulate air quality issues associated with new development projects. Instead, this is controlled through local jurisdictions in accordance to CEQA. In order to assist local jurisdictions with air quality compliance issues, the ICAPCD has prepared the *CEQA Air Quality Handbook* (ICAPCD, 2017). The purpose of the Handbook is to assist lead agencies in evaluating a project's potential air quality impacts and provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant and how to mitigate these impacts. The Handbook provides the following standard measures for dust control and use of combustion equipment that all construction projects in the Air Basin are required to implement:

- All disturbed areas, including Bulk Material storage which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust

suppressants, tarps, or other suitable material such as vegetative ground cover.

- All onsite and off-site unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering.
- All unpaved traffic areas one (1) acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emission shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants and/or watering.
- The transport of Bulk Materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of Bulk Material. In addition, the cargo compartment of all Haul Trucks is to be cleaned and/or washed at delivery site after removal of Bulk Material.
- All Track-Out or Carry-Out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an Urban area.
- Movement of Bulk Material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line.
- The construction of any new Unpaved Road is prohibited within any area with a population of 500 or more unless the road meets the definition of a Temporary Unpaved Road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering.
- Use alternative-fueled or catalyst-equipped diesel construction equipment, including all off-road and portable diesel powered equipment.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum.
- Limit, to the extent feasible, the hours of operation of heavy duty equipment and/or the amount of equipment in use.
- Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set)

Since the project site is located in an area that is known to experience high winds, the Proposed Project would also need to implement the fugitive dust reduction measures provided in the *High Wind Exceptional Event Fugitive Dust Mitigation Plan for Imperial County*, (ICAPCD, 2018). The High Wind Plan requires the implementation of various measures to limit fugitive dust emissions when sustained winds exceed 25 miles per hour.

Since the Proposed Project will utilize off-road diesel equipment that will emit air emissions, the Proposed Project will be required to obtain an ICAPCD permit under Rule 201. The Permit will require the applicant to demonstrate that all off-road equipment utilized are registered with CARB or the ICAPCD. The Permit also requires the applicant to quantify the emissions created from the specific equipment utilized during construction of the Proposed Project in order to ensure that the air emissions created from the off-road equipment utilized during construction activities are within the ICAPCD standards.

Monitored Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. The air quality at any location in the Air Basin is determined by the release of pollutants throughout the Air Basin as well as from air pollutants that travel from the coastal areas and Mexico to the Air Basin. The ICAPCD operates a network of monitoring stations throughout the County that continuously monitor ambient levels of criteria pollutants in compliance with federal monitoring regulations.

Since not all air monitoring stations measure all of the tracked pollutants, the data from the following two monitoring stations, listed in the order of proximity to the Proposed Project site have been used: Niland – English Road Monitoring Station (Niland Station) and El Centro – 9th Street Monitoring Station (El Centro Station).

The Niland Station is located approximately 23 miles east of the proposed well sites at 7711 English Road, Niland and the El Centro Station is located approximately 38 miles southeast of the proposed well sites at 150 9th Street, El Centro. It should be noted that due to the air monitoring stations distances from the proposed wells sites, recorded air pollution levels at the air monitoring stations reflect with varying degrees of accuracy local air quality conditions at the Proposed Project site. Table 3 below presents the composite of gaseous pollutants monitored from 2016 through 2018.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

Table 3: Ambient Air Quality Monitoring Summary

Air Pollutant	2016	2017	2018
Ozone (O_3)[1]			
Max 1 Hour (ppm)	0.079	0.072	0.060
Days > CAAQS (0.09 ppm)	0	0	0
Max 8 Hour (ppm)	0.066	0.061	0.055
Days > NAAQS (0.070 ppm)	0	0	0
Days > CAAQS (0.070 ppm)	0	0	0
Nitrogen Dioxide (NO_2)[2]			
Max 1 Hour (ppb)	50.9	48.8	34.1
Days > NAAQS (100 ppb)	0	0	0
Days > CAAQS (180 ppb)	0	0	0
Particulate Matter (PM_{10})[1]			
Max Daily California Measurement	**225.7**	**345.8**	**331.5**
Days > NAAQS (150 µg/m³)	**1**	**4**	**11**
Days > CAAQS (50 µg/m³)	**14**	**ND**	**7**
State Average (20 µg/m³)	**40.7**	**ND**	**ND**
Particulate Matter ($PM_{2.5}$)[2]			
Max Daily National Measurement	31.3	23.2	22.4
Days > NAAQS (35 µg/m³)	0	0	0
National Average (12 µg/m³)	9.4	8.4	8.6
State Average (12 µg/m³)	9.5	8.4	8.7

Abbreviations:
> = exceed ppm = parts per million ppb = parts per billion µg/m³ = micrograms per cubic meter
CAAQS = California Ambient Air Quality Standard NAAQS = National Ambient Air Quality
ND = Insufficient or No Data **Bold** = exceedance
[1] Measurement taken from Niland Mesa Station
[2] Measurement taken from El Centro Station
Source: http://www.arb.ca.gov/adam/

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to the following determinations. Would the Project:

a) Conflict with or obstruct implementation of the applicable air quality plan? ☐ ☐ ☒ ☐

a) Geophysical Survey: The Proposed Project geographical survey would not conflict with the applicable air quality plans, which include the 2017 Ozone SIP, 2018 PM_{10} Plan, and 2018 $PM_{2.5}$ SIP that are described above in the air quality regulatory setting. The CEQA Air Quality Handbook, prepared by ICAPCD, November 2007, requires large residential and commercial developments that are required to develop an EIR. Projects that have the potential to exceed the ICAPCD thresholds of significance for its operations are considered large developments and are required to demonstrate consistency with the regional air quality plans. The geographical survey consists of development of six exploratory wells and would not include any residential or commercial development, nor does the Project require the preparation of an EIR. Accordingly, the Proposed Project would not conflict with or obstruct implementation of the applicable air quality plan.

Exploratory Wells: The exploratory wells would not conflict with the applicable air quality plans, which include the 2017 Ozone SIP, 2018 PM_{10} Plan, and 2018 $PM_{2.5}$ SIP that are described above in the air quality regulatory setting. The CEQA Air Quality Handbook, prepared by ICAPCD, November 2007, requires large residential and commercial developments to develop an EIR. Projects that have the potential to exceed the ICAPCD thresholds of significance for its operations are considered large developments and are required to demonstrate consistency with the regional air quality plans. The Proposed Project consists of development of six exploratory wells and would not include any residential or commercial development, nor does the project require the preparation of an EIR. Accordingly, the Proposed Project would not conflict with or obstruct implementation of the applicable air quality plan.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? ☐ ☐ ☒ ☐

b) As shown above in Table 3, the Proposed Project area is designated as a federal and/or state nonattainment area for ozone, PM_{10}, and $PM_{2.5}$. The ICAPCD has prepared the *CEQA Air Quality Handbook* (ICAPCD, 2017), in order to assist lead agencies in making a determination of significance for air quality impacts. The screening criteria in the CEQA Handbook can be used to demonstrate that a project's total emissions would not result in a significant impact as defined by CEQA. Table 4 shows the ICAPCD screening thresholds for both construction and operations.

Table 4: ICAPCD Thresholds of Significance

	Pollutant Emissions (Pounds/Day)					
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction	75	100	550	150	150	550
Operation	137	137	550	150	150	550

Notes:
[1] Since the ICAPCD does not provide a construction threshold for SO_2 and $PM_{2.5}$, the operation threshold has been utilized to provide a conservative analysis.
Source: ICAPCD, http://www.co.imperial.ca.us/AirPollution/PlanningDocs/CEQAHandbk.pdf

Geophysical Survey: The geographical survey would create air emissions primarily from on-road vehicle emissions and helicopter exhaust. The helicopter exhaust emissions were calculated through use of the FAA's EDMS 5.1.2 model for a Bell 407 helicopter based on 16 landings and takeoffs per day for 14 days (see Appendix A). The on-road vehicle emissions were analyzed through use of the CalEEMod model (see Appendix A) and included four off-highway trucks (Vibroseis trucks) operating eight hours per day, six vendor trucks per day to deliver equipment, and 20 worker trips per day. Table 5 shows the estimated worst-case summer or winter daily emissions that would be predicted from each phase of the Proposed Project for one well site, which is based on the construction equipment provided by the applicant of what is anticipated to be used during construction activities.

Table 5: Construction-Related Criteria Pollutant Emissions from the Geophysical Survey

Activity	Pollutant Emissions in pounds/day					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
On-Road Vehicles	2.82	26.07	16.44	0.05	30.42	3.82
Helicopter	27.08	2.62	115.94	1.56	--	--
Total Daily Emissions	**29.90**	**28.69**	**132.38**	**1.61**	**30.42**	**3.82**
ICAPCD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**550**
Exceed Thresholds?	No	No	No	No	No	No

Source: CalEEMod Version 2016.3.2; EDMS Version 5.1.2.

As shown in Table 5, the geophysical survey emissions for one well site would not exceed ICAPCD's construction-related criteria pollutant thresholds. In addition, construction emissions would be short-term, limited only to the period when construction activity is taking place and all construction activities are required to comply with ICAPCD regulations for controlling fugitive dust emissions, including the standard regulations for all projects provided in the CEQA Handbook and summarized above in the Regulatory Section as well as Rule 800 – General Requirements for Control of PM10; Rule 802; Rule 802 – Bulk Materials; Rule 803 – Carry-Out and Track-Out; Rule 804 – Open Areas; and Rule 805 – Unpaved Roads. As such, construction-related emissions would be less than significant for the geophysical survey.

Exploratory Wells:
Construction Emissions

Construction of the exploratory wells would create air emissions primarily from equipment exhaust and fugitive dust. The air emissions from the exploratory wells were analyzed through use of the CalEEMod model (see Appendix A). Construction activities for the Proposed Project are anticipated to begin in early 2020 and each well would take approximately two months to complete, or approximately one year for all six wells as it is anticipated that after a well is completed the crew would move to the next well location, so no concurrent well construction activities are anticipated. It should also be noted that the project applicant is also proposing four additional exploratory wells on federal land that is being processed under a separate environmental analysis; however, similar to the Proposed Project, the same well crew that would complete the proposed six wells would also complete the four wells on federal land and will complete one well at a time. As such, no cumulative construction emission impacts are anticipated to occur from both projects. The anticipated construction phases for each well location would include: (1) Well pad preparation; (2) Well drilling; (3) Well testing; and (4) Well clean-up.

Table 6 shows the estimated worst-case summer or winter daily emissions that would be predicted from each phase of the Proposed Project for one well site, which is based on the construction equipment provided by the applicant of what is anticipated to be used during construction activities.

Table 6: Construction-Related Criteria Pollutant Emissions from One Well Site

Activity	Pollutant Emissions in pounds/day					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Well Pad Preparation	2.07	22.61	11.20	0.02	22.67	4.35
Well Drilling	3.75	33.21	30.92	0.07	108.06	12.18
Well Testing	1.99	18.35	16.15	0.03	12.25	2.09
Well Clean-Up	0.87	9.35	6.78	0.01	19.90	3.57
Maximum Daily Construction Emissions	**3.75**	**33.21**	**30.92**	**0.07**	**108.06**	**12.18**
ICAPCD Construction Thresholds	**75**	**100**	**550**	**150**	**150**	**550**
Exceed Thresholds?	No	No	No	No	No	No

Source: CalEEMod Version 2016.3.2.

As shown in Table 6, the Proposed Project's emissions for one well site would not exceed ICAPCD's construction-related criteria pollutant thresholds. In addition, construction emissions would be short-term, limited only to the period when construction activity is taking place and all construction activities are required to comply with ICAPCD regulations for controlling fugitive dust emissions, including the standard regulations for all projects provided in the CEQA Handbook and summarized above in the Regulatory Section as well as Rule 800 – General Requirements for Control of PM_{10}; Rule 802; Rule 802 – Bulk Materials; Rule 803 – Carry-Out and Track-Out; Rule 804 – Open Areas; and Rule 805 – Unpaved Roads. As such, construction-related emissions would be less than significant for the Proposed Project.

Operational Emissions

The Proposed Project consists of development of six exploratory geothermal wells, which would be tested after completion of the well drilling phase in order to determine the commercial potential of each well. If a well is judged to have commercial potential, well monitoring may be continued indefinitely until the applicant proceeds with the approval process to place the well into commercial service. Therefore, the operational emissions would be limited to well monitoring activities that may be limited to weekly or monthly vehicle trips to the well sites to obtain pressure and temperature measurements. The air emissions associated with the Proposed Project have been calculated through use of the CalEEMod model and are based on the year 2020, which is the anticipated opening year of the Proposed Project. Table 7 shows the estimated worst-case daily emissions from operation of the Proposed Project.

Table 7: Exploratory Wells Operations-Related Criteria Pollutant Emissions

Activity	Pollutant Emissions in pounds/day					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Area Sources[1]	0.08	0.02	0.00	0.00	0.00	0.00
Energy Usage[2]	0.00	0.00	0.00	0.00	0.00	0.00
Mobile Sources[3]	0.01	0.07	0.10	0.00	5.96	0.60
Total Project Emissions	**0.09**	**0.09**	**0.10**	**0.00**	**5.96**	**0.60**
ICAPCD Operational Thresholds	137	137	550	150	150	550
Exceed Thresholds?	No	No	No	No	No	No

Notes:

[1] Area sources consist of emissions from consumer products, architectural coatings, and landscape equipment.

[2] Energy usage consists of emissions from natural gas usage (no natural gas appliances would be utilized as part of the Proposed Project).

[3] Mobile sources consist of emissions from vehicles and road dust.

Source: CalEEMod Version 2016.3.2.

As shown in Table 7, the exploratory wells operations-related emissions would not exceed ICAPCD thresholds. As such, operations-related emissions would be less than significant for the Proposed Project. Due to the nominal operational emissions created from operation of the Proposed Project, it is also anticipated that the cumulative operational emissions created from both the Proposed Project and from the project for the four additional exploratory wells on federal land that is being processed under a separate environmental analysis would also result in a less than significant impact.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

Accordingly, the Proposed Project would not result in a cumulative considerable net increase of any criteria pollutant.

c) Expose sensitive receptors to substantial pollutants concentrations? ☐ ☐ ☒ ☐

c) The nearest sensitive receptor to the exploratory wells is a single-family home located on Skyway Drive that is as near as 0.20 mile to the southeast of proposed well site 47-32. As discussed above in (b), the criteria pollutant emissions have been calculated for construction activities, which were found to be within the ICAPCD's allowable construction thresholds. Due to the limited amount of criteria pollutants created from construction activities and the distances to the nearest sensitive receptors to the Proposed Project, construction emissions would not expose sensitive receptors to substantial concentrations of criteria pollutants.

In addition, to the criteria pollutant emissions, construction activities have the potential to expose nearby sensitive receptors to toxic air contaminants (TACs), which would be created from the operation of diesel-powered equipment in the form of diesel particulate matter (DPM). According to SCAQMD methodology, health effects from TACs are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the Proposed Project would not result in a long-term (i.e., 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. In addition, California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 regulates emissions from off-road diesel equipment in California. This regulation limits idling of equipment to no more than five minutes, requires equipment operators to label each piece of equipment and provide annual reports to CARB of their fleet's usage and emissions. This regulation also requires systematic upgrading of the emission Tier level of each fleet, and currently no commercial operator is allowed to purchase Tier 0 or Tier 1 equipment and by January 2023, no commercial operator is allowed to purchase Tier 2 equipment. In addition to the purchase restrictions, equipment operators need to meet fleet average emissions targets that become more stringent each year between years 2014 and 2023. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the Proposed Project.

Operational emissions would be limited to weekly or monthly vehicle trips to obtain pressure and temperature measurements well monitoring activities. As discussed above in (b), the criteria pollutant emissions have been calculated for operational activities, which were found to be within the ICAPCD's allowable operational thresholds. Due to the limited amount of criteria pollutants created from operational activities and the distances to the nearest sensitive receptors to the proposed exploratory wells, operational emissions would not expose sensitive receptors to substantial concentrations of criteria pollutants that are anticipated to create nominal levels of emissions and would not result in a substantial increase in traffic volumes, which have the potential to create CO hotspots. As such, operation of the Proposed Project would result in a less than significant exposure of sensitive receptors to substantial pollutant concentrations.

Therefore, implementation of the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations, and impacts would be less than significant.

d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people? ☐ ☐ ☒ ☐

d) Geophysical Survey: Any diesel equipment used during the geophysical survey associated with the Proposed Project would consist of mobile equipment that would be changing locations, allowing the odors to disperse rapidly and not impact any nearby receptors. The survey is anticipated to be limited to 12 to 14 days, thus odor impacts will be temporary and would be likely not be noticeable at the nearest sensitive receptors that are located 0.2 mile or farther from the proposed well sites. Therefore, construction and operation of the Proposed Project would not create objectionable odors affecting a substantial number of people, and impacts would be less than significant.

Exploratory Wells: Any diesel equipment used during construction of the Proposed Project would consist of mobile equipment that would be changing locations, allowing the odors to disperse rapidly and not impact any nearby receptors. Should diesel equipment be required during maintenance at the proposed well sites, it would also change locations, allowing the odors to disperse rapidly and not impact any nearby receptors. Well construction activities would also result in the discharge of drilling mud that will be stored onsite in the containment basins. It is anticipated that the due to the climate of the project site, any drilling mud would evaporate and harden quickly, which upon hardening will cease the release of odors. In addition, well testing activities have the potential to release geothermal gases that are a known source of odors. Since most well testing activities are anticipated to be limited to less than a day, the well testing odors would be temporary and the odor impacts would be likely not be noticeable at the nearest sensitive receptors that are located 0.2 mile or farther from the proposed well sites. Therefore, construction and operation of the Proposed Project would not create objectionable odors affecting a substantial number of people, and impacts would be less than significant.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

IV. *BIOLOGICAL RESOURCES* *Would the project:*

The following section is based on the Biological Resources Evaluation Report (2018) and the Botanical Survey Report (2017) prepared by Power Engineers for the Proposed Project. These reports are included as Appendix B and Appendix C respectively.

a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

a) Surveys to document special status flora and fauna species were conducted in 2016, 2017, and 2018 by Power Engineers. Power Engineers provided a wildlife biologist and a botanist for the surveys. The role of the wildlife biologist was to record observations of wildlife species, with emphasis on special- status species such as flat-tailed horned lizard (*Phrynosoma mcallii*) and burrowing owl (Athene cunicularia), and record active or potential burrows for a variety of wildlife species.

The botanist was tasked with creating a vegetation map of the corridors that were surveyed, extending as far as they could reliably determine using line-of-sight and aerial imagery, and identifying and recording plant species encountered, with emphasis on special-status plant species. Botanists also recorded occurrences of seeps encountered.

All detected wildlife and botanical species were recorded, as were observed vegetation communities within and adjacent to the survey corridors. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat). The botanical inventory was floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special- status plant species. Vegetation communities were classified according to Holland (1986).

Vegetation communities consisted primarily of Sonoran creosote bush scrub and desert saltbush scrub. Seven special- status plant species were observed within the Proposed Project area during the surveys. A list of plant species observed during the field surveys is provided in Appendix A. One special- status, wildlife species, flat-tailed horned lizard, was detected within the Proposed Project area. Few wildlife species were observed within the Proposed Project area, but wildlife sign was observed more frequently. Burrows of varying sizes were present intermittently throughout the Proposed Project area, including rodent and potential burrowing owl burrows. A small number of unoccupied bird nests were also observed.

Special Status Plant Species

A total of 38 plant species have the potential to occur within the Proposed Project area. Of the 38 plant species considered to have a potential to occur, seven were observed during the survey. Three species were determined to have a moderate potential for occurrence within the Proposed Project area, and seven had a low potential, while the remaining were determined to be absent. Potential for occurrence was based on habitat, elevation, soil, and proximity to known recorded occurrences of a species. Table 8 (located in Attachment A) provides the potential for occurrence of special- status plant species. A plant was considered to be of special- status if it met one or more of the following criteria:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (50 Code of Federal Regulations Part 17.12 [listed plants]);
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CDFW 2017);
- Identified by the CDFW as species of concern or fully protected species, including fish and wildlife that do not have State or federal threatened or endangered status, but may still be threatened with extinction (CDFW 2017);
- Included in the CNPS Rare Plant Inventory (CNPS 2017);
- Otherwise defined as rare, threatened, or endangered under the California Environmental Quality Act;
- Identified by State Parks Ocotillo Wells Field Office as a sensitive species; or
- Identified by the BLM or the BLM El Centro Field Office as a sensitive species.

Special Status Wildlife Species

A total of 12 wildlife species have the potential to occur within the Proposed Project area. Of the 12 wildlife species, one species had a high potential for occurrence within the Proposed Project area, two had a moderate potential, five had a low potential, and the remainder were determined to be absent. Their habitat description, status, and potential for occurrence within the Proposed Project area are provided in Table 7.9 (located in Attachment A). Additionally, American badgers and Colorado Desert fringe-toed lizards may be present within the project area and auditory detections of wester mastiff bats have occurred in Tule Wash (Alvarez 2015).

One special- status, wildlife species, flat-tailed horned lizard, was detected within the Proposed Project area. Additionally, small mammal burrows occur throughout the Proposed Project area that can provide suitable cover for a variety of wildlife species, including

flat-tailed horned lizard and burrowing owls.

The Applicant will secure all the necessary permits, memorandums of understanding, or permissions identified in Section II of this document. Impacts to special- status species would be avoided where feasible, and where not feasible, impacts would be reduced via implementation of the mitigation measures identified below.

Due to the potential for the Proposed Project to impact special- status species, the following mitigation measures would be implemented to ensure that impacts to special- status species would be reduced to a level below significant. Following implementation of the mitigation measures identified below would result in a less than significant impact associated with special- status species.

MM-BIO-1: A qualified biologist(s) will monitor all construction activities to ensure that standard and special- status species-specific avoidance and minimization recommendations are adhered to. The monitor will retain stop work authority in the event there is the likelihood of eminent take of special- status species. The biological monitor will conduct a general preconstruction survey no more than 14 days prior to the start of construction to verify that no special- status species are in the Proposed Project area or its buffers. The monitor shall also conduct a daily survey in and around work areas before activities start.

MM-BIO-2: A worker education program (WEAP) will be prepared and presented to all employees working on the Proposed Project in sensitive species habitat. The education program will include identification of target species and their habitats, any project mitigation measures and stipulations, reporting requirements, and penalties for failure of compliance.

MM-BIO-3: Should construction activities occur between February 15 and August 15, the time period typically referenced in California for the general bird nesting season, preconstruction nesting surveys will be conducted in the Proposed Project area by a qualified biologist within two weeks of the start of construction. If no active bird nests are found within this area, no further mitigation is required. If an active nest is found, a buffer shall be instated around the nest if it belongs to a non-listed or migratory bird in coordination with USFWS and CDFW. If the nest belongs to a listed or fully-protected species, a larger buffer shall be instated around the nest, at a distance approved prior to construction activities.

MM-BIO-4: Avoid burrows that may be utilized by special- status wildlife species with a minimum buffer of 20-feet from burrows suitable for flat-tailed horned lizard and a minimum buffer of 30- feet from burrows suitable for burrowing owls. If burrows cannot be avoided, MM-BIO-5 and MM-BIO-6 would be implemented.

MM-BIO-5: If flat-tailed horned lizards are observed within the construction area, the qualified biological monitor, with prior approval through project acquired permits or permissions and in consultation with CDFW, will notify CDFW and relocate the individual out of the construction area, adjacent to where it was moved from.

MM-BIO-6: If burrowing owls are observed within the Project area prior to or during construction activities, occupied burrows shall not be disturbed during the owl nesting season, February 1 and August 31. If burrows are found, the appropriate CDFW-recommended buffer, or a buffer deemed appropriate by the qualified biological monitor, shall be instated in consultation with CDFW until occupancy status is determined. If the buffer cannot be maintained during the non-breeding season, owls may be evicted from the burrows using accepted methodology as approved by resource agencies. Eviction will not occur during the breeding season.

MM-BIO-7: Avoid special- status plant species with a minimum buffer of 5 to 10 feet, depending on the root structure and as determined by the biological monitor.

MM-BIO-8: Access to proposed well sites and geophysical survey truck paths will be via pre-existing access routes, to the greatest extent possible, and the work area boundaries will be delineated with staking, flagging, or other comparable markings to minimize surface disturbance associated with vehicle straying. Signs and/or fencing will be placed around the Proposed Project area to restrict access to project-related vehicles.

MM-BIO-9: Project-related equipment will be washed prior to entering the project area for the first time to reduce the chance of transporting noxious weed seeds from outside the area.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? ☐ ☐ ☐ ☒

b) Geophysical Survey: The Biological Resources Evaluation Report (2018) prepared for the geophysical survey associated with the Proposed Project did not identify any riparian habitat throughout the survey area. The survey area is within the boundary of the BLM Desert Renewable Energy Conservation Plan (DRECP), which identifies sensitive natural communities; though, the geophysical survey area is not classified in the DRECP as an Area of Critical Environmental Concern, California Desert National Conservation Lands, or Wildlife Allocation (BLM 2016). Coordination with the BLM would occur to ensure that the geophysical survey is consistent with the conservation goals of the DRECP. No impact would occur.

Exploratory Wells: The Botanical Survey Report (2017) prepared for the Proposed Project did not identify any riparian habitat throughout the well sites associated with the Proposed Project; therefore, the Proposed Project would not result in any impacts to riparian habitat. The wells sites are within the boundary of the BLM DRECP, which identifies areas with sensitive natural communities; though, the exploratory well sites are not classified in the DRECP as Areas of Critical Environmental Concern, California Desert National Conservation Lands, or Wildlife Allocation (BLM 2016). Coordination with the BLM would occur to ensure that the well construction is consistent with the conservation goals of the DRECP. No impact would occur.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? ☐ ☒ ☐ ☐

c) Geophysical Survey: Some of the 200-foot long receiver lines implemented during the geophysical survey would be deployed in the vicinity of federally protected wetlands (USFW 2019). The geophysical survey associated with the Proposed Project is temporary, lasting an anticipated 12 to 14 days, and does not require removal, filling, or hydrological interruption. No wetland or riparian vegetation will be removed during the survey and geophone sensors will enter, at maximum, the top 3 inches of soil using only foot pressure. Pre-operational meetings would occur daily to inform crew personnel on expectations for protecting riparian areas. Impacts would be less than significant.

Exploratory Wells: The exploratory wells associated with the Proposed Project have the potential to impact state and/or federally protected wetlands. The Proposed well sites 18-32, and 47-32 would require access roads that are located within a 100-year Federal Emergency Management Administration (FEMA) floodplain. As identified in the biological resources studies, these washes may be considered to be jurisdictional waters of the United States or Sate. Potential impacts would include potential upgrades to thise access paths to allow for vehicle travel to the well pads. If the features are found to be state or federally protected wetlands and project activities will require dredge or fill within these areas, the Proposed Project would require compliance with Section 401 and 404 of the Clean Water Act (CWA) and Fish and Game Code 1600. If it is determined the Proposed Project would result in impacts to jurisdictional waters, the appropriate permits will be secured prior to impacts to the waters. This impact is potentially significant unless mitigation is incorporated.

Due to potential impacts associated with construction of the access roads for proposed well pads 47-32 and 18-32, the Proposed Project would implement Mitigation Measures MM-BIO-10 to reduce impacts associated with state or federally protected wetlands.

MM-BIO-10: If the California Department of Fish and Wildlife (CDFW), Regional Water Quality Control Board (RWQCB), or U.S. Army Corps of Engineers (USACE) determine that access roads associated with well sites 47-32 and 18-32 are located within waters of the State/United States, prior to impacts the Applicant or its contractor shall obtain, and shall comply with all mitigation and conditions associated with, one or more of the following permits, as applicable: a CDFW Lake and Streambed Alteration Agreement; RWQCB Section 401 Water Quality Certification; or Section 404 USACE permit. Permit compliance shall be met through the purchase of in-lieu credits for non-vegetated streams at an approved mitigation bank, implementation of in-kind or out-of-kind restoration, or a combination of these actions. The mitigation replacement ratio shall be determined by the regulatory agencies during the permitting process.

d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? ☐ ☒ ☐ ☐

d) Geophysical Survey: The geophysical survey area associated with the Proposed Project area is currently undeveloped. As identified in the Biological Resources Evaluation Report (2018) prepared by Power Engineers, nesting birds have the potential to occur within the survey area; a potential exists for avian species covered by the Migratory Bird Treaty Act (MBTA) to nest on site. During the surveys for the Biological Resources Evaluation Report no active avian nests were observed, and only abandoned bird nests were observed. If construction activities are to occur during bird breeding season, nesting bird surveys will be required in accordance with the MBTA, as described in Mitigation Measure MM-BIO-3, above.

Exploratory Wells: The well sites associated with the Proposed Project area are currently vacant. The well sites do not provide for any substantial movement of wildlife species through a land-based corridor. However, as identified in the Biological Resources Evaluation Report (2018) prepared by Power Engineers, there is potential for nesting birds to occur within the well sites; a potential exists for avian species covered by the Migratory Bird Treaty Act (MBTA) to nest onsite. During the surveys for the Biological Resources Evaluation Report no active or old avian nests were observed. If construction activities are to occur during bird breeding season, nesting bird surveys will be required in accordance with the MBTA, as described in Mitigation Measure MM-BIO-3, above.

e) Conflict with any local policies or ordinance protecting biological resource, such as a tree preservation policy or ordinance? ☐ ☒ ☐ ☐

e) The County of Imperial General Plan Open Space Conservation Policy requires detailed investigations to be conducted to determine

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

the significance, location, extent, and condition of natural resources in the County. If any rare, sensitive, or unique plant or wildlife habitat will be impacted by a project, the County must notify the agency responsible for protecting plant and wildlife before approving the project.

Geophysical Survey: The geophysical survey associated with the Proposed Project is not anticipated to conflict with any local policies or ordinances protecting biological resources during construction of the Proposed Project. Implementation of the survey would be consistent with the County's Open Space Conservation Policy because appropriate studies have been prepared for the survey area.

Exploratory Wells: Construction of the well sites is not anticipated to conflict with any local policies or ordinances protecting biological resources during construction of the Proposed Project. Consistent with the County's Open Space Conservation Policy, appropriate studies have been prepared for the well sites. Additionally, implantation of Mitigation Measures MM-BIO-1 through MM-BIO-9 would reduce any potential impacts to rare, sensitive, or unique plant or wildlife habitat to less than significant; therefore, this impact is potentially significant unless mitigation is incorporated.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? ☐ ☐ ☒ ☐

f) The Proposed Project area overlaps with the boundaries of the Ocotillo Wells SVRA Research Area designated within the Flat-tailed Horned Lizard Rangewide Management Strategy. This document was written by the members of the Flat-tailed Horned Lizard Interagency Coordinating Committee in 1997, and updated in 2003, with the purpose of guiding conservation and management of sufficient habitat to maintain extant populations of flat-tailed horned lizards in five management areas near the California-Arizona border (ICC 2003).

Geophysical Survey: The geophysical survey area overlaps with the Ocotillo Wells SVRA Research Area designated within the Flat-Tailed Horned Lizard Rangewide Management Strategy (ICC 2003). Coordination with the BLM and California Department of Parks and Recreation (CDPR) would occur to ensure the geophysical survey activities comply with the goals of the Flat-Tailed Horned Lizard Rangewide Management Strategy. Impacts would be less than significant.

Exploratory Wells: The well sites overlap with the Ocotillo Wells SVRA Research Area designated within the Flat-Tailed Horned Lizard Rangewide Management Strategy (ICC 2003). Coordination with the BLM and CDPR would occur to ensure the proposed well site construction complies with the goals of the Flat-Tailed Horned Lizard Rangewide Management Strategy. Impacts would be less than significant.

V. *CULTURAL RESOURCES* *Would the project:*

This section is based on the Class III Archaeological Survey prepared by Power Engineers, Inc (POWER) for the Proposed Project in August 2019; this report in included as Appendix D.

a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? ☐ ☒ ☐ ☐

a) A Class III Archaeological Survey for the Proposed Project was prepared by Power Engineers, Inc (POWER) in August 2019. A record search with the South Coast Information Center (SCIC) for the Proposed Project determined a total of 31 cultural resource studies have been conducted in and within one-half mile of the Proposed Project area. Three of the previous surveys identified by the SCIC occurred in the past 10 years, and the rest occurred between 11 and 45 years ago. The earliest studies were associated with the widening of State Route 86 and represent the first modern archaeological studies in this region.

The records search identified 219 archaeological sites and 183 historic-era isolates within one-half mile of the Proposed Project area. In 2017, POWER recorded 12 sites and 12 isolates during the 2017 field season as part of the Proposed Project. Seven of these sites are in the Proposed Project area. Because the Proponents' geophysical contractor and POWER archaeological staff were tasked with moving Proposed Project features away from archaeological sites listed by the SCIC, no cultural resources are located within a feature of the Proposed Project.

The archaeological sites previously recorded in and within one-half mile from the geophysical survey area and well sites associated with the Proposed Project consist mainly of artifact scatters, although sites bearing stacked rock features and what appears to be habitation foundations are plentiful near large washes, especially the wash banks just west of State Route 86. No sites have been recorded on the floor of any wash, although a few isolates are known. Sites bearing the remnants of prehistoric fish traps or weir foundations, which in this area take the form of V-or J-shaped single-coursed cobble alignments (Dice et.al. 2018) are also recorded in the Proposed Project area. Many of these can be seen on high-resolution aerial photographs. Historic trash and metal debris do occur near older roads, including dummy bombs and rounds that may have been dropped by World War II training planes between approximately 1940 and 1943 within the Proposed Project area. Trash litters both sides of the State Route 86 right-of-way and some of this is mixed with debris that may be more than 50 years old.

Attempts were made before any fieldwork began to move projected location of project features into locations where no sites had been previously located. Nonetheless, the inventory encountered 175 archaeological resources and 91 isolated artifacts. Proposed Project features have been moved to positions that would avoid the recorded site boundaries; however, construction of the access road associated with proposed well site 87-6 has the potential to impact a historic resource. To minimize impacts to historic resources associated with the construction of the access road for proposed well site 87-6, the mitigation measures listed below would be implemented, the resulting impact would be reduced to less than significant.

MM-CUL-1: A temporary track will be placed over the historic site within the geophysical survey vibroseis path in the three different locations the Applicant would like to cross over the historic resource. Once the need to cross the area associated with the historic resource has concluded, the temporary cover can be removed.

MM-CUL-2: Prior to construction, the Applicant shall prepare a mitigation and monitoring plan specific to Cultural resources. The mitigation and monitoring plan shall identify procedures for monitoring and the implementation of a discovery plan in coordination with affected Tribal groups. The mitigation and monitoring plan will incorporate a worker awareness program, stop work authority and all avoidance recommendations from the Class III report.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? ☐ ☒ ☐ ☐

b) As noted above, POWER prepared a Class III Archaeological Survey for the Proposed Project. Prior to any fieldwork associated with the Class III Archaeological Survey, the Applicant relocated project features into locations where no sites had been previously located. Although all archaeological sites have been avoided, aside from the site located within the geophysical survey vibroseis path at the western end of the Salton Sea Airport landing strip, there remains potential to impact unknown archaeological resources. Implementation of the mitigation measures below would reduce any potential impacts associated with an archaeological resource to less than significant.

MM-CUL-3: The Applicant shall retain qualified archaeological monitors (and Tribal monitors, if requested) for all ground-disturbing activities associated with the geophysical survey and development of access roads and construction of the drill pads. If a significant cultural resource site is found during ground-disturbing activities associated with well pad or access road construction the Project features will either be moved, or the resource will be protected in place, or data recovery will be initiated, consistent with the mitigation and monitoring plan required by MM-CUL-2. The final disposition of archaeological or historical, resources recovered on state land under the jurisdiction of the California State Lands Commission must be approved by the Commission.

c) Disturb any human remains, including those interred outside of dedicated cemeteries? ☐ ☒ ☐ ☐

c) No publicly available information indicates that human remains may occur within the Proposed Project area and the geophysical survey vibroseis paths and well sites were chosen in coordination with POWER to avoid potential impacts to cultural resources; however, given the cultural sensitivity of the area, it remains possible to uncover human remains. In the event that the discovery of human remains occurs during ground-disturbing activities, the following regulations must be followed to reduce the impact to less than significant.

MM-CUL-4: California State law (California Health and Safety Code 7050.5) and federal law and regulations (Archaeological Resources Protection Act [ARPA], 16 United States Code [U.S.C.] 470 and 43 Code of Federal Regulations, [CFR] 7, Native American Graves Protection and Repatriation Act [NAGPRA] 25 U.S.C. 3001 and 43 CFR 10, and Public Lands, Interior 43 CFR 8365.1-7) require a defined protocol if human remains are discovered in the state of California regardless if the remains are modern or archaeological. Upon discovery of human remains, all work within a minimum of 200 feet of the remains must cease immediately, and the County Coroner must be notified. The appropriate land manager/owner or the site shall also be notified of the discovery. If the remains are located on federal lands, the federal land manager(s), federal law enforcement, and/or federal archaeologist should also be notified. If the human remains are determined by the Coroner to be prehistoric, the appropriate federal archaeologist must be called. The archaeologist will initiate the proper procedures under ARPA and/or NAGPRA. If the remains can be determined to be Native American, the steps as outlined in NAGPRA 43 CFR 10.6 Inadvertent Discoveries must be followed.

VI. ***ENERGY Would the project:***

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? ☐ ☐ ☒ ☐

a) Geophysical Survey: Performing the geophysical survey associated with the Proposed Project would not require the use of energy sources beyond rechargeable battery packs for wireless receiving equipment and small portable generators. Additionally, the survey is anticipated to last 12 to 14 days, so energy consumption would be minor and temporary. Completion of the survey would not result in wasteful, inefficient, or unnecessary consumption of energy resources because the Proposed Project would not include the

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construction of structures (residential, commercial, or industrial) that would require daily usage of energy resources. Impacts would be less than significant.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would result in the need for energy resources. The amount of energy resources required for the construction of the exploratory wells would be contingent on the well location because the total acreage of disturbance would vary; therefore, the energy requirements for each site is unknown at this time. However, energy use for the exploratory wells would be temporary in nature and minimal. Operation of the well sites would not result in wasteful, inefficient, or unnecessary consumption of energy resources because the exploratory wells associated with the Proposed Project would not involve the construction of structures (residential, commercial, or industrial) that would require daily usage of energy resources. This impact is less than significant.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? ☐ ☐ ☒ ☐

b) The County of Imperial prepared a Renewable Energy and Conservation Element (Element) that provides objectives in innovating renewable energy systems within the County.

Geophysical Survey: The geophysical survey associated with the Proposed Project would not conflict or obstruct a renewable energy or energy efficiency plan because the survey would occur within the Truckhaven Geothermal Leasing area, consistent with the Element. Therefore, impacts would be less than significant with regard to energy usage and renewable energy plans.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not conflict or obstruct a renewable energy or energy efficiency plan because implementation of the well sites would occur within the Truckhaven Geothermal Leasing area, consistent with the Element. Therefore, impacts would be less than significant with regard to energy usage and renewable energy plans.

VII. *GEOLOGY AND SOILS Would the project:*

a) Directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving: ☐ ☐ ☒ ☐

1) 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 Division of Mines and Geology Special Publication 42? ☐ ☐ ☐ ☒

1) In accordance with the Alquist-Priolo Special Studies Zone Act (Chapter 7.5, Division 2, Public Resources Code, State of California, effective May 4, 1975) the Office of State Geologist delineated Special Study Zones which encompass potentially and recently active traces of four major faults (San Andreas, Calaveras, Hayward and San Jacinto). The Alquist-Priolo Special Study Zone Act is enforced by the County to assure that homes, offices, hospitals, public buildings, and other structures for human occupancy which are built on or near active faults, or if built within special study areas, are designed and constructed in compliance with the County of Imperial Codified Ordinance.

Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in the construction of any structure intended for human occupancy, and human presence in the area would be limited to 12 to 14 days. Additionally, the Proposed Project area is not located within or adjacent to any earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map (County of Imperial 1997). There would be no impacts relating to the rupture of a known earthquake fault.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would not result in the construction of any structure intended for human occupancy. Additionally, the Proposed Project area is not located within or adjacent to any earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map (County of Imperial 1997). There would be no impacts relating to the rupture of a known earthquake fault.

2) Strong Seismic ground shaking? ☐ ☐ ☒ ☐

2) California rests on the boundary between the North American Plate and the Pacific Plate. The San Andreas Fault system is located where the northwesterly drifting Pacific Plate grinds along and is subducted by the southwesterly drifting North American Plate. Baja, and California west of the fault system, are part of the Pacific Plate and move northwest compared to the rest of California and North America.

Geophysical Survey: As described in the Project Summary section above, a geophysical survey would be conducted as part of

the Proposed Project. Because Southern California is a seismically active region, it is highly likely that regional earthquakes would occur that could affect the survey area (County of Imperial 1997); however, as noted above, no active faults are underlaying or adjacent to the survey area. The California Department of Transportation (Caltrans) Transportation and Construction Vibration Manual (September 2013) and the USBM OSMRE Blasting Guidance Manual (March 1987) provide vibration criteria and standards related to potential impacts from vibrations on structures and people. The survey would be conducted in general accordance with current practice and the standard of care exercised by consultants performing geophysical survey tasks within the survey area. Further, no onsite structures or facilities would be constructed as a result of the survey, and the survey would occur over an anticipated 12 to 14 days. Since the survey does not involve structure building and is temporary in nature, the potential impacts due to strong seismic ground shaking are a less than significant impact.

Exploratory Wells: Southern California is a seismically active region, therefore it is highly likely that regional earthquakes would occur that could affect the exploratory well sites (County of Imperial 1997); though, as noted in section a) 1), no active faults are underlaying or adjacent to the well sites. As noted above in the Project Summary Section of this document, vibration monitoring would be conducted prior to construction to determine areas appropriate for drilling. The California Department of Transportation (Caltrans) Transportation and Construction Vibration Manual (September 2013) and the USBM OSMRE Blasting Guidance Manual (March 1987) provide velocity attenuation relationships that can be used to estimate PPV at various distances and site conditions. Also included in these Manuals are vibration criteria and standards related to potential impacts from vibrations on structures and people. The vibration monitoring would be conducted in general accordance with current practice and the standard of care exercised by consultants performing vibration monitoring tasks within the exploratory well sites. Additionally, all structures and onsite facilities would be designated in accordance with the California Building Code (CBC) for the peak site ground acceleration. Since the design and construction of the wells associated with the Proposed Project would be required to conform to the specific mandated structural design requirements to protect against strong seismic shaking, the potential impacts due to strong seismic ground shaking are a less than significant impact.

3) Seismic-related ground failure, including liquefaction and seiche/tsunami? ☐ ☐ ☒ ☐

3) The geology that makes up Imperial County includes young, unconsolidated sediments of the Salton Trough that are subject to failure during earthquakes, especially throughout the irrigated portions of Imperial Valley where the soil is generally saturated. Liquefaction, and related loss of foundation support, is a common hazard in these areas (County of Imperial 1997).

A seiche is a to and from vibration of a body of water like the slopping of water in a jolted basin. Once initiated, the water body continues to oscillate independently. Seiches can be triggered by seismic events such as earthquakes. The most likely location for a significant seiche to occur is the Salton Sea. While there have been a number of seismic events since the formation of the Salton Sea, no significant seiches have occurred to date (County of Imperial 1997).

Geophysical Survey: The geophysical survey associated with the Proposed Project is not located within an irrigated portion of Imperial Valley, thus the risk of liquefication in the area is low. Additionally, despite the survey area being close proximity to the Salton Sea, seiches in the area are unlikely. Furthermore, the survey area is approximately 80 miles from the closest ocean, the Pacific Ocean, and therefore is too far to be at risk of experiencing a tsunami. Due to these factors, the impacts regarding seismic-related ground failure, including liquefaction and seiche/tsunami are less than significant.

Exploratory Wells: The exploratory wells associated with the Proposed Project are not located within an irrigated portion of Imperial Valley, causing the risk of liquefication in the area to be low. Additionally, despite the survey area being close proximity to the Salton Sea, seiches in the area are unlikely. Additionally, the well sites are approximately 80 miles from the nearest ocean, the Pacific Ocean, and therefore are too far to be at risk of experiencing a tsunami. Impacts associated with seismic-related ground failure, including liquefaction and seiche/tsunami are less than significant.

4) Landslides? ☐ ☐ ☒ ☐

4) A landslide refers to slowly to very rapidly descending rock or debris caused by the pull of gravity. Landslides affect humans in many ways. A very rapid landslide could result in casualties and devastating property damage while a slow landslide could result in the nuisance of having a fence slowly pulled apart. The cost in lives and property from landslides is surprisingly high. According to the U.S. Geological Survey, more people in the United States died from landslides during the last three months of 1985 than were killed by all other geologic hazards, such as earthquakes and volcanic eruptions. The damage to property from landslides each year exceeds the cost of earthquake damage for the last twenty years (County of Imperial 1997).

Geophysical Survey: The geophysical survey area is located in a relatively flat portion of Imperial County and is not identified as an area at risk of landslide (County of Imperial 1997); therefore, impacts associated with landslides are considered less than significant.

Exploratory Wells: The exploratory well sites are located in a relatively flat portion of Imperial County and are not identified as an area at risk of landslide (County of Imperial 1997); therefore, impacts associated with landslides are considered less than significant.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐

b) Erosion is the removal of rock fragments or soil by the action of running water, glacial ice, or wind. Human activities can accelerate erosion. The areas in Imperial County that are most subject to erosion are the Algodones Sand Dunes paralleling the East Mesa and Superstition Mountain, and the Chocolate, Picacho, Cargo Muchacho, and Coast Range Mountains. The remainder of Imperial County is generally flat and experiences low levels of natural erosion (County of Imperial 1997).

Geophysical Survey: The geophysical survey area is relatively flat and identified as having low erosion potential (County of Imperial 1997). Moreover, the survey does not entail any major soil disturbing activities that would expose highly erodible subsoil; geophone sensors will be deployed into the top three inches of soil at maximum on a thin spike and wide, low pressure flotation tires are installed on vibration trucks to reduce ground depression. Vibrator trucks would also drive only along approved routes to reduce soil disturbance and the survey would last up to 12 to 14 days. Therefore, impact is less than significant.

Exploratory Wells: Although the exploratory wells are located in a relatively flat area identified as having low erosion potential (County of Imperial 1997), the preparation of a SWPPP would be required due to the size of the disturbed area exceeding one acre. The SWPPP would identify best management practices (BMPs) that would reduce any impacts associated with soil erosion or loss of topsoil; therefore, this impact is less than significant.

MM-GEO-1: Applicant will prepare a SWPPP consistent with the requirements of the California State Water Resources Control Board (SWRCB) to reduce the potential for water pollution and sedimentation from proposed Project activities. The SWPPP will be project specific and expressly address site runoff, assuring that project runoff would not affect or alter drainage patterns to sensitive habitat,

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 on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐

c) Subsidence is the gradual, local settling or sinking of the earth's surface with little or no horizontal motion. Subsidence is usually the result of gas, oil, or water extraction, hydrocompaction, or peat oxidation, and not the result of a landslide or slope failure. Ground surface effects related to subsidence are generally restricted to long surface structures such as canals, drains, and sewers, which are sensitive to slight changes in elevation. Subsidence from earthquakes and other activities, including geothermal resources development, can disrupt drainage systems and cause localized flooding.

Geophysical Survey: As noted above, the geophysical survey area is relatively flat and in an area with low risk of landslide and liquefaction. No gas, oil, or water extraction, hydrocompaction, or peat oxidation would occur as a result of the survey; therefore risk of subsidence is low. As mentioned in Impact b), no major soil disturbance activities are associated with the geophysical survey. Impact is less than significant.

Exploratory Wells: Well field programs covering production and injection plans are required by the Bureau of Land Management (BLM) and the California Division of Oil and Gas (CDOG) for each major geothermal project. Detrimental subsidence from geothermal development would be avoided through careful permit review by CDOG and the County, establishment of standards for each project, and through impact mitigation and monitoring programs. Compliance with the well field program and adherence to standards established via coordination with CDOG and the County would reduce any impacts associated with subsidence; therefore, this impact is less than significant.

d) Be located on expansive soil, as defined in the latest Uniform Building Code, creating substantial direct or indirect risk to life or property?	☐	☐	☒	☐

d) Expansive soils are soils that expand when water is added and shrink when they dry out. This continuous change in soil volume can cause structures built on this soil to move unevenly and crack; expansive soils are commonly associated with clay rich soils.

Geophysical Survey: The soils underlaying the geophysical survey site are sedimentary rock and the survey would not result in the establishment of permanent structures; therefore, impacts associated with expansive soils are less than significant.

Exploratory Wells: The soils underlaying the well sites are sedimentary rock. Additionally, construction of the exploratory wells would not result in the establishment of permanent structures, unless a viable geothermal resource is identified. Therefore, impacts associated with expansive soils are less than significant.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

e) Geophysical Survey: The geophysical survey associated with the Proposed Project would not require the use of septic systems or

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

alternative wastewater systems to accommodate wastewater needs. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not require the use of septic systems or alternative wastewater systems to accommodate wastewater needs. No impact would occur.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ☐ ☒ ☐ ☐

f) A Paleontological Resource Assessment and Survey Report was prepared for the Proposed Project by Applied Earthworks, Inc. in March 2017 and an Addendum to the report was prepared by Rincon Consultants, Inc. in December 2018.

The 2017 Paleontological Resource Assessment and Survey Report assessment included a comprehensive review of published and unpublished literature and museum collections records maintained by the Natural History Museum of Los Angeles County. The purpose of the literature review and museum records search was to identify the geologic units underlying the Proposed Project area and to determine whether previously recorded paleontological localities occur either within the Proposed Project boundaries or within the same geologic units elsewhere. The museum records search was supplemented by a search of the University of California Museum of Paleontology's online collections database. Using the results of museum records search and literature review, the paleontological resource potential and Potential Fossil Yield Classification (PFYC) of geologic units within the Project area was recommended in accordance with the Society of Vertebrate Paleontology (2010) and BLM (2008) guidelines, respectively.

As a result of the 2017 study, the Pliocene to Holocene geologic units underlying the Proposed Project area consist of undifferentiated younger alluvium, older alluvium, lacustrine (Lake Cahuilla), and terrace deposits of Quaternary age. These deposits have a recommended paleontological sensitivity of low (PFYC Class 2) to very high (PFYC Class 5). Consequently, the likelihood of impacting scientifically significant vertebrate fossils as a result of Proposed Project development is high. Although a review of available online museum records indicated that no paleontological resources have been found within the Proposed Project area, geologic units underlying the Project area have been known to yield significant fossils nearby. Concretions, sandstone bars, and visible Lake Cahuilla remnants are also considered unique geologic features within the Proposed Project area.

The 2018 Addendum to the Paleontological Resource Assessment and Survey Report was prepared to summarize the results of Rincon's supplemental paleontological field survey, discuss the potential for impacts to paleontological resources, and provide additional mitigation measures, as necessary. The findings of the paleontological field survey described in the addendum are consistent with the results of the 2016 paleontological survey described in the paleontological resource assessment and survey for the project (Applied EarthWorks 2017). The report determined the Proposed Project area is underlain by geologic units with PFYC 2 to 5 (low to very high paleontological sensitivity), in accordance with SVP (2010) and BLM (2016) guidelines.

In general, the potential for a given project to result in adverse impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project. The Proposed Project entails a geophysical survey and the drilling, completion, testing and monitoring of the proposed wells and construction of associated access roads. Each of the proposed geothermal exploration wells would be located on separate, individual well pads. Ground disturbing activities are anticipated and the likelihood of impacting fossils is related to both the type and extent of disturbance and the geologic unit in which the disturbance occurs. Ground disturbances are proposed along areas underlain by previously undisturbed Arroyo Diablo Formation, Borrego Formation, Brawley Formation, Lake Cahuilla deposits, and Quaternary older alluvium, which have proven to yield vertebrate remains throughout the western Colorado Desert, including Imperial County, eastern San Diego County, and southern Riverside County. Ground disturbance planned for portions of the Proposed Project area that are underlain Quaternary alluvium will also likely impact previously undisturbed lithology in those deposits. Significant fossils have not been reported within these deposits, but they may shallowly overlie older sensitive units at an unknown depth. Implementation of the mitigation measures below would reduce impacts associated with paleontological resources to a less than significant level and would also be consistent with other federal and local laws and regulations. This impact is less than significant with mitigation incorporated.

MM-PAL-1: All Project personnel and other onsite workers shall receive environmental awareness training on paleontological resources prior to the start or continuation of any elements of the Project that include ground-disturbing activities. The training will be conducted by a qualified, BLM- and DPR-permitted paleontologist and will provide a description of the fossil resources that may be encountered in the Project area, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist. The training may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.) and may also be videotaped or presented in an informational brochure for future use by field personnel not present at the start of the Project. The workers should be informed that any unlawful collection of paleontological resources may be subject to a misdemeanor, a fine, or both.

MM-PAL-2: Prior to the commencement of ground-disturbing activities, a qualified professional paleontologist shall be retained to prepare and implement a Paleontological Resource Mitigation Plan (Plan) for the Project. The Plan should address the recommended approach to additional specimen collection, the specific locations and intensity of monitoring recommended for each geologic unit, and monitoring intensity.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

Paleontological monitoring will be required for all ground-disturbing activities within the previously undisturbed Arroyo Diablo Formation, Borrego Formation, Brawley Formation, Lake Cahuilla deposits, and Quaternary older alluvium, which underlies the Project area. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected. The final disposition of paleontological resources recovered on state land under the jurisdiction of the California State Lands Commission must be approved by the Commission.

MM-PAL-3: Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped paleontology laboratory to a point ready for curation. Preparation will include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossils specimens will be identified to the lowest taxonomic level, cataloged, analyzed, and curated. Fossil specimens collected from BLM managed land remain the property of the Federal government and they must be placed in the approved museum repository identified on the Paleontological Resource Use Permit. Fossil specimens collected from DPR-managed land remain the property of the State of California and must also be delivered to an accredited regional museum repository for permanent curation and storage. The cost of curation is assessed by the repository and is the responsibility of 8nb.

At the conclusion of laboratory work and museum curation, a final report will be prepared to describe the results of the paleontological mitigation monitoring efforts associated with the Project. The report will include a summary of the field and laboratory methods, an overview of the Project area geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report will also be submitted to the curation facility.

VIII. *GREENHOUSE GAS EMISSION*

Introduction

This section describes the regulatory setting and potential global climate change effects from implementation of the Proposed Project. GHG emission modeling was performed through use of the CalEEMod Version 2016.3.2. The CalEEMod model output files are provided in Appendix G.

Regulatory Setting

Significant legislative and regulatory activities directly and indirectly affect climate change and GHGs in California. The primary climate change legislation in California is AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing greenhouse gas emissions in California, and AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. In addition to AB 32, Executive Order B-30-15 was issued on April 29, 2015 that aims to reduce California's GHG emissions 40 percent below 1990 levels by 2030. In September 2016, AB 197 and SB 32 codified into statute the GHG emission reduction targets provided in Executive Order B-20-15.

CARB is the state agency charged with monitoring and regulating sources of emissions of GHGs in California that contribute to global warming in order to reduce emissions of GHGs. The CARB Governing Board approved the 1990 GHG emissions level of 427 million tons of CO_2 equivalent ($MtCO_2e$) on December 6, 2007. Therefore, in 2020, annual emissions in California are required to be at or below 427 $MtCO_2e$. The CARB Board approved the Climate Change Scoping Plan (Scoping Plan) in December 2008, the First Update to the Scoping Plan in May 2014, and California's 2017 Climate Change Scoping Plan in November 2017. The Scoping Plans define a range of programs and activities that will be implemented primarily by state agencies but also include actions by local government agencies. Primary strategies addressed in the Scoping Plans include new industrial and emission control technologies; alternative energy generation technologies; advanced energy conservation in lighting, heating, cooling, and ventilation; reduced-carbon fuels; hybrid and electric vehicles; and other methods of improving vehicle mileage. Local government will have a part in implementing some of these strategies. The Scoping Plans also call for reductions in vehicle-associated GHG emissions through smart growth that will result in reductions in vehicle miles traveled (CARB 2008, 2014, 2017).

Would the project:

a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

a) Neither the County of Imperial nor the ICAPCD has established significance thresholds for GHG emissions. In order to establish context in which to consider the GHG emissions created from the Proposed Project, this analysis reviewed guidelines used by other public agencies in California and found the most conservative GHG emissions threshold is detailed in *CEQA & Climate Change*, prepared by California Air Pollution Control Officers Association (CAPCOA, 2008), which recommends a threshold of 900 metric tons of CO_2e ($MTCO_2e$) per year from any project. It should also be noted that a direct comparison of construction GHG emissions with long-term thresholds would not be appropriate, since construction emissions are short-term in nature and would cease upon completion of

construction. Other Air Districts, including the SCAQMD, recommend that GHG emissions from construction activities be amortized over 30 years, when construction emissions are compared to operational-related GHG emissions thresholds.

The CalEEMod model used to calculate the criteria pollutant emissions for the air quality analysis was also utilized to calculate the GHG emissions associated with construction of the Proposed Project (see Appendix G). The CalEEMod model calculated GHG emissions generated from the construction of one of the six exploratory wells that would be constructed as part of the proposed project. and the completion of the geophysical survey as well as from the on-going geothermal well monitoring. Table 10 shows the estimated GHG emissions from each phase of construction of geophysical survey, one well site and the total construction-related GHG emissions from all six exploratory well sites.

Table 8: Proposed Project Greenhouse Gas Emissions

Activity	Greenhouse Gas Emissions in metric tons/year			
	CO_2	CH_4	N_2O	CO_2e
Geophysical Survey				
Exploratory Well Construction	34.41	0.01	0.00	34.67
• Well Pad & Access Road Construction	10.54	0.00	0.00	9.47
• Well Drilling	148.41	0.02	0.00	149.02
• Well Testing	2.51	0.00	0.00	2.52
• Well Clean-Up	3.28	0.00	0.00	3.31
• Total Construction Emissions for One Well Site	164.74	0.03	0.00	165.46
• Total Construction Emissions for Six Well Sites	988.46	0.18	0.00	992.77
Total Geographical Survey and Exploratory Well Construction Emissions	**1,022.87**	**0.20**	**0.00**	**1,027.44**
Total Construction Emissions Amortized over 30 years	**34.10**	**0.01**	**0.00**	**34.25**
Geothermal Well Monitoring	**0.56**	**0.00**	**0.00**	**0.56**
Total Project GHG Emissions	**34.66**	**0.01**	**0.00**	**34.81**
GHG Emissions Threshold of Significance[1]				**900**
Exceed Threshold?				No

Notes:
[1] GHG emissions threshold from CAPCOA, 2008.
Source: CalEEMod Version 2016.3.2 (see Appendix B).

As shown in Table 10, construction and operation of the Proposed Project would generate 34.81 $MtCO_2e$ per year, which would not exceed the annual GHG emissions threshold of 900 $MtCO_2e$. As such, it could be concluded that the Project's construction-related GHG contribution is not "cumulatively considerable" and is therefore less than significant under CEQA.

Therefore, implementation of the Proposed Project would not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, and impacts would be less than significant.

b) Conflict with an applicable plan or policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? ☐ ☐ ☒ ☐

b) The California State Legislature adopted AB 32 in 2006, that requires the State's GHG emissions by 2020 to meet the GHG emissions level created in 1990 and adopted AB 197 and SB 32 in 2016, that requires the State's GHG emissions to be 40 percent below 1990 levels by 2030.

Neither the County of Imperial nor the ICAPCD has adopted a climate action plan to reduce GHG emissions in the Proposed Project area. As such, the only applicable plans for reducing GHG emissions for the Proposed Project area are statewide plans that include AB 32, AB 197, and SB 32. As shown above in impact (a), the Proposed Project would generate 33.09 MTCO2e per year from construction of the Proposed Project and as discussed above in impact (a), only negligible GHG emissions would be created from operation of the

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Proposed Project. In addition, it should be noted that the Proposed Project has the potential to assist the State in meeting its GHG reduction goals provided in AB 32, AB 197, and SB 32, as the project consists of six exploratory geothermal wells that have the potential of creating a carbon-free electricity in the future, if any of the wells are found to be commercially viable.

Therefore, the Proposed Project would not conflict with any applicable plan, policy, or regulation adopted for reducing the emissions of GHGs. A less than significant impact would occur.

IX. *HAZARDS AND HAZARDOUS MATERIALS* *Would the project:*

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? ☐ ☐ ☒ ☐

a) Material that is to be transported, stored, or disposed of during project construction and operation has the potential to contain hazardous materials and could present a hazard to construction workers, the public, or the environment if improperly managed.

Geophysical Survey: Vehicles and equipment used for the geophysical survey would contain or require the temporary, short-term use of potentially hazardous substances, such as fuels, lubricating oils, and hydraulic fluid. Hazardous substances would be stored in transportable containment trailers at locations within the construction staging area to minimize potential for accidental releases and/or spills. No other hazardous or potentially hazardous materials will be brought to the geophysical survey area. Further, the Proposed Project would be required to comply with all applicable rules and regulations involving hazardous materials, including the State of California CCR Title 23 Health and Safety Regulations, the California Division of Occupational Safety and Health (Cal/OSHA) requirements, the Hazardous Waste Control Act, the California Accidental Release Prevention (CalARP) Program, and the California Health and Safety Code. Compliance with these measures would reduce any potential risk or impact associated with the transport, use, or disposal of hazardous materials. This impact is less than significant.

Exploratory Wells: Vehicles and equipment used for exploratory well construction would contain or require the temporary, short-term use of potentially hazardous substances, such as fuels, lubricating oils, and hydraulic fluid. Hazardous substances would be stored in transportable containment trailers at locations within the construction staging area to minimize potential for accidental releases and/or spills. No other hazardous or potentially hazardous materials will be brought to the exploratory well sites. Further, the Proposed Project would be required to comply with all applicable rules and regulations involving hazardous materials, including the State of California CCR Title 23 Health and Safety Regulations, the California Division of Occupational Safety and Health (Cal/OSHA) requirements, the Hazardous Waste Control Act, the California Accidental Release Prevention (CalARP) Program, and the California Health and Safety Code. Compliance with these measures would reduce any potential risk or impact associated with the transport, use, or disposal of hazardous materials. This impact is less than significant.

b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment? ☐ ☐ ☒ ☐

b) Geophysical Survey: As described in Impact a), the geophysical survey associated with the Proposed Project would require the storage of hazardous materials; however, hazardous substances would be stored in transportable containment trailers at locations within the construction staging area to minimize potential for accidental releases and/or spills. No other hazardous or potentially hazardous materials will be brought to the geophysical survey area. Further, the Proposed Project would be required to comply with all applicable rules and regulations involving hazardous materials, including the State of California CCR Title 23 Health and Safety Regulations, the California Division of Occupational Safety and Health (Cal/OSHA) requirements, the Hazardous Waste Control Act, the California Accidental Release Prevention (CalARP) Program, and the California Health and Safety Code. Compliance with these measures would reduce any potential risk or impact associated with the release of hazardous materials into the environment. This impact is less than significant.

Exploratory Wells: As noted above, the exploratory wells associated with the Proposed Project would require the storage of hazardous materials; however, hazardous substances would be stored in transportable containment trailers at locations within the construction staging area to minimize potential for accidental releases and/or spills. No other hazardous or potentially hazardous materials will be brought to the well sites. Further, the Proposed Project would be required to comply with all applicable rules and regulations involving hazardous materials, including the State of California CCR Title 23 Health and Safety Regulations, the California Division of Occupational Safety and Health (Cal/OSHA) requirements, the Hazardous Waste Control Act, the California Accidental Release Prevention (CalARP) Program, and the California Health and Safety Code. Compliance with these measures would reduce any potential risk or impact associated with the release of hazardous materials into the environment. This impact is less than significant.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter ☐ ☐ ☐ ☒

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

mile of an existing or proposed school?
c) Geophysical Survey: The nearest school to the geophysical survey area is West Shores High School, approximately 2 miles to the northeast. The Proposed Project would not result in a release of hazardous emissions, hazardous or acutely hazardous materials, or substances within 0.25 mile of an existing or proposed school. No impact would occur.

Exploratory Wells: The nearest school to the exploratory wells associated with the Proposed Project is West Shores High School, approximately 3 miles to the northeast to the closest well site. The Proposed Project would not result in a release of hazardous emissions, hazardous or acutely hazardous materials, or substances within 0.25 mile of an existing or proposed school. No impact would occur.

d) Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? ☐ ☐ ☐ ☒

d) Geophysical Survey: A review of federal and state standard and supplemental databases indicated that the geophysical survey area is not located within any identified hazardous material site pursuant to Government Code Section 65962.5. No hazardous materials sites are located within 0.25 mile of the Proposed Project area (DTSC 2109; SWRCB 2019). The Proposed Project would not create a significant hazard to the public or environment. No impacts would occur.

Exploratory Wells: A review of federal and state standard and supplemental databases indicated that the exploratory well sites are not located within any identified hazardous material site pursuant to Government Code Section 65962.5. No hazardous materials sites are located within 0.25 mile of the Proposed Project area (DTSC 2109; SWRCB 2019). The Proposed Project would not create a significant hazard to the public or environment. No impacts would occur.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? ☐ ☐ ☐ ☒

e) Geophysical Survey: The geophysical survey area is within 2 miles of the Salton City Airport, though the survey would be temporary in nature, lasting an anticipated 12 to 14 days. Following construction, no permanent workers or structures would remain on site. As such, the project will not result in exposure to a safety hazard or excessive noise from proximity to the Salton City Airport. No impact would occur.

Exploratory Wells: The exploratory well sites are located within 2 miles of the Salton City Airport; however, implementation of the exploratory wells associated with the Proposed Project would not result in people permanently residing or working in the area. Following construction, no permanent workers would be located on site and work in the area would be restricted to maintenance activities at well sites that are determined to have a viable geothermal resource; the exploratory wells do not involve housing. As such, the project will not result in exposure to a safety hazard or excessive noise from proximity to the Salton City Airport. No impact would occur.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? ☐ ☐ ☐ ☒

f) Geophysical Survey: The geophysical survey associated with the Proposed Project would not involve blocking or restricting any access routes. The geophysical survey would not interfere with emergency response plans or operations near the survey area. No impacts are expected.

Exploratory Wells: The construction of the exploratory wells associated with the Proposed Project would not involve blocking or restricting any access routes. The exploratory wells would not interfere with emergency response plans or operations near the well sites. No impacts are expected.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? ☐ ☐ ☐ ☒

g) Geophysical Survey: The potential for a wildfire in the unincorporated areas of the County is generally low (County of Imperial 1997) and the survey area is not located within a fire hazard severity zone (CalFire 2007). The geophysical survey would not introduce features that directly or indirectly increase the risk of wildfire throughout the survey area. No impact would occur.

Exploratory Wells: The potential for a wildfire in the unincorporated areas of the County is generally low (County of Imperial 1997) and the exploratory well sites are not located within a fire hazard severity zone (CalFire 2007). The exploratory wells would not introduce features that directly or indirectly increase the risk of wildfire throughout the Proposed Project area. No impact would occur.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

X. ***HYDROLOGY AND WATER QUALITY*** ***Would the project:***

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? ☐ ☐ ☒ ☐

a) Geophysical Survey: The geophysical survey associated with the Proposed Project is not expected to affect water quality due to the lack of ground-disturbing activities incorporated and the temporary nature of the survey. Geophone sensors will be deployed into the top 3 inches of soil at maximum, and flotation tires will prevent vibration trucks from causing major soil compaction. Additionally, vibrator trucks will avoid drainage crossings to the extent possible and vibrational source generation would not occur within 328 feet (100 meters) of springs, water wells, and stock ponds. The survey is also anticipated to last only 12 to 14 days. The character of surface and ground water following the geophysical survey should remain substantially similar to current surface and ground water conditions; thus, impacts would be less than significant.

Exploratory Wells: No known or reasonably expected surface water quality issues are anticipated to result from implementation of the exploratory wells; however, because ground-disturbing activities will occur in an area greater than one acre, a SWPPP will be developed that implements BMPs (as previously discussed) that sufficiently control degradation of water quality on site and adjacent to a drill pad or access road. In addition, the SWPPP will be implemented such that stormwater discharges would not adversely impact human health or the environment, nor contribute to any exceedances of any applicable water quality standard contained in the Basin Plan (Lahontan Regional Water Quality Control Board). This impact is less than significant.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin? ☐ ☐ ☒ ☐

b) Geophysical Survey: The geophysical survey associated with the Proposed Project would not require water use beyond filling the 100-gallon bucket available as a fire safety precaution for the helicopter. This water bucket would be filled using a fire hydrant with water purchased from the Coachella Valley Water District; therefore, the survey would not decrease groundwater supplies of interfere with groundwater recharge and impacts would be less than significant.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would require the use of 50,000 gallons of water per day; however, the use of water would be temporary in nature (30 days per proposed well site), and water necessary for these activities would be purchased from the Coachella Valley Water District via a fire hydrant. The exploratory wells would not result in a decrease in groundwater supplies and would not interfere with groundwater recharge; therefore, the exploratory wells would result in less than significant impacts associated with groundwater depletion.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

(i) result in substantial erosion or siltation on- or off-site; ☐ ☐ ☒ ☐

(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; ☐ ☐ ☒ ☐

(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or; ☐ ☐ ☒ ☐

(iv) impede or redirect flood flows? ☐ ☒ ☐ ☐

c) Geophysical Survey: As previously discussed, the geophysical survey would not result in ground-disturbing activities and therefore would not substantially change the character of surface or ground waters in the survey area. Minor soil compaction may occur as a result of vibrator trucks despite flotation tires; although, trucks would both avoid passing over the same ground more than once and avoid drainage crossings to the extent possible. Additionally, the SWPPP would identify BMPs which would minimize drainage impacts. If crossing is unavoidable, the drainage will be reconstructed to approximate the original contours to BLM standards. Further, vibrational

source generation would not occur within 328 feet (100 meters) of springs, water wells, and stock ponds and the survey is anticipated to last only up to 14 days. Therefore, impacts would be less than significant.

Exploratory Wells: As previously discussed, the construction of the exploratory wells would result in ground-disturbing activities in an area greater than one acre; therefore, a SWPPP would be required. The SWPPP would be developed to identify BMPs that sufficiently avoid any onsite or offsite erosion and runoff from areas proposed for ground disturbance. Operation of the exploratory wells would not have an impact of a stormwater drainage system as the wells would not result in an increase in the amount of runoff from any proposed well site. Impacts would, therefore, be less than significant.

It should be noted that proposed well sites 18-32, and 47-32 would require access roads that are located within a 100-year Federal Emergency Management Administration (FEMA) floodplain. Prior to construction, a Waters of the US determination would be required to determine the appropriate permitting requirements. It is possible that the Proposed Project would require compliance with Section 401 and 404 of the Clean Water Act (CWA) and Fish and Game Code 1600. If it is determined the exploratory wells associated with the Proposed Project would result in impacts to jurisdictional waters, the appropriate permits will be secured prior to impacts to the waters. This impact is less than significant.

Due to potential impacts associated with construction of the access roads for proposed well pads 47-32 and 18-32, the Proposed Project would implement Mitigation Measures MM-BIO-10 to reduce impacts associated with state or federally protected wetlands.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? ☐ ☐ ☐ ☒

d) Geophysical Survey: The geophysical survey associated with the Proposed Project area is not located in an area at risk of tsunami or seiche (Count of Imperial 1997). No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project are not located in an area at risk of tsunami or seiche (Count of Imperial 1997). No impact would occur.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? ☐ ☐ ☐ ☒

e) Geophysical Survey: As noted previously, the geophysical survey would not substantially alter the water quality or groundwater in the area; therefore, the survey would be in compliance with all city, state, and federal regulations including active water quality control plans and groundwater management plans. No impact would occur.

Exploratory Wells: As discussed above, the exploratory wells would be compliant with all city, state, and federal regulations, including compliance with the NPDES permits with the implementation of BMPs; compliance with the referenced regulations would reduce any potential impact associated with a water quality control plan to a less than significant. Additionally, as discussed above, implementation of the exploratory wells would not require water supplies beyond the supplies purchased from Coachella Valley Water District. No impact would occur.

XI. *LAND USE AND PLANNING Would the project:*

a) Physically divide an established community? ☐ ☐ ☐ ☒

a) Geophysical Survey: The geophysical survey associated with the Proposed Project would require four vibration trucks and receiving equipment that would not physically divide an established community. Temporary signage would be placed to close off the survey area for an anticipated 12 to 14 days, but the area is predominantly vacant currently and no facilities or structures are proposed that would prohibit travel through the survey area long-term. Moreover, land use designations within the survey area would remain the same. Thus, no impact would occur.

Exploratory Wells: The Proposed Project includes the drilling, testing, and monitoring of the proposed geothermal resource wells. The exploratory wells would not physically divide an established community, as no facilities are proposed that would prohibit travel throughout the Proposed Project area. Components of the exploratory wells associated with the Proposed Project would not physically divide or block residents from accessing public areas or facilities. Land use designations within the well sites would remain the same. No impact would occur.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? ☐ ☐ ☐ ☒

b) Geophysical Survey: The geophysical survey area associated with the Proposed Project is located within the Truckhaven

Geothermal Leasing Area of Imperial County (County of Imperial 2015); the land uses associated with the Proposed Project are allowable under the Imperial County Renewable Energy and Transmission Element (2015). The Proposed Project is not in conflict with the County adopted land use plans or policies. It is consistent with the County's General Plan, the Renewable Energy and Transmission Element Update and the applicable sections of the Imperial County Land Use Ordinance (Title 9); therefore, no impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project are located within the Truckhaven Geothermal Leasing Area of Imperial County (County of Imperial 2015); the land uses associated with the Proposed Project are allowable under the Imperial County Renewable Energy and Transmission Element (2015). The Proposed Project is not in conflict with the County adopted land-use plans or policies. It is consistent with the County's General Plan, the Renewable Energy and Transmission Element Update, and the applicable sections of the Imperial County Land Use Ordinance (Title 9); therefore, no impact would occur.

XII. *MINERAL RESOURCES* *Would the project:*

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? ☐ ☐ ☐ ☒

a) A number of mineral resources in Imperial County are currently being extracted, including gold, gypsum, sand, gravel, lime, clay, stone, kyanite, limestone, sericite, mica, tuff, salt, potash, and manganese. Several issues influence the extraction of mineral deposits in Imperial County, including the location of geologic deposition, the potential for impacts to the environment, and land use conflicts. As a result, the extraction of mineral resources is limited to a relatively small number of sites throughout the County.

Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in any impacts to known mineral resources or mineral resource recovery sites. Additionally, the survey would not preclude future mineral resource exploration throughout the Proposed Project area. No impacts would occur.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would not result in any impacts to known mineral resources or mineral resource recovery sites. Additionally, the exploratory wells would not preclude future mineral resource exploration throughout the Proposed Project area. No impacts would occur.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? ☐ ☐ ☐ ☒

b) Geophysical Survey: As noted above, implementation of the geophysical survey associated with the Proposed Project would not result in any impacts to known mineral resources or mineral resource recovery sites. Additionally, the geophysical survey would not preclude future mineral resource exploration throughout the Proposed Project area. No impacts would occur.

Exploratory Wells: As noted in Impact a), implementation of the exploratory wells associated with the Proposed Project would not result in any impacts to known mineral resources or mineral resource recovery sites. Additionally, the exploratory wells would not preclude future mineral resource exploration throughout the Proposed Project area. No impacts would occur.

XIII. *NOISE*

This section describes the existing noise setting and potential noise and vibration effects from project implementation on the site and its surrounding area. Construction noise modeling was performed through use of the Roadway Construction Noise Model (RCNM) Version 1.1. The model output is provided in Appendix H.

Environmental Setting

The proposed wells sites are located on the southwest side of Salton City, which is an unincorporated area located in the western portion of Imperial County. The primary sources of noise within the study area consists of vehicle noise on State Route 86 and the local roads, aircraft noise from Salton Sea Airport (Airport), and from off-road equipment operating at the Salton City Landfill. It should be noted that due to the distances these sources are located from the proposed well sites, these noise sources only provide nominal increases to the very low ambient noise levels at the proposed well sites.

County of Imperial Noise Standards

The General Plan Noise Element (County of Imperial, 2015) provides the applicable noise standards for the Proposed project. The Noise Element limits the noise level from any noise generating property to 50 dBA between 7 a.m. and 10 p.m. and to 45 dBA between 10 p.m. and 7 a.m. at the property line of the nearest home. The Noise Element exempts construction noise from these standards, provided construction activities

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

occur between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday and construction noise does not exceed 75 dBA Leq averaged over 8 hours.

Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐

a) Geophysical Survey: The Proposed Project involves a geophysical survey that requires equipment that would have the potential to generate noise in excess of standards. The General Plan Noise Element exempts construction activities from the applicable noise standards, provided that construction activities are limited to between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday and do not exceed 75 dBA Leq at the nearby homes. The geophysical survey would adhere to the allowable times for construction activities as detailed in the General Plan.

The geophysical survey would map a 23.5-square-mile area that includes several sensitive receptors within the survey area. The geophysical survey would utilize two sets of two Vibroseis trucks that produce a noise level as high as 84.5 dBA at 20 meters (66 feet) (Schlumberger 2014), that would exceed the County's 75-dBA construction noise standard, if the Vibroseis trucks are operated in close proximity to the homes located within the survey area. This would be considered a significant impact.

Mitigation measure MM-NOI-1 is proposed that would require the Vibroseis trucks to be located a minimum of 200 feet away from any occupied home. Implementation of MM-NOI-1 would reduce the noise from the Vibroseis trucks to 74.8 dBA, which is based on the standard noise propagation rate of 6 dB of noise reduction per doubling of the distance between noise source and receptor. Impacts would be less than significant with implementation of MM NOI-1.

Exploratory Wells: The Proposed Project would consist of development of six exploratory geothermal wells. Both construction and operation of the exploratory wells would have the potential to generate noise in excess of standards and have been analyzed separately below.

Construction-Related Noise

Construction activities for the exploratory wells associated with the Proposed Project are anticipated to begin in early 2020 and each well would take approximately two months to complete, or approximately one year for all six wells as it is anticipated that after a well is completed the crew would move to the next well location, so no concurrent well construction activities are anticipated. The anticipated construction phases for each well location would include: (1) Well pad and access road construction; (2) Well drilling; (3) Well testing; and (4) Well clean-up.

The General Plan Noise Element exempts construction activities from the applicable noise standards, provided that construction activities are limited to between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday and do not exceed 75 dBA Leq at the nearby homes. The well pad and access road construction, well testing, and well clean-up activities will adhere to these time limits, as such the construction noise level threshold for these activities is 75 dBA Leq at the property lines of the nearest homes. However, the well drilling phase of construction is required to operate 24-hours per day in order to minimize a risk of cave-in of the borehole. As such, the noise level threshold for the well drilling phase of construction is 45 dBA at the property line of the nearest home, which is based on the most restrictive nighttime residential noise standard.

The Federal Highway Administration (FHWA) compiled noise level data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table 11 below provides a list of the construction equipment measured, along with the associated measured noise emissions and measured percentage of typical equipment use per day. From this acquired data, FHWA developed the Roadway Construction Noise Model (RCNM). The RCNM, which uses the Spec 721.560 L_{max} at 50 feet, has been used to calculate the construction equipment noise emissions (see Appendix H).

Table 9: Construction Equipment Emissions and Usage Factors

Equipment	Acoustical Use Factor[1] (Percent)	Spec 721.560 L_{max} @ 50 Feet[2] (dBA, slow[3])	Actual Measured L_{max} @ 50 feet[4] (dBA, slow)
Auger Drill Rig	20	85	N/A
Backhoe	40	80	78
Compressor (air)	40	80	78
Concrete Mixer Truck	40	85	79
Concrete Pump	20	82	81
Concrete Saw	20	90	90
Crane	16	85	81
Dozer	40	85	82
Dump Truck	40	84	76
Excavator	40	85	81
Flatbed Truck	40	84	74
Front End Loader	40	80	79
Generator	50	82	81
Gradall (Forklift)	40	85	83
Mounted Impact Hammer	20	90	90
Paver	50	85	77
Roller	20	85	80
Tractor	40	84	N/A
Welder/Torch	40	73	74

1 Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.

2 Spec 721.560 is the equipment noise level utilized by the Roadway Construction Noise Model program.

3 The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.

4 Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.

Source: Federal Highway Administration, 2006.

The anticipated areas of construction and construction equipment that will be utilized during development of each area were obtained from the Project applicant. For each proposed well pad area, all equipment was placed at the shortest distance of the proposed well pad area to the nearest home. The results are shown below in Table 12.

Table 10: Proposed Project Construction Noise Levels at Nearby Homes Prior to Mitigation

Sensitive Receptor Location	Distance to Receptor (mile)	Construction Noise Level during: (dBA L_{eq})			
		Well Pad & Access Road Construction	Well Drilling	Well Testing	Well Cleanup
Nearest Home to Well 32-5	0.34	53	53	51	53
Nearest Home to Well 47-5	0.44	51	51	51	51
Nearest Home to Well 18-32	0.4	52	52	52	52
Nearest Home to Well 47-32	0.2	58	58	56	56
Nearest Home to Well 14-4	0.28	55	55	55	55
Nearest Home to Well 17-4	0.58	49	49	49	49
Construction Noise Threshold[1]		**75**	**45**	**75**	**75**
Exceed Threshold?		No	**Yes**	No	No

Notes:

[1] Construction Noise Thresholds from the General Plan Noise Element (County of Imperial, 2015).

Source: RCNM Version 1.1 (see Appendix C).

Table 12 shows that construction noise created during well pad and access road construction, well testing, and well cleanup and abandonment would be below the County's 75 dBA noise standard that is applicable when construction activities are exempt from the County's residential noise standards. Table 12 also shows that well drilling activities that would occur 24-hours per day until completion of the well, would exceed the County's residential nighttime noise standard of 45 dBA at the nearest home to each of the six proposed well sites. This would be considered a significant impact.

The mitigation measure MM-NOI-2 is proposed that would require the implementation of various sound control measures during well drilling phase of construction that are anticipated to reduce nighttime noise levels by up to 15 dB.

The well drilling phase of construction has been recalculated based on implementation of MM-NOI-2 and the results are shown in Table 13. As shown in Table 13 with implementation of MM-NOI-2, the well drilling noise levels would be lowered to within the County's residential nighttime noise standard of 45 dBA at the nearest home to each of the six proposed well sites. Impacts would be less than significant with implementation of MM NOI-2.

Table 11: Mitigated Proposed Project Construction Noise Levels at Nearby Homes

Sensitive Receptor Location	Distance to Receptor (mile)	Construction Noise Level during: (dBA L_{eq})			
		Well Pad & Access Road Construction	Well Drilling[1]	Well Testing	Well Cleanup
Nearest Home to Well 32-5	0.34	53	38	51	53
Nearest Home to Well 47-5	0.44	51	36	51	51
Nearest Home to Well 18-32	0.4	52	37	52	52
Nearest Home to Well 47-32	0.2	58	43	56	56
Nearest Home to Well 14-4	0.28	55	40	55	55
Nearest Home to Well 17-4	0.58	49	34	49	49
Construction Noise Threshold[2]		**75**	**45**	**75**	**75**
Exceed Threshold?		No	No	No	No

Notes:

[1] Well Drilling noise levels includes implementation of MM NOI-2.

[2] Construction Noise Thresholds from the General Plan Noise Element (County of Imperial, 2015).

Source: RCNM Version 1.1 (see Appendix C).

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Operation-Related Noise

The Proposed Project consists of development of six exploratory geothermal wells, which would be tested after completion of the well drilling phase in order to determine the commercial potential of each well, and a geophysical survey to better model geothermal reservoirs in the area. If a well is judged to have commercial potential, well monitoring may be continued indefinitely until the applicant proceeds with the approval process to place the well into commercial service. Therefore, the operational emissions would be limited to well monitoring activities that may be limited to weekly or monthly vehicle trips to the well sites to obtain pressure and temperature measurements. As such, only nominal operational noise levels would be created from the on-going operation of the Proposed Project and operations-related noise would be less than significant for the Proposed Project.

Accordingly, with implementation of MM-NOI-1 and MM-NOI-2, the Proposed Project would not expose persons to noise levels in excess of standards established by Imperial County.

MM-NOI-1: During the geophysical survey, the project applicant shall require that the Vibroseis trucks are operated a minimum of 200 feet away from any occupied home.

MM-NOI-2: During construction of the exploratory wells, the project applicant shall require the well drilling contractor to implement the following noise reduction measures:

- All construction equipment shall use noise-reduction features (e.g., mufflers and engine shrouds that are no less effective than those originally installed by the manufacturer;
- All non-essential well drilling equipment and truck deliveries shall be limited to operating during the allowable construction times of between 7 a.m. and 7 p.m. Monday thru Friday and between 9 a.m. and 5 p.m. on Saturday;

The portable office and any storage containers used during the well drilling phase shall be placed between the drilling equipment and nearest home, in order to effectively act as a sound wall and provide attenuation to the nearest home.

b)	Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

b) Construction activities would require the operation of off-road equipment and trucks that are known sources of vibration. Construction activities may occur as near as 0.2 mile (1,060 feet) from the home located in the proximity of proposed Exploratory Well 47-32.

A vibration monitoring study was prepared for the proposed project by Southwest Geophysics, Inc., January 17, 2018. However, it should be noted that the vibration study was limited to calculating the vibration propagation rates of the existing geological conditions of the project study area and does not provide any information about the proposed project vibration levels at the nearby sensitive homes, however the average attenuation rate of 1.28 calculated by the vibration study has been utilized to calculate the vibration levels at the nearby homes.

Since neither the County's General Plan nor the Municipal Code provide any thresholds related to vibration, Caltrans guidance has been utilized, which defines the threshold of perception from transient sources at 0.25 inch-per-second peak particle velocity (PPV). Table 14 shows the typical PPV produced from some common construction equipment.

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

Table 12: Typical Construction Equipment Vibration Emissions

Equipment	Peak Particle Velocity in inches per second at 25 feet	Vibration Level (L_v) at 25 feet
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.170	93
Clam Shovel Drop	0.202	94
Hydromill		
- in soil	0.008	66
- in rock	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drill	0.089	87
Loaded truck (off road)	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: Federal Transit Administration 2006.

From the list of equipment shown in Table 14, a large bulldozer with a vibration level of 0.089 inch-per-second PPV would be the source of the highest vibration levels of all equipment utilized during construction activities for the Proposed Project. Based on typical propagation rates this would result in a vibration level of 0.001 inch-per-second PPV at the nearest home to construction activities. The construction-related vibration levels would be within the 0.25 inch-per-second PPV threshold detailed above. Construction-related vibration impacts would be less than significant.

The ongoing operation of the Proposed Project would not result in the creation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the Proposed Project.

Accordingly, the Proposed Project would not expose persons to excessive groundborne vibration or groundborne noise levels.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? ☐ ☐ ☒ ☐

c) Geophysical Survey: The closest receiving line required for the geophysical survey would be deployed as near as 400 feet from the runway for Salton Sea Airport, and an 8-foot by 8-foot staging area would be set up at the Airport. It should be noted that Noise Element of the General Plan (Imperial County, 2015) states that current airport activity at Salton Sea Airport is negligible; and, due to the low levels of activity, the County did not prepare noise contours for Salton Sea Airport. Therefore, it is likely that Salton Sea Airport does not have activity to create 65-dBA CNEL noise contours. It should also be noted that the geophysical survey is anticipated to last 12 to 14 days, and airport noise levels are typically calculated based on annual average activity noise levels; therefore, airport and airstrip noise impacts would be less than significant.

Exploratory Wells: The proposed well sites are located as near as 400 feet from the runway for Salton Sea Airport. It should be noted that Noise Element of the General Plan (Imperial County, 2015) states that current airport activity at Salton Sea Airport is negligible and due to the low levels of activity, the County did not prepare noise contours for Salton Sea Airport. Therefore, it is likely that Salton Sea Airport does not have activity to create 65-dBA CNEL noise contours. It should also be noted that the Proposed Project would consist of the development of six exploratory wells, where the operation of the proposed wells would be limited to well monitoring activities that may be limited to weekly or monthly vehicle trips to the well sites to obtain pressure and temperature measurements. The Proposed Project would consist of a very limited increase in people working in the project area and the only source of airport noise is Salton Sea Airport that produces noise levels below County noise standards. As such, airport and airstrip noise impacts would be less than significant.

XIV. *POPULATION AND HOUSING* *Would the project:*

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and ☐ ☐ ☐ ☒

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

business) or indirectly (for example, through extension of roads or other infrastructure)?

a) Geophysical Survey: The geophysical survey associated with the Proposed Project would not induce unplanned population growth or displace existing people or housing. No residential units are in the survey area that would require relocation, and access roads associated with the Proposed Project would be used only for accessing the survey area. No development of new roads or infrastructure is proposed that would introduce new populations to the survey area. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not induce unplanned population growth or displace existing people or housing. The Proposed Project consists of the installation of exploratory wells within a predominantly undeveloped, vacant area of Imperial County. No residential units are on the proposed well sites that would require relocation, and access roads associated with the Proposed Project would be used only for accessing the proposed well sites. No development of new roads or infrastructure is proposed that would introduce new populations to the Proposed Project area. No impact would occur.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? ☐ ☐ ☐ ☒

b) Geophysical Survey: The geophysical survey associated with the Proposed Project does not include any activities that would displace people or housing with the Proposed Project area. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project do not include any activities that would displace people or housing within the Proposed Project area. No impact would occur.

XV. *PUBLIC SERVICES*

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

1) Fire Protection? ☐ ☐ ☐ ☒

1) Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in substantial adverse physical impacts to fire protection. The survey would not involve the modification of any fire protection services or their facilities. The survey also would not invite new populations to the survey area that would result in the permanent, and increased need of fire protection services. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not result in substantial adverse physical impacts to fire protection. The exploratory wells would not involve the modification of any fire protection services or their facilities. The exploratory wells would not invite new populations to the proposed well locations that would result in the permanent, and increased need of fire protection services. No impact would occur.

2) Police Protection? ☐ ☐ ☐ ☒

2) Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in substantial adverse physical impacts to fire protection. The survey would not involve the modification of any fire protection services or their facilities. The survey also would not invite new populations to the survey area that would result in the permanent, and increased need of fire protection services. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not result in substantial adverse physical impacts to police protection. The Proposed Project would not involve the modification of any police protection services or their facilities. The Proposed Project would not invite new populations to the proposed well locations that would result in the permanent, and increased need of police protection services. No impact would occur.

3) Schools? ☐ ☐ ☐ ☒

3) Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in substantial adverse physical impacts to school facilities. The survey would not involve the modification of any schools or their facilities. In addition, the survey would not invite new populations to the survey area that would result in the permanent, and increased need for schools. No impact would occur.

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Exploratory Wells: The exploratory wells associated with the Proposed Project would not result in substantial adverse physical impacts to school facilities. The exploratory wells would not involve the modification of any schools or their facilities. Additionally, the proposed wells would not invite new populations to the proposed well locations that would result in the permanent, and increased need for schools. No impact would occur.

4) Parks? ☐ ☐ ☐ ☒

4) Geophysical Survey: The geophysical survey would not result in substantial adverse physical impacts to parks. The geophysical survey would not involve the modification of any parks or their facilities. Moreover, the survey would not invite new populations to the survey area that would result in the permanent and increased need for parks. No impact would occur.

Exploratory Wells: The exploratory wells would not result in substantial adverse physical impacts to parks. The exploratory wells would not involve the modification of any parks or their facilities. Furthermore, the exploratory wells would not invite new populations to the proposed well locations that would result in the permanent and increased need for parks. No impact would occur.

5) Other Public Facilities? ☐ ☐ ☐ ☒

5) Geophysical Survey: The geophysical survey associated with the Proposed Project would not result in substantial adverse physical impacts to public facilities. The survey would not involve the modification of any public facilities. Further, the survey would not invite new populations to the survey area that would result in the permanent and increased need of public facilities. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not result in substantial adverse physical impacts to public facilities. The exploratory wells would not involve the modification of any public facilities. The exploratory wells would not invite new populations to the proposed well locations that would result in the permanent and increased need of public facilities. No impact would occur.

XVI. *RECREATION*

a) Would the project increase the use of the existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? ☐ ☐ ☐ ☒

a) Geophysical Survey: Implementation of the geophysical survey associated with the Proposed Project would not increase the use of existing neighborhood parks, campgrounds, trails, or other recreational facilities and would not include the construction or expansion of new recreational facilities. The survey would not induce new populations that would result in the substantial physical deterioration of recreational facilities or require new facilities. Trails within the Ocotillo Wells SVRA would be used to access source points, thus vibrational trucks may cross-paths with recreational vehicles during the survey. To discourage public travel on vibroseis paths located off-trail, signage will be placed to clarify that the tracks are not open to public travel and entry points will be broomed or hand raked to simulate undisturbed soil. No impact would occur.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would not increase the use of existing neighborhood parks, campgrounds, trails, or other recreational facilities and would not include the construction or expansion of new recreational facilities. The exploratory wells would not induce new populations that would result in the substantial physical deterioration of recreational facilities or require new facilities. No impact would occur.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment? ☐ ☐ ☐ ☒

b) Geophysical Survey: Implementation of the geophysical survey associated with the Proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities. The survey would not induce new populations that would result in the substantial physical deterioration of recreational facilities or require new facilities. No impact would occur.

Exploratory Wells: Construction of the exploratory wells associated with the Proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities. The exploratory wells would not induce new populations that would result in the substantial physical deterioration of recreational facilities or require new facilities. No impact would occur.

XVII. *TRANSPORTATION* ***Would the project:***

a) Conflict with a program plan, ordinance or policy addressing ☐ ☐ ☒ ☐

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

the circulation system, including transit, roadway, bicycle and pedestrian facilities?

a) Geophysical Survey: Primary highway access to the Project vicinity is provided by State Highway 86, a four-lane highway running north-south through Imperial County on the west side of the Salton Sea. Immediate access to the survey area is from State Highway 86 to a number of two-way, paved roads in the survey area, including the Borrego Salton Sea Way, Harvard Avenue, and Air Park Drive. All existing designated roads and trails that bisect eligible sites would be available to be used as access; though, because the geophysical survey is short-term and temporary and the traffic volumes generated by the survey consists of four vehicles, the potential for the geophysical survey to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system is negligible. This impact is less than significant.

Exploratory Wells: Primary highway access to the Project area and some of the proposed well sites is from State Highway 86 to Airpark Drive. Access to the rest of the proposed well sites is from State Highway 86 to County Dump Road. Both Airpark Drive and County Dump Road are two-lane roads with very low traffic volume. Because the drilling of the exploratory wells is short-term and temporary, and the traffic volumes generated by construction and well drilling so minor, the potential for the Proposed Project to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system is negligible. This impact is less than significant.

b) Would the project conflict or be inconsistent with the CEQA Guidelines section 15064.3, subdivision (b)? ☐ ☐ ☒ ☐

b) Geophysical Survey: As noted above, any increase in traffic would be short-term and temporary, and the traffic volume generated by the geophysical survey would be so minor, the potential for the geophysical survey to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system is negligible. This impact is less than significant.

Exploratory Wells: As noted in Impact a), any increase in traffic would be short-term and temporary, and the traffic volumes generated by construction and well drilling so minor, the potential for the exploratory wells associated with the Proposed Project to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system is negligible. Additionally, operation of the Proposed Project would not increase vehicle miles travelled (VMT) as only routine maintenance activities would be required during operation. This impact is less than significant.

c) Substantially increases hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? ☐ ☐ ☒ ☐

c) Geophysical Survey: The geophysical survey associated with the Proposed Project does not include any alteration to the existing public road network. The access roads to the geophysical survey would be limited to approved travel corridors, many of them designated roadways. To discourage public OHV travel on source routes and reduce the visual appearance following the completion of the survey, entry and exit points would be broomed or hand raked. This impact is less than significant.

Exploratory Wells: The exploratory wells associated with the Proposed Project do not include any alteration to the existing public road network. The access roads to the exploratory wells associated with the Proposed Project would be designed to accommodate trucks delivering heavy drill equipment to each proposed well site. The access roads would not be open to the public and would only be maintained as long as the proposed well site is being constructed or in use. Once a proposed well site is retired or abandoned, the access road would be return to the existing condition. This impact is less than significant.

d) Result in inadequate emergency access? ☐ ☐ ☐ ☒

d) Geophysical Survey: The geophysical survey associated with the Proposed Project would not involve blocking or restricting any access routes. The geophysical survey would not interfere with emergency response plans or operations near the survey area. No impacts would occur.

Exploratory Wells: The construction of the exploratory wells associated with the Proposed Project would not involve blocking or restricting any access routes. The exploratory wells would not interfere with emergency response plans or operations near the Proposed Project area. No impacts would occur.

XVIII. *TRIBAL CULTURAL RESOURCES*

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place or object with cultural

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value to a California Native American tribe, and that is:				
(i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as define in Public Resources Code Section 5020.1(k), or	☐	☐	☒	☐
(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth is subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.	☐	☐	☒	☐

a) As discussed in Section V, the records search identified 219 archaeological sites and 183 historic-era isolates within one-half mile of the Proposed Project area, which includes both the geophysical survey area and exploratory well sites. In 2017, POWER recorded 12 sites and 12 isolates during the 2017 field season as part of the Proposed Project. Seven of these sites are in the Proposed Project area. Because the Proponents' geophysical contractor and POWER archaeological staff were tasked with moving Proposed Project features away from historic sites listed by the SCIC, no tribal cultural resources are located within a feature of the Proposed Project.

The archaeological sites previously recorded in and within one-half mile from the Proposed Project area consist mainly of artifact scatters, although sites bearing stacked rock features and what appears to be habitation foundations are plentiful near large washes, especially the wash banks just west of State Route 86. No sites have been recorded on the floor of any wash, although a few isolates are known. Sites bearing the remnants of prehistoric fish traps or weir foundations, which in this area take the form of V-or J-shaped single-coursed cobble alignments (Dice et.al. 2018) are also recorded in the Proposed Project area. Many of these can be seen on high-resolution aerial photographs. Historic trash and metal debris do occur near older roads, including dummy bombs and rounds that may have been dropped by World War II training planes between approximately 1940 and 1943 within the Proposed Project area. Trash litters both sides of the State Route 86 right-of-way and some of this is mixed with debris that may be more than 50 years old.

Attempts were made before any fieldwork began to move projected location of project features into locations where no sites had been previously located. Nonetheless, the inventory encountered 175 archaeological resources and 91 isolated artifacts. Proposed Project features have been moved to positions that would avoid the recorded site boundaries; however, construction of the access road associated with proposed well site 87-6 has the potential to impact a historic resource. Implementation of MM-CUL-1 would reduce the impact to less than significant.

Additionally, the County sent formal AB 52 consultation letters to Torres - Martinez Tribes and Quechan Tribes on August 7th, 2019 and no formal consultation has been requested.

XIX. *UTILITIES AND SERVICE SYSTEMS* *Would the project:*

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐

a) Geophysical Survey: The geophysical survey area does not currently contain any public utilities or services. The geophysical survey would not require the construction of any water, wastewater, stormwater, or energy facilities to accommodate the demands of the survey. Water use associated with the survey would be limited to the 100-gallon water bucket kept on site should the helicopter be needed to fight fire in the area; this water would be purchased from the Coachella Valley Water District via a nearby fire hydrant. The geophysical survey would not generate wastewater that would need to be treated by a wastewater treatment facility. Due to the lack of public utilities and services available within the Proposed Project area and the lack of need to provide expanded services to accommodate the geophysical survey these impacts are less than significant.

Exploratory Wells: The proposed exploratory well sites do not currently contain any public utilities or services. The exploratory wells would not require the construction of any water, wastewater, stormwater, or energy facilities to accommodate the demands of the exploratory wells associated with the Proposed Project. Water use associated with the exploratory wells would be limited to the

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

construction phase, and no infrastructure would be required to provide water to the proposed well sites; water for dust control and drilling would be purchased from the Coachella Valley Water District via a nearby fire hydrant. The exploratory wells would not generate wastewater that would need to be treated by a wastewater treatment facility. Storm water control would be implemented for each well pad and access road. Due to the lack of public utilities and services available within the Proposed Project area, and the lack of need to provide expanded services to accommodate the exploratory wells, these impacts are less than significant.

b) Have sufficient water supplies available to serve the project from existing and reasonably foreseeable future development during normal, dry and multiple dry years? ☐ ☐ ☒ ☐

b) Geophysical Survey: As described above, the geophysical survey associated with the Proposed Project would not require a significant amount of water. Water use associated with the survey would be limited to fire prevention measures and purchased from the Coachella Valley Water District via a nearby fire hydrant. This impact is less than significant.

Exploratory Wells: As noted in Impact a), the exploratory wells associated with the Proposed Project would not require a significant amount of water. Water use associated with the exploratory wells would be limited to drilling and dust control measures. Water for dust control and drilling would be purchased from the Coachella Valley Water District via a nearby fire hydrant. Operation of the exploratory wells would not require significant amount of water and would be limited to general maintenance activities. This impact is less than significant.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? ☐ ☐ ☐ ☒

c) Geophysical Survey: As described above, the geophysical survey associated with the Proposed Project would not generate wastewater that would need to be treated by a wastewater treatment facility. Onsite wastewater needs will be accommodated by the use of portable toilets that would be removed from the site once construction is complete. No impact would occur.

Exploratory Wells: As noted in Impact b), the exploratory wells associated with the Proposed Project would not generate wastewater that would need to be treated by a wastewater treatment facility. Onsite wastewater needs will be accommodated by the use of portable toilets that would be removed from the site once construction is complete. No impact would occur.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? ☐ ☐ ☒ ☐

d) Solid wastes generated by the Proposed Project would be handled in conformance with all applicable statutes and regulations. The potential for the small amount of waste generated by the Project to exceed the available landfill disposal capacity is negligible.

Geophysical Survey: All solid waste or trash created during the geophysical survey associated with the Proposed Project will be transported for disposal at an approved solid waste disposal facility. All survey debris, including flagging, stakes, and pin flags, will be gathered on cleared pathways daily and disposed of at an approved site or landfill. Impact is therefore less than significant.

Exploratory Wells: Small amounts drilling mud and cuttings would be generated from drilling operations associated with the Proposed Project. These wastes would be temporarily stored in the onsite containment basin or tanks. The solid contents remaining in each containment basin, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, will be tested as required by the CRWQCB. The solids will be removed and disposed of in a waste disposal facility authorized by the CRWQCB to receive and dispose of these materials. If allowed they may be used as daily cover at the nearby landfill. This impact is less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? ☐ ☐ ☒ ☐

e) Geophysical Survey: The Proposed Project would comply with all applicable statutes and regulations related to solid waste, as described above. Solid waste generated from the survey is expected to be minimal. This impact is less than significant.

Exploratory Wells: As noted in Impact d), the exploratory wells associated with the Proposed Project would comply with all applicable statutes and regulations related to solid waste. Solid waste generated from the exploratory wells is expected to be minimal. This impact is less than significant.

XX. *WILDFIRE*

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

		Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
a)	Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

a) Geophysical Survey: As described in Section IX, the geophysical survey associated with the Proposed Project would not occur within a fire hazard severity zone (CalFire 2007). As previously noted, construction of the survey would not involve blocking or restricting any emergency access routes. The geophysical survey would not interfere with emergency response plans or operations near the Proposed Project area. No impact would occur.

Exploratory Wells: As noted above in Section IX, the exploratory wells associated with the Proposed Project are not located within a fire hazard severity zone (CalFire 2007). As previously noted, construction of the exploratory wells would not involve blocking or restricting any emergency access routes. The well site construction would not interfere with emergency response plans or operations near the Proposed Project area. No impact would occur.

b)	Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒

b) Geophysical Survey: The geophysical survey would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. The survey would comply to the goals and policies identified in the County of Imperial General Plan Seismic and Public Safety Element to provide adequate safety measures to protect residents within the Proposed Project area. No impact would occur.

Exploratory Wells: The exploratory wells associated with the Proposed Project would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. The exploratory wells would comply to the goals and policies identified in the County of Imperial General Plan Seismic and Public Safety Element to provide adequate safety measures to protect residents within the Proposed Project area. No impact would occur.

c)	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒

c) Geophysical Survey: As noted above, the geophysical survey associated with the Proposed Project would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. No impact would occur.

Exploratory Wells: As noted in Impact b), the exploratory wells associated with the Proposed Project would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. No impact would occur.

d)	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

d) Geophysical Survey: As noted above, the geophysical survey would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. No impact would occur.

Exploratory Wells: As noted throughout this section, the exploratory wells would not involve development of structures of infrastructure that would introduce new populations to the Proposed Project area that could result in impacts involving wildfires. No impact would occur.

Note: Authority cited: Sections 21083 and 21083.05, Public Resources Code. Reference: Section 65088.4, Gov. Code; Sections 21080(c), 21080.1, 21080.3, 21083, 21083.05, 21083.3, 21093, 21094, 21095, and 21151, Public Resources Code; Sundstrom v. County of Mendocino, (1988) 202 Cal.App.3d 296; Leonoff v. Monterey Board of Supervisors, (1990) 222 Cal.App.3d 1337; Eureka Citizens for Responsible Govt. v. City of Eureka (2007) 147 Cal.App.4th 357; Protect the Historic Amador Waterways v. Amador Water Agency (2004) 116 Cal.App.4th at 1109; San Franciscans Upholding the Downtown Plan v. City and County of San Francisco (2002) 102 Cal.App.4th 656.

Revised 2009- CEQA

	Potentially Significant Impact **(PSI)**	Potentially Significant Unless Mitigation Incorporated **(PSUMI)**	Less Than Significant Impact **(LTSI)**	No Impact **(NI)**

Revised 2011- ICPDS
Revised 2016 – ICPDS
Revised 2017 – ICPDS
Revised 2019 – ICPDS

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)

SECTION 3
III. MANDATORY FINDINGS OF SIGNIFICANCE

The following are Mandatory Findings of Significance in accordance with Section 15065 of the CEQA Guidelines.

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, eliminate tribal cultural resources or eliminate important examples of the major periods of California history or prehistory?

☐ ☒ ☐ ☐

a) As identified in Section IV of this IS, the Proposed Project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, and/or reduce the number or restrict the range of a rare or endangered plant or animal. However, the Proposed Project would implement MM-BIO-1 through MM-BIO-10 to reduce any potentially significant impacts to biological resources. Additionally, the Proposed Project was determined to result in potentially significant impacts associated with California history or prehistory. Implementation of MM-CUL-1 through MM-CUL-4 would reduce these impacts to less than significant. Therefore, the Proposed Project would result in less than significant impacts with mitigation incorporated.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

☐ ☒ ☐ ☐

b) Implementation of the Proposed Project would not result in a cumulative impact. All potentially significant impacts can be reduced to less than significant vie the implementation of mitigation measures. The cumulative impacts associated with the Proposed Project are less than significant.

c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

☐ ☒ ☐ ☐

c) As noted above, all environmental impacts associated with implementation of the Proposed Project can be reduce to less than significant via implementation of mitigation measures. The Proposed Project would not result in significant impacts on human beings. This impact is less than significant

c) As noted above, all environmental impacts associated with implementation of the Proposed Project can be reduce to less than significant via implementation of mitigation measures. The Proposed Project would not result in significant impacts on human beings. This impact is less than significant.

IV. PERSONS AND ORGANIZATIONS CONSULTED

This section identifies those persons who prepared or contributed to preparation of this document. This section is prepared in accordance with Section 15129 of the CEQA Guidelines.

A. COUNTY OF IMPERIAL

- Jim Minnick, Director of Planning & Development Services
- Michael Abraham, AICP, Assistant Director of Planning & Development Services
- David Black, Project Planner
- Imperial County Air Pollution Control District
- Department of Public Works
- Fire Department
- Ag Commissioner
- Environmental Health Services
- Sheriff's Office

B. OTHER AGENCIES/ORGANIZATIONS

- **Bureau of Land Management**
- **California State Parks**
- **California State Lands Commission**
- **California Department of Conservation**

V. REFERENCES

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Department of Toxic Substances Control (DTSC)

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Federal Transit Administration (FTA)

2018 Transit Noise and Vibration Impact Assessment Manual. Available Online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Imperial County Air Pollution Control District (ICAPCD)

2018 High Wind Exceptional Event Fugitive Dust Plan for Imperial County. Available Online at: https://www.co.imperial.ca.us/AirPollution/otherpdfs/MitigationPlan.pdf

2017 CEQA Air Quality Handbook. Available Online at: https://www.co.imperial.ca.us/AirPollution/PlanningDocs/CEQAHandbk.pdf

State Water Resources Control Board (SWRCB)

2017 GeoTracker Database. Available online at: https://geotracker.waterboards.ca.gov/

Trinity Consultants

2017 California Emissions Estimator Model (CalEEMod) version 2016.3.2. Available Online at: http://www.caleemod.com/

VI. FINDINGS

This is to advise that the County of Imperial, acting as the lead agency, has conducted an Initial Study to determine if the project may have a significant effect on the environmental and is proposing this Negative Declaration based upon the following findings:

☐ The Initial Study shows that there is no substantial evidence that the project may have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.

☒ The Initial Study identifies potentially significant effects but:

(1) Proposals made or agreed to by the applicant before this proposed Mitigated Negative Declaration was released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur.

(2) There is no substantial evidence before the agency that the project may have a significant effect on the environment.

(3) Mitigation measures are required to ensure all potentially significant impacts are reduced to levels of insignificance.

A NEGATIVE DECLARATION will be prepared.

If adopted, the Negative Declaration means that an Environmental Impact Report will not be required. Reasons to support this finding are included in the attached Initial Study. The project file and all related documents are available for review at the County of Imperial, Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 (442) 265-1736.

NOTICE

The public is invited to comment on the proposed Negative Declaration during the review period.

10-26-19 for

Date of Determination Jim Minnick, Director of Planning & Development Services

The Applicant hereby acknowledges and accepts the results of the Environmental Evaluation Committee (EEC) and hereby agrees to implement all Mitigation Measures, if applicable, as outlined in the MMRP.

Applicant Signature Date

EEC ORIGINAL PKG

Table 13: Potential for Occurrence – Special Status Plant Species

Species	Status	Habitat	Blooming Period	Potential for Occurrence
Abronia villosa var. *aurita* chaparral sand-verbena	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in chaparral, Coastal scrub, and Desert dunes, on sandy soils. From 245 to 5,250 feet in elevation.	March – September	**Moderate** Suitable habitat occurs within the Proposed Project area, and observed within 0.5-miles.
Astragalus crotalariae Salton milk-vetch	Fed: None State: None CNPS: 4.3	Perennial herb occurring in desert wash and Sonoran desert scrub, on sandy or gravelly soils. From 195 to 820 feet in elevation.	January – April	**Present.** Observed within the Proposed Project area during the survey.
Astragalus insularis var. *harwoodii* Harwood's milk-vetch	Fed: None State: None CNPS: 2B.2	Annual herb occurring on desert dunes, desert wash, and Mojavean desert scrub, on sandy or gravelly soils. From 0 to 2,330 feet in elevation.	January – May	**Moderate**. Suitable habitat occurs within the Proposed Project area.
Astragalus magdalenae var. *peirsonii* Peirson's milk-vetch	Fed: **THR** State: **END** CNPS: 1B.2	Perennial herb occurring on desert dunes. From 195 to 740 feet in elevation.	December – April	**Absent**. No suitable habitat occurs within the Proposed Project area.
Bursera microphylla littleleaf elephant tree	Fed: None State: None CNPS: 2B.3	Perennial deciduous tree occurring in desert wash, Sonoran desert scrub, on rocky soils. From 655 to 2,300 feet in elevation.	June – July	**Absent**. The Proposed Project area is below the known elevation range for the species.
Castela emoryi crucifixion thorn	Fed: None State: None CNPS: 2B.2	Perennial deciduous shrub occurring on alkali playa, desert wash, Mojavean desert scrub and Sonoran desert scrub, on gravelly soils. From 300 to 2,380 feet in elevation.	June – July	**Low**. Suitable habitat occurs on site, but the Proposed Project area is below the known elevation range for the species.
Chaenactis carphoclinia var. *peirsonii* Peirson's pincushion	Fed: None State: None CNPS: 1B.3	Annual herb occurring in Sonoran desert scrub, on sandy soils. From 10 to 1,640 feet in elevation.	March – April	**Moderate** Suitable habitat occurs within the Proposed Project area, and observed within 0.5-miles.
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in coastal bluff scrub and coastal dunes. From 0 to 330 feet in elevation.	January – August	**Absent**. No suitable habitat occurs within the Proposed Project area.
Chorizanthe polygonoides var. *longispina* long-spined spineflower	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, ultramafic soils, and vernal pools in clay soils. From 100 to 5,020 feet in elevation.	April – June	**Absent**. No suitable habitat occurs within the Proposed Project area.
Croton wigginsii Wiggin's croton	Fed: None State: **Rare** CNPS: 2B.2 BLM: S	Perennial shrub occurring on desert dunes and Sonoran desert scrub, on sandy soils. From 165 to 330 feet in elevation.	March – May	**Moderate**. Suitable habitat occurs within the Proposed Project area.
Cylindropuntia fosbergii pink teddy-bear cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring in Sonoran desert scrub. From 280 to 2,790 feet in elevation.	March – May	**Low**. Suitable habitat occurs on site, but the Proposed Project area is below the known elevation range for the species.
Cylindropuntia munzii Munz's cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring Sonoran desert scrub, on sandy or gravelly soils. From 490 to 1,970 feet in elevation.	May	**Low**. Suitable habitat occurs on site, but the Proposed Project area is below the known elevation range for the species.

Species	Status	Habitat	Blooming Period	Potential for Occurrence
Dieteria asteroids var. lagunensis Mount Laguna aster	Fed: None State: **Rare** CNPS: 2B.1 BLM: S	Perennial herb occurring in cismontane woodland and lower montane coniferous forest. From 2,590 to 7,875 feet in elevation.	July – August	**Absent**. The Proposed Project area is below the known elevation range for the species.
Euphorbia abramsiana Abram's spurge	Fed: None State: None CNPS: 2B.2	Annual herb occurring in Mojavean desert scrub and Sonoran desert scrub, on sandy soils. From -15 to 4,300 feet in elevation.	August – November	**Moderate**. Suitable habitat occurs within the Proposed Project area.
Euphorbia platysperma flat-seeded spurge	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in desert dunes and Sonoran desert scrub, on sandy soils. From 215 to 330 feet in elevation.	February – September	**Low**. Suitable habitat occurs on site, but the Proposed Project area is below the known elevation range for the species, and there are no known occurrences within 10 miles.
Fremontodendron mexicanum Mexican flannelbush	Fed: **END** State: **Rare** CNPS: 1B.1	Perennial evergreen shrub occurring in chaparral, cismontane woodlands, and closed-cone coniferous forest, on gabbroic, metavolcanic, or serpentinite soils. From 30 to 2,350 feet in elevation.	March – June	**Absent**. No suitable habitat occurs within the Proposed Project area.
Grindelia hallii San Diego sunflower	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, meadows and seeps, and valley and foothill grassland. From 605 to 5,725 feet in elevation.	May – October	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Helianthus niveus ssp. *tephrodes* Algodones Dunes sunflower	Fed: None State: **END** CNPS: 1B.2 BLM: S	Perennial herb occurring on desert dunes. From 165 to 330 feet in elevation.	September – May	**Absent**. No suitable habitat occurs within the Proposed Project area.
Hulsea californica San Diego sunflower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, and upper montane coniferous forest in openings and burned areas. From 3,000 to 9,560 feet in elevation.	April – June	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Johnstonella costata (=*Cryptantha costata*) ribbed cryptantha	Fed: None State: None CNPS: 4.3 BLM: S	Annual herb occurring in desert dunes, Mojavean desert scrub, and Sonoran desert scrub, on sandy soils. From -195 to 1,640 feet in elevation.	February – May	**Moderate** Suitable habitat occurs within the Proposed Project area, and observed within 0.5-miles.
Lepidium flavum var. *felipense* Borrego Valley pepper-grass	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinon and juniper woodlands and Sonoran desert scrub, on sandy soils. From 1,490 to 2,755 feet in elevation.	March – May	**Absent**. The Proposed Project area is below the known elevation range for the species.
Lupinus excubitus var. *medius* Mountain Springs bush lupine	Fed: None State: None CNPS: 1B.3	Perennial shrub occurring in pinyon and juniper woodlands and Sonoran desert scrub. From 1,395 to 4,495 feet in elevation.	March – May	**Absent**. The Proposed Project area is below the known elevation range for the species.
Lycium parishii Parish's desert-thorn	Fed: None State: None CNPS: 2B.3	Perennial shrub occurring in coastal scrub and Sonoran desert scrub. From 440 to 3,280 feet in elevation.	March – April	**Absent**. The Proposed Project area is below the known elevation range for the species.

Species	Status	Habitat	Blooming Period	Potential for Occurrence
Malperia tenuis brown turbans	Fed: None State: None CNPS: 2B.3	Annual herb occurring in Sonoran desert scrub, on sandy or gravelly soils. From 50 to 1,100 feet in elevation.	March – April	**Low**. Suitable habitat occurs within the Proposed Project area, but there are no known occurrences within 10 miles.
Monardella nana ssp. *leptosiphon* San Felipe monardella	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in chaparral and lower montane coniferous forest. From 3,940 to 6,085 feet in elevation.	June – July	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Monardella robisonii Robison's monardella	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in pinon & juniper woodlands. From 2,000 to 4,920 feet in elevation.	April – September	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Palafoxia arida var. *gigantea* giant Spanish needle	Fed: None State: None CNPS: 1B.3 BLM: S	Annual to perennial herb occurring on desert dunes. From 50 to 330 feet in elevation.	February – May	**Absent**. No suitable habitat occurs within the Proposed Project area.
Pholisma sonorae sand food	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial parasitic herb occurring on desert dunes and Sonoran desert scrub on sandy soils. From 0 to 655 feet in elevation.	April – June	**Moderate**. Suitable habitat occurs within the Proposed Project area.
Pilostyles thurberi Thurber's pilostyles	Fed: None State: None CNPS: 4.3	Perennial parasitic herb occurring on *Psorothamnus* in Sonoran desert scrub. From 0 to 1,120 feet in elevation.	December – April	**Moderate** Suitable habitat occurs within the Proposed Project area, and observed within 1-mile.
Salvia greatae Orocopia sage	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial evergreen shrub occurring in desert wash, Mojavean desert scrub, and Sonoran desert scrub. From -130 to 2,705 feet in elevation.	March – April	**Low**. Suitable habitat occurs within the Proposed Project area, but all known populations occur on northeastern portion of the Salton Sea.
Schoenoplectus americanus Olney's three-square bulrush	Fed: None State: None CNPS: None State Parks: S	Perennial rhizomatous herb occurring in mineral-rich or brackish marshes, shores, fens, seeps, and springs. Up to 7,220 feet in elevation.	May - August	**Absent**. No suitable habitat occurs within the Proposed Project area.
Senna covesii Cove's senna	Fed: None State: None CNPS: 2B.2	Perennial herb occurring in sandy desert washes and slopes, and in Sonoran desert scrub. From 740 to 4,250 feet in elevation.	March – June	**Absent**. The Proposed Project area is below the known elevation range for the species.
Streptanthus campestris Southern jewel-flower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in chaparral, lower montane coniferous forest, and pinon and juniper woodlands, on rocky soils. From 2,950 to 7,545 feet in elevation.	May – July	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Symphyotrichum defoliatum San Bernardino aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, coastal scrub, lower montane coniferous forest, marsh and swamps, meadows and seeps, and valley and foothill grassland. From 5 to 6,690 feet in elevation.	July – November	**Absent**. No suitable habitat occurs within the Proposed Project area.

Species	Status	Habitat	Blooming Period	Potential for Occurrence
Thermopsis californica var. *semota* velvety false lupine	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and wetlands. From 3,280 to 6,150 feet in elevation	March – June	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Thysanocarpus rigidus ridge fringepod	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinon and juniper woodlands, often on dry rocky slopes. From 1,970 to 7,220 feet in elevation.	February – May	**Absent**. No suitable habitat occurs within the Proposed Project area, and is below the known elevation range for the species.
Xylorhiza cognata Mecca aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in Sonoran desert scrub. From 65 to 1,310 feet in elevation.	January – June	**Low**. Suitable habitat occurs within the Proposed Project area, but all known populations occur on northeastern portion of the Salton Sea.
Xylorhiza orcuttii Orcutt's woody aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in desert wash and Sonoran desert scrub. From 0 to 1,200 feet in elevation.	March – April	**Moderate** Suitable habitat occurs within the Proposed Project area, and observed within 0.5-miles.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.
Federal status
END = listed as Endangered under the federal Endangered Species Act
Delisted = previously listed under the federal Endangered Species Act but now removed
State status
END = listed as Endangered under the California Endangered Species Act
BLM status
S = designated as a Sensitive species
State Parks status
S = designated as a Sensitive species
SRPR State Rare Plant Rank
1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
1B: Considered rare, threatened, or endangered in California and elsewhere.
2A: Plants presumed extirpated in California, but more common elsewhere
2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3: Plants About Which More Information is Needed – A Review List
4: Plants of Limited Distribution - A Watch List
Threat Ranks/ Decimal notations: A California Native Plant Society extension added to the SSRPR
.1 Seriously threatened in California (over 80 percent of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20-80 percent occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (less than 20 percent of occurrences threatened / low degree and immediacy of threat or no current threats known)

Table 14: Potential for Occurrence – Special Status Wildlife Species

Species	Status	Habitat	Potential for Occurrence
Antrozous pallidus pallid bat	Fed: None State: SSC BLM: S	Occurs in chaparral, coastal scrub, desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, riparian woodland, Sonoran desert scrub, upper montane coniferous forest, and valley and foothills grassland. Most common in open, dry habitats with rock areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Low**. This species has been detected within the SVRA within five miles of the BSA (personal communication, State Parks 2017), and suitable foraging habitat for this species occurs within the BSA, but roosting habitat is of low quality, combined with frequent anthropogenic disturbance.
Athene cunicularia burrowing owl	Fed: None State: SSC BLM: S	Occurs in open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. This includes a wide variety of vegetation communities, including coastal prairies, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley and foothill grasslands. Depends on fossorial mammals for burrows.	**Moderate**. There is only one record of this species in the general Project vicinity (CDFW 2017). There were occasional suitable burrows within the survey area that could support this species, but there were few insects observed for prey.
Charadrius alexandrines nivosus western snowy plower	Fed: **THR** State: SSC BLM: S	Occurs in Great Basin standing waters, sand shores, salt pond levees and shores of large alkali lakes, and wetlands. Requires sandy, gravelly, or friable soils for nesting.	**Absent**. No suitable habitat is present within the BSA.
Charadrius montanus mountain plover	Fed: None State: SSC BLM: S	Occurs in chenopod scrub, short grasslands, freshly-plowed fields, newly-sprouting grain fields, and occasionally sod farms. Needs a mixture of short vegetation and bare ground, along with flat topography. Prefers grazed areas and areas with fossorial rodents.	**Absent**. No suitable habitat is present within the BSA.
Falco mexicanus prairie falcon	Fed: None State: WL	Occurs in Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley and foothill grassland.	**Low.** Some suitable habitat for this species occurs within the BSA.
Lasiurus blossevillii western red bat	Fed: None State: SSC	Occurs in cismontane woodland, lower montane coniferous forest, riparian forest, and riparian woodland. Roosts primarily in trees 2-40 feet above ground, preferring habitat edges and mosaics with trees that are protected from above and open below with opens areas for foraging.	**Low**. This species has been detected within the SVRA within five miles of the BSA (personal communication, State Parks 2017), but no suitable foraging or roosting habitat for this species occurs within the BSA.
Oliarces clara cheeseweed owlfly	Fed: None State: None	Occurs in the lower Colorado River drainage. It is found under rocks or in flight over streams. Larrea tridentata is the suspected larval host.	**Low**. *Larrea tridentata* occurs within the BSA, but one confirmed observation in the vicinity is more than five miles from the site.
Pelecanus occidentalis californicus California brown pelican	Fed: Delisted State: **FP** BLM: S	This colonial rooster and nester generally occurs on coastal islands outside of the survey line, but also nests on small islands of small to moderate size which afford immunity from attack by ground-dwelling predators.	**Absent**. No suitable habitat is present within the BSA.
Perognathus longimembris bangsi Palm Springs pocket mouse	Fed: None State: SSC BLM: S	Occurs in desert riparian, desert washes and Sonoran desert scrub. Most common in desert scrub dominated by creosote. Rarely found on rock sites.	**Moderate**. Suitable habitat for this species occurs within the BSA.
Phrynosoma mcallii flat-tailed horned lizard	Fed: None State: SSC BLM: S	Occurs in desert dunes, Mojavean desert scrub, and Sonoran desert scrub in central Riverside, eastern San Diego, and Imperial Counties.	**High**. Suitable habitat for this species occurs within the BSA.
Toxostoma lecontei Le Conte's thrasher	Fed: None State: SSC	Occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in dense, spiny shrubs or densely-branched cacti.	**Low**. Some suitable habitat for this species occurs within the BSA.

Species	Status	Habitat	Potential for Occurrence
Xantusia gracilis sandstone night lizard	Fed: None State: None BLM: S	Known only from the Truckhaven Rocks in the eastern part of Anza-Borrego State Park. Found in fissures or under slabs of exfoliating sandstone and rodent burrows in compacted sandstone and mudstone.	**Absent**. The Truckhaven Rocks is a highly localized area more than five miles from the BSA.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.

Federal status
END = listed as Endangered under the federal Endangered Species Act
THR = listed as Threatened under the federal Endangered Species Act
State status
END = listed as Endangered under the California Endangered Species Act
THR = listed as Threatened under the California Endangered Species Act
SSC = designated as a Species of Concern
FP = designated as a Fully Protected species
WL = watch list species
BLM status
S = designated as a Sensitive species
Other
CNDDB = this species is only listed by the CNDDB and may be locally sensitive or its occurrences may be monitored to see if further protection is needed

EEC ORIGINAL PKG

APPENDIX A – CalEEMod AIR QUALITY MODEL RUN PRINTOUTS

 # EDMS 5.1.2 Emissions Inventory Report
Emissions Inventory Summary for 224 Landings and Takeoffs (16 per day for 14 days)
Study: Multiple Scenarios Study
Scenario - Airport: Baseline - Hagerstown
Year: 2020
Units: Pounds per Year
Generated: 10/17/19 10:18:44

# Category	CO2	CO	THC	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5	Fuel Consum
Aircraft	53,185	1,623	330	381	379	381	37	22	N/A	N/A	16,857
GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
APUs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parking Facilities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roadways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stationary Sources	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Training Fires	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grand Total (pounds)	53,185	1,623	330	381	379	381	37	22	N/A	N/A	16,857
Grand Total (tons)	26.59										
Daily Emissions	3,798.89	115.94	23.55	27.23	27.08	27.23	2.62	1.56			1204

Truckhaven Geothermal Exploration Wells - 1 Well Calculations

Imperial County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	160.00	1000sqft	3.67	160,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2021
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Summer

Project Characteristics -

Land Use - 1 Well Pad = 400 ft x 400 ft = 3.67 acres

Construction Phase - Construction Schedule Provided by Applicant

Off-road Equipment - Well Cleanup - 1 Rubber Tired Loader, 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Drilling - 1 Drill Rig 24-hours, 1 Mud Tank (Pump) 24-hours, 1 diesel generator (for lights) 12 hours, 1 Forklift 8 hours, 1 air compressor 8 hours

Off-road Equipment - Well Pad - 1 Rubber Tired Dozer, 1 Grader, and 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Testing - 1 Crane 8 hours, 1 pump 24 hours, 1 Tractor/Loader/Backhoe 8 hours

Trips and VMT - 6 vendor truck trips per day added to Well Pad Construction and Well Cleanup to account for Water Trucks (already accounted for in Well Drilling)

On-road Fugitive Dust - 90% of construction trips on pavement

Grading -

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Regulation VIII minimum requirements

Off-road Equipment - Geo Survey - 4 Off-hwy trucks 8 hr/dy

Off-road Equipment - Well Pad - 1 Grader, 1 Dozer, 2 Tractors

Vehicle Trips - 2 trips per week

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Summer

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	PhaseName		Well Pad Construction
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Cleanup-Abandoment
tblOffRoadEquipment	PhaseName		Geophysical Survey
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00

tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.02

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.7504	33.1484	30.9164	0.0756	106.5738	1.4856	108.0594	10.7298	1.4525	12.1823	0.0000	7,320.0557	7,320.0557	1.6744	0.0000	7,350.1154
Maximum	**3.7504**	**33.1484**	**30.9164**	**0.0756**	**106.5738**	**1.4856**	**108.0594**	**10.7298**	**1.4525**	**12.1823**	**0.0000**	**7,320.0557**	**7,320.0557**	**1.6744**	**0.0000**	**7,350.1154**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.7504	33.1484	30.9164	0.0756	106.5738	1.4856	108.0594	10.7298	1.4525	12.1823	0.0000	7,320.0557	7,320.0557	1.6744	0.0000	7,350.1154
Maximum	**3.7504**	**33.1484**	**30.9164**	**0.0756**	**106.5738**	**1.4856**	**108.0594**	**10.7298**	**1.4525**	**12.1823**	**0.0000**	**7,320.0557**	**7,320.0557**	**1.6744**	**0.0000**	**7,350.1154**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0106	0.0664	0.1030	2.4000e-004	5.9614	1.6000e-004	5.9615	0.5950	1.5000e-004	0.5951		24.9731	24.9731	2.0700e-003		25.0249
Total	**0.0871**	**0.0665**	**0.1194**	**2.4000e-004**	**5.9614**	**2.2000e-004**	**5.9616**	**0.5950**	**2.1000e-004**	**0.5952**		**25.0081**	**25.0081**	**2.1600e-003**	**0.0000**	**25.0622**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0106	0.0664	0.1030	2.4000e-004	5.9614	1.6000e-004	5.9615	0.5950	1.5000e-004	0.5951		24.9731	24.9731	2.0700e-003		25.0249
Total	**0.0871**	**0.0665**	**0.1194**	**2.4000e-004**	**5.9614**	**2.2000e-004**	**5.9616**	**0.5950**	**2.1000e-004**	**0.5952**		**25.0081**	**25.0081**	**2.1600e-003**	**0.0000**	**25.0622**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Geophysical Survey	Trenching	2/11/2020	2/29/2020	5	14	
2	Well Pad Construction	Site Preparation	3/1/2020	3/14/2020	5	10	
3	Well Drilling	Building Construction	3/15/2020	4/28/2020	7	45	
4	Well Testing	Trenching	4/29/2020	4/30/2020	5	2	
5	Well Cleanup-Abandoment	Grading	5/1/2020	5/7/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.67

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Well Pad Construction	Graders	1	8.00	187	0.41
Well Pad Construction	Rubber Tired Dozers	1	8.00	247	0.40
Well Pad Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Drilling	Air Compressors	1	8.00	78	0.48
Well Drilling	Bore/Drill Rigs	1	24.00	221	0.50
Well Drilling	Forklifts	1	8.00	89	0.20
Well Drilling	Generator Sets	1	12.00	84	0.74
Well Drilling	Pumps	1	24.00	84	0.74
Well Testing	Cranes	1	8.00	231	0.29
Well Testing	Pumps	1	24.00	84	0.74
Well Testing	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Well Cleanup-Abandoment	Rubber Tired Loaders	1	8.00	203	0.36
Well Cleanup-Abandoment	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Geophysical Survey	Off-Highway Trucks	4	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Well Pad Construction	4	10.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Drilling	10	67.00	26.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Testing	3	8.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Cleanup-Abandoment	6	8.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Geophysical Survey	4	20.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Geophysical Survey - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6524	25.2909	15.2404	0.0528		0.9214	0.9214		0.8477	0.8477		5,114.4880	5,114.4880	1.6541		5,155.8412
Total	**2.6524**	**25.2909**	**15.2404**	**0.0528**		**0.9214**	**0.9214**		**0.8477**	**0.8477**		**5,114.4880**	**5,114.4880**	**1.6541**		**5,155.8412**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.1393	0.0862	1.0128	1.1500e-003	21.5880	7.6000e-004	21.5887	2.1712	7.0000e-004	2.1719		113.2805	113.2805	9.6200e-003		113.5209
Total	**0.1661**	**0.7659**	**1.2004**	**3.1000e-003**	**29.4928**	**4.9100e-003**	**29.4977**	**2.9688**	**4.6700e-003**	**2.9735**		**317.3255**	**317.3255**	**0.0203**		**317.8316**

3.2 Geophysical Survey - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6524	25.2909	15.2404	0.0528		0.9214	0.9214		0.8477	0.8477	0.0000	5,114.4880	5,114.4880	1.6541		5,155.8412
Total	**2.6524**	**25.2909**	**15.2404**	**0.0528**		**0.9214**	**0.9214**		**0.8477**	**0.8477**	**0.0000**	**5,114.4880**	**5,114.4880**	**1.6541**		**5,155.8412**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.1393	0.0862	1.0128	1.1500e-003	21.5880	7.6000e-004	21.5887	2.1712	7.0000e-004	2.1719		113.2805	113.2805	9.6200e-003		113.5209
Total	**0.1661**	**0.7659**	**1.2004**	**3.1000e-003**	**29.4928**	**4.9100e-003**	**29.4977**	**2.9688**	**4.6700e-003**	**2.9735**		**317.3255**	**317.3255**	**0.0203**		**317.8316**

3.3 Well Pad Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416		2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**6.5523**	**1.0234**	**7.5758**	**3.3675**	**0.9416**	**4.3091**		**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0696	0.0431	0.5064	5.7000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		56.6403	56.6403	4.8100e-003		56.7605
Total	**0.0965**	**0.7228**	**0.6940**	**2.5200e-003**	**18.6988**	**4.5300e-003**	**18.7033**	**1.8832**	**4.3200e-003**	**1.8875**		**260.6852**	**260.6852**	**0.0154**		**261.0711**

3.3 Well Pad Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416	0.0000	2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**2.9486**	**1.0234**	**3.9720**	**1.5154**	**0.9416**	**2.4569**	**0.0000**	**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0696	0.0431	0.5064	5.7000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		56.6403	56.6403	4.8100e-003		56.7605
Total	**0.0965**	**0.7228**	**0.6940**	**2.5200e-003**	**18.6988**	**4.5300e-003**	**18.7033**	**1.8832**	**4.3200e-003**	**1.8875**		**260.6852**	**260.6852**	**0.0154**		**261.0711**

3.4 Well Drilling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329		6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**		**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1163	2.9452	0.8129	8.4600e-003	34.2541	0.0180	34.2721	3.4563	0.0172	3.4735		884.1949	884.1949	0.0460		885.3460
Worker	0.4665	0.2888	3.3930	3.8500e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		379.4897	379.4897	0.0322		380.2952
Total	**0.5828**	**3.2340**	**4.2060**	**0.0123**	**106.5738**	**0.0206**	**106.5944**	**10.7298**	**0.0196**	**10.7494**		**1,263.6846**	**1,263.6846**	**0.0783**		**1,265.6412**

3.4 Well Drilling - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329	0.0000	6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**	**0.0000**	**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1163	2.9452	0.8129	8.4600e-003	34.2541	0.0180	34.2721	3.4563	0.0172	3.4735		884.1949	884.1949	0.0460		885.3460
Worker	0.4665	0.2888	3.3930	3.8500e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		379.4897	379.4897	0.0322		380.2952
Total	**0.5828**	**3.2340**	**4.2060**	**0.0123**	**106.5738**	**0.0206**	**106.5944**	**10.7298**	**0.0196**	**10.7494**		**1,263.6846**	**1,263.6846**	**0.0783**		**1,265.6412**

3.5 Well Testing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486		2,728.6619	2,728.6619	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**		**2,728.6619**	**2,728.6619**	**0.3898**		**2,738.4074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.9400e-003	0.2266	0.0625	6.5000e-004	2.6349	1.3800e-003	2.6363	0.2659	1.3200e-003	0.2672		68.0150	68.0150	3.5400e-003		68.1035
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0646**	**0.2611**	**0.4677**	**1.1100e-003**	**11.2701**	**1.6800e-003**	**11.2718**	**1.1344**	**1.6000e-003**	**1.1360**		**113.3272**	**113.3272**	**7.3900e-003**		**113.5119**

3.5 Well Testing - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486	0.0000	2,728.6618	2,728.6618	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**	**0.0000**	**2,728.6618**	**2,728.6618**	**0.3898**		**2,738.4074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.9400e-003	0.2266	0.0625	6.5000e-004	2.6349	1.3800e-003	2.6363	0.2659	1.3200e-C03	0.2672		68.0150	68.0150	3.5400e-003		68.1035
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-C04	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0646**	**0.2611**	**0.4677**	**1.1100e-003**	**11.2701**	**1.6800e-003**	**11.2718**	**1.1344**	**1.6000e-C03**	**1.1360**		**113.3272**	**113.3272**	**7.3900e-003**		**113.5119**

3.6 Well Cleanup-Abandoment - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796		1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**6.5523**	**0.4126**	**6.9650**	**3.3675**	**0.3796**	**3.7471**		**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0825**	**0.7142**	**0.5927**	**2.4100e-003**	**16.5400**	**4.4500e-003**	**16.5444**	**1.6661**	**4.2500e-003**	**1.6703**		**249.3572**	**249.3572**	**0.0145**		**249.7190**

3.6 Well Cleanup-Abandoment - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796	0.0000	1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**2.9486**	**0.4126**	**3.3612**	**1.5154**	**0.3796**	**1.8950**	**0.0000**	**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0268	0.6797	0.1876	1.9500e-003	7.9048	4.1500e-003	7.9090	0.7976	3.9700e-003	0.8016		204.0450	204.0450	0.0106		204.3106
Worker	0.0557	0.0345	0.4051	4.6000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		45.3122	45.3122	3.8500e-003		45.4084
Total	**0.0825**	**0.7142**	**0.5927**	**2.4100e-003**	**16.5400**	**4.4500e-003**	**16.5444**	**1.6661**	**4.2500e-003**	**1.6703**		**249.3572**	**249.3572**	**0.0145**		**249.7190**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0106	0.0664	0.1030	2.4000e-004	5.9614	1.6000e-004	5.9615	0.5950	1.5000e-004	0.5951		24.9731	24.9731	2.0700e-003		25.0249
Unmitigated	0.0106	0.0664	0.1030	2.4000e-004	5.9614	1.6000e-004	5.9615	0.5950	1.5000e-004	0.5951		24.9731	24.9731	2.0700e-003		25.0249

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	3.20	0.00	832	832
Total	0.00	3.20	0.00	832	832

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	6.70	5.00	8.90	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.509486	0.032430	0.160670	0.124446	0.017653	0.005129	0.019157	0.119824	0.003361	0.001189	0.005223	0.000739	0.000694

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Unmitigated	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-C05	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Total	**0.0765**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0350**	**0.0350**	**9.0000e-005**		**0.0373**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Total	**0.0765**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0350**	**0.0350**	**9.0000e-005**		**0.0373**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Truckhaven Geothermal Exploration Wells - 1 Well Calculations

Imperial County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	160.00	1000sqft	3.67	160,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2021
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Winter

Project Characteristics -

Land Use - 1 Well Pad = 400 ft x 400 ft = 3.67 acres

Construction Phase - Construction Schedule Provided by Applicant

Off-road Equipment - Well Cleanup - 1 Rubber Tired Loader, 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Drilling - 1 Drill Rig 24-hours, 1 Mud Tank (Pump) 24-hours, 1 diesel generator (for lights) 12 hours, 1 Forklift 8 hours, 1 air compressor 8 hours

Off-road Equipment - Well Pad - 1 Rubber Tired Dozer, 1 Grader, and 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Testing - 1 Crane 8 hours, 1 pump 24 hours, 1 Tractor/Loader/Backhoe 8 hours

Trips and VMT - 6 vendor truck trips per day added to Well Pad Construction and Well Cleanup to account for Water Trucks (already accounted for in Well Drilling)

On-road Fugitive Dust - 90% of construction trips on pavement

Grading -

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Regulation VIII minimum requirements

Off-road Equipment - Geo Survey - 4 Off-hwy trucks 8 hr/dy

Off-road Equipment - Well Pad - 1 Grader, 1 Dozer, 2 Tractors

Vehicle Trips - 2 trips per week

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Winter

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	PhaseName		Well Pad Construction
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Cleanup-Abandoment
tblOffRoadEquipment	PhaseName		Geophysical Survey
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00

tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.02

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.6628	33.2174	30.1988	0.0747	106.5738	1.4858	108.0596	10.7298	1.4527	12.1825	0.0000	7,227.2488	7,227.2488	1.6737	0.0000	7,257.2827
Maximum	**3.6628**	**33.2174**	**30.1988**	**0.0747**	**106.5738**	**1.4858**	**108.0596**	**10.7298**	**1.4527**	**12.1825**	**0.0000**	**7,227.2488**	**7,227.2488**	**1.6737**	**0.0000**	**7,257.2827**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.6628	33.2174	30.1988	0.0747	106.5738	1.4858	108.0596	10.7298	1.4527	12.1825	0.0000	7,227.2488	7,227.2488	1.6737	0.0000	7,257.2827
Maximum	**3.6628**	**33.2174**	**30.1988**	**0.0747**	**106.5738**	**1.4858**	**108.0596**	**10.7298**	**1.4527**	**12.1825**	**0.0000**	**7,227.2488**	**7,227.2488**	**1.6737**	**0.0000**	**7,257.2827**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	8.1000e-003	0.0662	0.0862	2.2000e-004	5.9614	1.7000e-004	5.9615	0.5950	1.6000e-004	0.5951		22.3799	22.3799	2.0800e-003		22.4320
Total	**0.0846**	**0.0663**	**0.1026**	**2.2000e-004**	**5.9614**	**2.3000e-004**	**5.9616**	**0.5950**	**2.2000e-004**	**0.5952**		**22.4149**	**22.4149**	**2.1700e-003**	**0.0000**	**22.4693**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	8.1000e-003	0.0662	0.0862	2.2000e-004	5.9614	1.7000e-004	5.9615	0.5950	1.6000e-004	0.5951		22.3799	22.3799	2.0800e-003		22.4320
Total	**0.0846**	**0.0663**	**0.1026**	**2.2000e-004**	**5.9614**	**2.3000e-004**	**5.9616**	**0.5950**	**2.2000e-004**	**0.5952**		**22.4149**	**22.4149**	**2.1700e-003**	**0.0000**	**22.4693**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Geophysical Survey	Trenching	2/11/2020	2/29/2020	5	14	
2	Well Pad Construction	Site Preparation	3/1/2020	3/14/2020	5	10	
3	Well Drilling	Building Construction	3/15/2020	4/28/2020	7	45	
4	Well Testing	Trenching	4/29/2020	4/30/2020	5	2	
5	Well Cleanup-Abandoment	Grading	5/1/2020	5/7/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.67

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Well Pad Construction	Graders	1	8.00	187	0.41
Well Pad Construction	Rubber Tired Dozers	1	8.00	247	0.40
Well Pad Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Drilling	Air Compressors	1	8.00	78	0.48
Well Drilling	Bore/Drill Rigs	1	24.00	221	0.50
Well Drilling	Forklifts	1	8.00	89	0.20
Well Drilling	Generator Sets	1	12.00	84	0.74
Well Drilling	Pumps	1	24.00	84	0.74
Well Testing	Cranes	1	8.00	231	0.29
Well Testing	Pumps	1	24.00	84	0.74
Well Testing	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Well Cleanup-Abandoment	Rubber Tired Loaders	1	8.00	203	0.36
Well Cleanup-Abandoment	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Geophysical Survey	Off-Highway Trucks	4	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Well Pad Construction	4	10.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Drilling	10	67.00	26.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Testing	3	8.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Cleanup-Abandoment	6	8.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Geophysical Survey	4	20.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Geophysical Survey - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6524	25.2909	15.2404	0.0528		0.9214	0.9214		0.8477	0.8477		5,114.4880	5,114.4880	1.6541		5,155.8412
Total	**2.6524**	**25.2909**	**15.2404**	**0.0528**		**0.9214**	**0.9214**		**0.8477**	**0.8477**		**5,114.4880**	**5,114.4880**	**1.6541**		**5,155.8412**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.1119	0.0904	0.7649	9.6000e-004	21.5880	7.6000e-004	21.5887	2.1712	7.0000e-004	2.1719		95.0146	95.0146	7.7600e-003		95.2085
Total	**0.1397**	**0.7827**	**0.9786**	**2.8400e-003**	**29.4928**	**4.9700e-003**	**29.4977**	**2.9688**	**4.7300e-003**	**2.9735**		**291.7636**	**291.7636**	**0.0196**		**292.2531**

3.2 Geophysical Survey - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6524	25.2909	15.2404	0.0528		0.9214	0.9214		0.8477	0.8477	0.0000	5,114.4880	5,114.4880	1.6541		5,155.8412
Total	**2.6524**	**25.2909**	**15.2404**	**0.0528**		**0.9214**	**0.9214**		**0.8477**	**0.8477**	**0.0000**	**5,114.4880**	**5,114.4880**	**1.6541**		**5,155.8412**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.1119	0.0904	0.7649	9.6000e-004	21.5880	7.6000e-004	21.5887	2.1712	7.0000e-004	2.1719		95.0146	95.0146	7.7600e-003		95.2085
Total	**0.1397**	**0.7827**	**0.9786**	**2.8400e-003**	**29.4928**	**4.9700e-003**	**29.4977**	**2.9688**	**4.7300e-003**	**2.9735**		**291.7636**	**291.7636**	**0.0196**		**292.2531**

3.3 Well Pad Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416		2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**6.5523**	**1.0234**	**7.5758**	**3.3675**	**0.9416**	**4.3091**		**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0560	0.0452	0.3825	4.8000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		47.5073	47.5073	3.8800e-003		47.6043
Total	**0.0837**	**0.7375**	**0.5961**	**2.3600e-003**	**18.6988**	**4.5900e-003**	**18.7034**	**1.8832**	**4.3800e-003**	**1.8876**		**244.2563**	**244.2563**	**0.0157**		**244.6489**

3.3 Well Pad Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	1.9743	21.8681	10.5055	0.0214		1.0234	1.0234		0.9416	0.9416	0.0000	2,071.5982	2,071.5982	0.6700		2,088.3481
Total	**1.9743**	**21.8681**	**10.5055**	**0.0214**	**2.9486**	**1.0234**	**3.9720**	**1.5154**	**0.9416**	**2.4569**	**0.0000**	**2,071.5982**	**2,071.5982**	**0.6700**		**2,088.3481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0560	0.0452	0.3825	4.8000e-004	10.7940	3.8000e-004	10.7944	1.0856	3.5000e-004	1.0860		47.5073	47.5073	3.8800e-003		47.6043
Total	**0.0837**	**0.7375**	**0.5961**	**2.3600e-003**	**18.6988**	**4.5900e-003**	**18.7034**	**1.8832**	**4.3800e-003**	**1.8876**		**244.2563**	**244.2563**	**0.0157**		**244.6489**

3.4 Well Drilling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329		6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**		**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1203	3.0000	0.9260	8.1600e-003	34.2541	0.0183	34.2724	3.4563	0.0175	3.4738		852.5789	852.5789	0.0512		853.8599
Worker	0.3750	0.3030	2.5624	3.2200e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		318.2988	318.2988	0.0260		318.9485
Total	**0.4953**	**3.3030**	**3.4884**	**0.0114**	**106.5738**	**0.0208**	**106.5946**	**10.7298**	**0.0198**	**10.7496**		**1,170.8777**	**1,170.8777**	**0.0772**		**1,172.8084**

3.4 Well Drilling - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1676	29.9144	26.7104	0.0633		1.4650	1.4650		1.4329	1.4329	0.0000	6,056.3711	6,056.3711	1.1241		6,084.4743
Total	**3.1676**	**29.9144**	**26.7104**	**0.0633**		**1.4650**	**1.4650**		**1.4329**	**1.4329**	**0.0000**	**6,056.3711**	**6,056.3711**	**1.1241**		**6,084.4743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1203	3.0000	0.9260	8.1600e-003	34.2541	0.0183	34.2724	3.4563	0.0175	3.4738		852.5789	852.5789	0.0512		853.8599
Worker	0.3750	0.3030	2.5624	3.2200e-003	72.3197	2.5500e-003	72.3222	7.2735	2.3500e-003	7.2758		318.2988	318.2988	0.0260		318.9485
Total	**0.4953**	**3.3030**	**3.4884**	**0.0114**	**106.5738**	**0.0208**	**106.5946**	**10.7298**	**0.0198**	**10.7496**		**1,170.8777**	**1,170.8777**	**0.0772**		**1,172.8084**

3.5 Well Testing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486		2,728.6619	2,728.6619	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**		**2,728.6619**	**2,728.6619**	**0.3898**		**2,738.4074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.2500e-003	0.2308	0.0712	6.3000e-004	2.6349	1.4000e-003	2.6363	0.2659	1.3400e-003	0.2672		65.5830	65.5830	3.9400e-003		65.6815
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0540**	**0.2669**	**0.3772**	**1.0100e-003**	**11.2701**	**1.7000e-003**	**11.2718**	**1.1344**	**1.6200e-003**	**1.1360**		**103.5888**	**103.5888**	**7.0400e-003**		**103.7649**

3.5 Well Testing - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9324	18.0838	15.6827	0.0286		0.9770	0.9770		0.9486	0.9486	0.0000	2,728.6618	2,728.6618	0.3898		2,738.4074
Total	**1.9324**	**18.0838**	**15.6827**	**0.0286**		**0.9770**	**0.9770**		**0.9486**	**0.9486**	**0.0000**	**2,728.6618**	**2,728.6618**	**0.3898**		**2,738.4074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	9.2500e-003	0.2308	0.0712	6.3000e-004	2.6349	1.4000e-003	2.6363	0.2659	1.3400e-C03	0.2672		65.5830	65.5830	3.9400e-003		65.6815
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-C04	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0540**	**0.2669**	**0.3772**	**1.0100e-003**	**11.2701**	**1.7000e-003**	**11.2718**	**1.1344**	**1.6200e-003**	**1.1360**		**103.5888**	**103.5888**	**7.0400e-003**		**103.7649**

3.6 Well Cleanup-Abandoment - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796		1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**6.5523**	**0.4126**	**6.9650**	**3.3675**	**0.3796**	**3.7471**		**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0725**	**0.7285**	**0.5196**	**2.2600e-003**	**16.5400**	**4.5100e-003**	**16.5445**	**1.6661**	**4.3100e-003**	**1.6704**		**234.7548**	**234.7548**	**0.0149**		**235.1280**

3.6 Well Cleanup-Abandoment - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9486	0.0000	2.9486	1.5154	0.0000	1.5154			0.0000			0.0000
Off-Road	0.7931	8.6199	6.1948	0.0125		0.4126	0.4126		0.3796	0.3796	0.0000	1,206.6969	1,206.6969	0.3903		1,216.4537
Total	**0.7931**	**8.6199**	**6.1948**	**0.0125**	**2.9486**	**0.4126**	**3.3612**	**1.5154**	**0.3796**	**1.8950**	**0.0000**	**1,206.6969**	**1,206.6969**	**0.3903**		**1,216.4537**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0278	0.6923	0.2137	1.8800e-003	7.9048	4.2100e-003	7.9090	0.7976	4.0300e-003	0.8016		196.7490	196.7490	0.0118		197.0446
Worker	0.0448	0.0362	0.3060	3.8000e-004	8.6352	3.0000e-004	8.6355	0.8685	2.8000e-004	0.8688		38.0058	38.0058	3.1000e-003		38.0834
Total	**0.0725**	**0.7285**	**0.5196**	**2.2600e-003**	**16.5400**	**4.5100e-003**	**16.5445**	**1.6661**	**4.3100e-003**	**1.6704**		**234.7548**	**234.7548**	**0.0149**		**235.1280**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.1000e-003	0.0662	0.0862	2.2000e-004	5.9614	1.7000e-004	5.9615	0.5950	1.6000e-004	0.5951		22.3799	22.3799	2.0800e-003		22.4320
Unmitigated	8.1000e-003	0.0662	0.0862	2.2000e-004	5.9614	1.7000e-004	5.9615	0.5950	1.6000e-004	0.5951		22.3799	22.3799	2.0800e-003		22.4320

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	3.20	0.00	832	832
Total	0.00	3.20	0.00	832	832

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	6.70	5.00	8.90	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.509486	0.032430	0.160670	0.124446	0.017653	0.005129	0.019157	0.119824	0.003361	0.001189	0.005223	0.000739	0.000694

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Unmitigated	0.0765	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Total	**0.0765**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0350**	**0.0350**	**9.0000e-005**		**0.0373**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0350	0.0350	9.0000e-005		0.0373
Total	**0.0765**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0350**	**0.0350**	**9.0000e-005**		**0.0373**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EEC ORIGINAL PKG

APPENDIX B – BIOLOGICAL RESOURCES EVALUATION REPORT

August 2018

ORMAT NEVADA, INC.

Truckhaven Geothermal Project

Proposed 3D Geophysical Survey
Biological Resources Evaluation Report

PROJECT NUMBER:
149090

PROJECT CONTACT:
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POWER ENGINEERS

Truckhaven Geothermal Project
Proposed 3D Geophysical Survey
Biological Resources Evaluation Report

PREPARED FOR: ORMAT NEVADA, INC.

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ACRONYMS AND ABBREVIATIONS

3D	Three Dimensional
BLM	Bureau of Land Management
BSA	Biological Survey Area
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
msl	mean sea level
Ormat	Ormat Nevada, Inc.
POWER	POWER Engineers, Inc.
Project	Truckhaven Geothermal Project
State Parks	State Parks Ocotillo Wells Field Office
SVRA	State Vehicular Recreation Area
USFWS	US Fish and Wildlife Service

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1.0 INTRODUCTION

This document presents the findings of the biological resources evaluation survey for the Ormat Nevada, Inc. (Ormat) Truckhaven Geothermal Project (Project). This survey focused exclusively on portions of the Project that will be affected by the seismic survey described below.

1.1 Project Description

Ormat is proposing to conduct a three-dimensional (3D) geophysical data acquisition seismic survey to evaluate potential subsurface geothermal resources located at the north end of the joint U.S. Department of the Interior, Bureau of Land Management (BLM)-State of California Truckhaven Geothermal Lease Area in Imperial County, California.

Land within the seismic survey footprint consists of a block of approximately 24 square miles. These lands are managed by public (state, federal) agencies or are owned privately. The public lands are managed by the BLM and the California Department of Parks and Recreation as part of the Ocotillo Wells State Vehicular Recreation Area (SVRA).

The 3D seismic data collection process requires the use of off-road buggy vibrators that must cross uneven terrain within the Project footprint. The biological resources survey was conducted to provide clearance for the vibrators to conduct the seismic data collection within defined corridors of vehicular movement. The results of the biological resources survey will allow for the evaluation of potential impacts to sensitive biological resources within the Project corridors prior to the seismic data collection.

This report combines the results of the 2016 and 2018 biological resources surveys conducted within the seismic survey footprint.

1.2 Project Location

The proposed Project is located within and south of Salton City, west of the Salton Sea in the northern portion of Imperial Valley, California (Figure 1). The outer site boundaries of the Biological Survey Area (BSA) are immediately south of the intersection of U.S. Highway 86 and South Marina Drive on the north, 0.3 mile west of the Salton City landfill on the west, 1.7 miles south of the Salton City landfill on the south, and 0.6 mile from the Thomas R. Cannell Waste Water Treatment Facility on the east. The elevation of the BSA ranges from approximately 125 feet above mean sea level (msl) to the northwest and 215 feet below msl to the northeast. The BSA is bisected by Highway 86. The majority of the BSA is sparsely vegetated with native and non-native plant species and is comprised of low-density residential housing and associated infrastructure and off-road vehicle usage. The BSA itself consists only of the proposed corridors of vehicular movement.

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Legend

Project Area

ORMAT NEVADA, INC. TRUCKHAVEN

Figure 1
Project Location

0 2 4 6 8 10
Miles

N

POWER ENGINEERS

Date: 4/26/2018

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2.0 METHODS

2.1 Approach to Data Collection

The first step in the approach to data collection for this analysis included the identification and characterization of biological resources, including vegetation community types, and special-status plant and animal species that are known to occur or have potential to occur in the BSA.

"Special-status," as used in this report, refers to species that are:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the Endangered Species Act (50 Code of Federal Regulations [CFR] Part 17.12 [listed plants], 50 CFR Part 17.11 [listed animals], 67 Federal Register 40657 [candidate species], and various notices in the Federal Register [proposed species]);
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (California Department of Fish and Wildlife [CDFW] 2016a and 2018);
- Identified by the CDFW as species of concern or fully protected species, including fish and wildlife that do not have State or federal threatened or endangered status but may still be threatened with extinction (CDFW 2016a and 2018);
- California Species of Special Concern: vertebrate species that have been designated as "species of special concern" by the CDFW because declining population levels, limited range, and/or continuing threats have made them vulnerable to extinction (CDFW 2016a and 2018);
- Included in the California Native Plant Society (CNPS) Rare Plant Inventory (CNPS 2016 and 2018);
- Otherwise defined as rare, threatened, or endangered under the California Environmental Quality Act;
- Identified by State Parks Ocotillo Wells Field Office (State Parks) as a sensitive species; or
- Identified by the BLM or the BLM El Centro Field Office as a sensitive species.

Prior to conducting fieldwork, the biologists reviewed records of known occurrences to identify special-status species that may occur within the BSA. Those records were then compared with lists of federal- or State-listed threatened, endangered, or other special-status species. Details of all survey work and approaches to collecting data are described below.

2.2 Literature Review

Preliminary investigation included review of information obtained from literature searches, examinations of habitat as discernible from aerial photographs, database searches including CNPS and the California Natural Diversity Database (CNDDB) records (CDFW 2016a and 2018), and previous surveys (POWER Engineers, Inc. [POWER] 2017). No changes were noted between the CDFW and CNPS 2016 and 2018 data. To identify the existing and potential biological resources present in the vicinity of the proposed Project, a geographic information system search was performed. This consisted of mapping baseline biological resource data (e.g., vegetation mapping, CNDDB records).

2.3 Field Survey

Biological resource evaluation surveys were conducted in April and May of 2016 and March and April of 2018. POWER provided a wildlife biologist and a botanist for the survey. The role of the wildlife biologist was to record observations of wildlife species, with emphasis on special-status species such as flat-tailed horned lizard (*Phrynosoma mcallii*) and burrowing owl (*Athene cunicularia*), and record active or potential burrows for a variety of wildlife species.

The botanist was tasked with creating a vegetation map of the corridors that were surveyed, extending as far as they could reliably determine using line-of-sight and aerial imagery, and identifying and recording plant species encountered, with emphasis on special-status plant species. Botanists also recorded occurrences of seeps encountered. All biologists were preauthorized for conducting surveys on private, BLM, and State Parks land by State Parks and CDFW.

All detected wildlife and botanical species were recorded, as were observed vegetation communities within and adjacent to the survey corridors. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat). The botanical inventory was floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special-status plant species. Vegetation communities were classified according to Holland (1986).

3.0 RESULTS

Vegetation communities consisted primarily of Sonoran creosote bush scrub and desert saltbush scrub (Figure 2). A more detailed description of this vegetation community is provided below. Seven special-status plant species were observed during the surveys. A list of plant species observed during the field surveys is provided in Appendix A. One special-status, wildlife species, flat-tailed horned lizard, was detected within the BSA during the surveys. Few wildlife species were observed within the BSA, but wildlife sign was observed more frequently. Burrows of varying sizes were present intermittently throughout the BSA, including rodent and potential burrowing owl burrows. A small number of unoccupied bird nests were also observed. Appendix B provides a list of observed animal species. The potential for occurrence of special-status plant and animal species are presented in Sections 3.2 and 3.3, respectively.

3.1 Vegetation Community Descriptions

The following vegetation communities were named according to Holland (1986), and are shown in Figure 2. Table 1 provides approximate vegetation community acreages found within the BSA.

TABLE 1 VEGETATION COMMUNITIES WITHIN THE BIOLOGICAL SURVEY AREA

VEGETATION COMMUNITY	ACRES
Sonoran Creosote Bush Scrub	884.2
Desert Saltbush Scrub	349.3
Desert Sink Scrub	18.4
Desert Wash	199.9
Bare/Disturbed	133.2
Total Acres	1,585

3.1.1 Sonoran Creosote Bush Scrub

Sonoran creosote bush scrub is a widely spaced open community generally dominated by creosote (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*), usually with abundant bare ground between larger shrubs. Growth in this community occurs from winter to early spring and later, with sufficient rainfall, with the shrubs often dormant for long periods. During years of sufficient rainfall, the bare ground is filled with ephemeral herbs. This community typically occurs on well-drained secondary soils of slopes, fans, and valley, rather than upland sites, with winter temperatures seldom below freezing (Holland 1986).

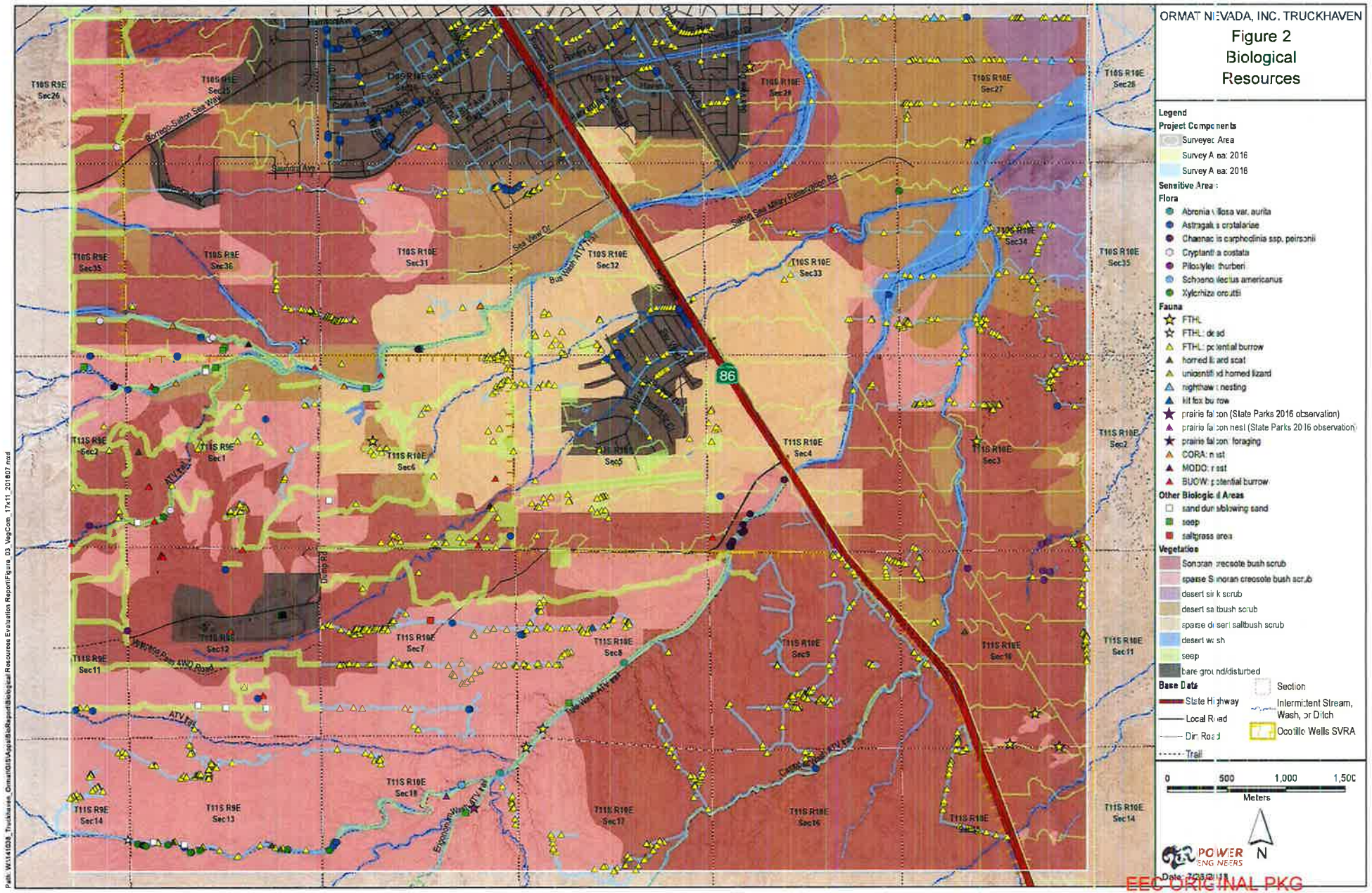
This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" Sonoran creosote bush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.

3.1.2 Desert Saltbush Scrub

Desert saltbush scrub is a low-growing open community dominated by chenopod bushes (*Atriplex* spp.), usually with a low-growing herbaceous cover. Total cover in this community is often low, with abundant bare ground between widely spaced shrubs. Stands of shrubs are typically dominated by a

single Atriplex species. Common species in this community include four-wing saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenolytra*), shadscale (*Atriplex confertifolia*), allscale (*Atriplex polycarpa*), and hop sage (*Grayia spinosa*). This community typically occurs on fine-textured, poorly drained soils with high alkalinity and/or salinity (Holland 1986).

This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" saltbush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.


ORMAT NEVADA, INC. TRUCKHAVEN
Figure 2
Biological
Resources
Legend
Project Components
Surveyed Area
Survey Area: 2016
Survey Area: 2018
Sensitive Areas
Flora
Abronia villosa var. aurita
Astragalus crotalariae
Chaenactis carphoclinia ssp. peirsonii
Cryptantha costata
Pilostyles thurberi
Schoenoplectus americanus
Xylorhiza orcuttii
Fauna
FTHL
FTHL: dead
FTHL: potential burrow
horned lizard scat
unidentified horned lizard
nighthawk nesting
kit fox burrow
prairie falcon (State Parks 2016 observation)
prairie falcon nest (State Parks 2016 observation)
prairie falcon foraging
CORA: nest
MODO: nest
BUOW: potential burrow
Other Biologically Areas
sand dune/blowing sand
seep
saltgrass area
Vegetation
Sonoran creosote bush scrub
sparse Sonoran creosote bush scrub
desert silk scrub
desert saltbush scrub
sparse desert saltbush scrub
desert wash
seep
bare ground/disturbed
Base Data
Section
State Highway
Intermittent Stream, Wash, or Ditch
Local Road
Dirt Road
Ocotillo Wells SVRA
Trail
0
500
1,000
1,500
Meters
N
POWER ENGINEERS
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3.1.3 Desert Sink Scrub

Desert sink scrub is similar to desert saltbush scrub, but plants are more widely spaced and with a higher proportion of succulent chenopod species. It occurs on poorly drained soils with high alkalinity and/or salt content. This community often has a higher water table and with visible salt crust on the surface Holland (1986). This community was dominated by pickleweed (*Salicornia* sp.), with varying amounts of saltbush scrub species and occasional creosote scrub species.

3.1.4 Desert Wash

Desert wash is a sparsely vegetated to bare community occurring throughout the BSA. These sandy to hardened silty-mud substrate washes most closely resemble the Holland (1986) vegetation descriptions of tamarisk scrub and arrowweed scrub communities. Where vegetation occurs in the washes, tamarisk (*Tamarix* sp.) was the largest shrub, while arrowweed (*Pluchea sericea*) was the most common. Occasionally, these washes also harbored Sonoran creosote bush scrub and desert saltbush scrub vegetation. Seeps occurred intermittently within desert washes, and were comprised mainly of salt grass (*Distichlis spicata*).

3.1.5 Bare Ground/Disturbed

Bare ground and disturbed areas within the BSA occurred mainly adjacent to developed areas and infrastructure, generally in the form of bare, compacted soils from human activities or paved roads. Vegetation in these areas tended to be sparse and weedy. Occasional individuals of the special-status Salton milk-vetch (*Astragalus crotalariae*), which thrives on disturbance, occur in disturbed areas and the edges of developed areas.

3.2 Special-Status Plant Species

A total of 36 special-status plant species were targeted for the survey, as determined by the literature review and consultation with State Parks and BLM. Their habitat description, status, and potential for occurrence within the BSA are provided in Table 2. Two additional special-status species that were not originally included in the list were observed during the course of the survey and were added to the potential for occurrence table, bringing the number to 38. Of the 38 plant species considered to have a potential to occur within the vicinity, seven were observed during the survey. Refer to Figure 2 for the species and location. Three species were determined to have a moderate potential for occurrence within the BSA, and seven had a low potential, while the remaining were determined to be absent. Potential for occurrence was based on habitat, elevation, soil, and proximity to known recorded occurrences of a species. The species accounts below include only those species that were observed or were determined to have at least a moderate potential to occur within the BSA. Appendix C provides the potential for occurrence of special-status plant species.

3.2.1 Chaparral Sand-verbena

Chaparral sand-verbena (*Abronia villosa* var. *aurita*) is a BLM sensitive species and is included on List 1B.1 of the CNPS online inventory (CNPS 2018). It is a pink-flowered annual herb in the Four o-clock Family (Nyctaginaceae) that occurs in south coast ranges and Sonoran desert. It occurs in coastal scrub and desert dunes, on sandy soils, ranging from 245 to 5,250 feet in elevation, and blooms from March to September (CNPS 2016). Suitable habitat for this species occurs within the BSA. Chaparral sand-verbena was observed within the BSA during the survey.

3.2.2 Salton Milk-vetch

Salton milk-vetch (*Astragalus crotalariae*) is included on List 4.3 of the CNPS online inventory (CNPS 2018). It is a red-purple to white flowered perennial herb in the Pea Family (Fabaceae). Salton milk-vetch occurs from the southeastern-most portion of California and into Arizona; documented in Imperial, Riverside, and San Diego counties. This species occurs in desert wash and Sonoran desert scrub, on sandy or gravelly soils. It ranges from 195 to 820 feet in elevation, and blooms from January to April (CNPS 2018). Suitable habitat for this species occurs within the BSA. Salton milk-vetch was observed within the BSA during the survey.

3.2.3 Harwood's Milk-vetch

Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*) is included on List 2B.2 of the CNPS online inventory (CNPS 2018). It is a pink to violet flowered annual herb in the Pea Family (Fabaceae). Harwood's milk-vetch occurs from the south easternmost portion of California and into Arizona and Mexico; documented in Imperial, Riverside, and San Diego counties. This species occurs in desert dunes, desert wash, and desert scrub, on sandy or gravelly soils. It ranges from msl to 2,330 feet in elevation, and blooms from January to May (CNPS 2018). Suitable habitat for this species occurs within the BSA. Harwood's milk-vetch has a moderate potential to occur within the BSA, and has a known occurrence within five miles of the site.

3.2.4 Peirson's Pincushion

Peirson's pincushion (*Chaenactis carphoclinia* var. *peirsonii*) is included on List 1B.3 of the CNPS online inventory (CNPS 2018). It is a pink to white flowered annual herb in the Sunflower Family (Asteraceae). Peirson's pincushion is known from the Sonoran desert. This species occurs in Sonoran desert scrub, on sandy soils. It ranges from 10 to 1,640 feet in elevation, and blooms from March to April. Suitable habitat for this species occurs within the BSA. Peirson's pincushion was observed within the BSA during the survey.

3.2.5 Wiggin's Croton

Wiggin's croton (*Croton wigginsii*) is a BLM sensitive species and is included on List 2B.2 of the CNPS online inventory (CNPS 2018). It is a petal-lacking perennial shrub in the Spurge Family (Euphorbiaceae). Wiggin's croton is known from the Sonoran desert. This species occurs in desert dunes and Sonoran desert scrub, on sandy soils. It ranges from 165 to 330 feet in elevation, and blooms from March to May (CNPS 2018). Suitable habitat for this species occurs within the BSA. Wiggin's croton has a moderate potential to occur within the BSA.Abram's Spurge

Abram's spurge (*Euphorbia abramsiana*) is included on List 2B.2 of the CNPS online inventory (CNPS 2018). It is a petal-lacking annual herb in the Spurge Family (Euphorbiaceae). Abram's spurge is known from the southeastern-most portion of California and into Arizona and Mexico; documented in Imperial, Riverside, and San Bernardino counties. This species occurs in desert scrub, on sandy soils. It ranges from -15 feet below msl to 4,300 feet in elevation, and blooms from August to November (CNPS 2018). Suitable habitat for this species occurs within the BSA. Abram's spurge has a moderate potential to occur within the BSA.

3.2.6 Ribbed Cryptantha

Ribbed cryptantha (*Johnstonella costata*) is a BLM sensitive species and is included on List 4.3 of the CNPS online inventory (CNPS 2018). It is a white flowered annual herb in the Waterleaf Family

(Boraginaceae). Ribbed cryptantha is known from the southeastern-most portion of California and into Arizona and Mexico; documented in Imperial, Riverside, and San Diego counties. This species occurs in desert dunes and Sonoran desert scrub, on sandy soils. It ranges from -195 feet below msl to 1,640 feet in elevation, and blooms from February to May (CNPS 2018). Suitable habitat for this species occurs within the BSA. Ribbed cryptantha was observed within the BSA during the survey.

3.2.7 Sand Food

Sand food (*Pholisma sonorae*) is a BLM sensitive species and is included on List 1B.2 of the CNPS online inventory (CNPS 2018). It is a pink to purple flowered perennial parasitic herb in the Waterleaf Family (Boraginaceae). Sand food occurs from the south easternmost portion of California and into Arizona; documented in Imperial County. This species occurs in desert dunes and Sonoran desert scrub, on sandy soils. It ranges from -305 feet below msl to 1,120 feet in elevation, and blooms from April to June (CNPS 2018). Suitable habitat for this species occurs within the BSA. Sand food has a moderate potential to occur within the BSA.

3.2.8 Olney's Three-square Rush

Olney's three-square rush (*Schoenoplectus americanus*) is a State Parks sensitive species. It is a grass-like perennial rhizomatous herb in the Sedge Family (Cyperaceae). Olney's three-square rush is known from a variety of ranges throughout California. This species occurs in mineral-rich or brackish marshes, shores, fens, seeps, and springs. It ranges from msl to 7,220 feet in elevation, and blooms from May to August. Suitable habitat for this species occurs within the BSA. Olney's three-square rush was observed within the BSA during the survey.

3.2.9 Orcutt's Woody Aster

Orcutt's woody aster (*Xylorhiza orcuttii*) is included on List 1B.2 of the CNPS online inventory (CNPS 2018). It is lavender to light blue flowered perennial herb in the Aster Family (Asteraceae). Orcutt's woody aster is known from the south easternmost portion of California and into Mexico; documented in Imperial, Riverside, and San Diego counties. This species occurs in desert wash and Sonoran desert scrub. It ranges from msl to 1,200 feet in elevation, and blooms from March to April (CNPS 2018). Orcutt's woody aster was observed within the BSA during the survey.

3.3 Special-Status Wildlife Species

A total of 10 special-status wildlife species were initially determined by the literature review to potentially occur within the BSA. Two additional species were added, based on personal communication with State Parks (2017), bringing the number to 12. Of the 12 wildlife species, one species was present, one had a high potential for occurrence within the BSA, three had a moderate potential, one had a low potential, and the remainder were determined to be absent. Their habitat description, status, and potential for occurrence within the survey area are provided in Appendix D.

One special-status wildlife species, flat-tailed horned lizard, was detected during the field surveys. In addition to these confirmed sightings, there were occasional small mammal burrows throughout the BSA that can provide suitable cover for the lizard and for burrowing owls (Figure 2).

The accounts below include species that are determined to have at least a moderate potential to occur in the BSA, or were observed during the field surveys. Appendix D provides the potential for occurrence of special-status wildlife species.

3.3.1 Burrowing Owl

Burrowing owl is designated as a Priority 2 Bird Species of Special Concern by CDFW due to rapid habitat loss and degradation from urbanization. It is also designated as a BLM Sensitive species and a U.S. Fish and Wildlife Service (USFWS) Bird of Conservation Concern. Its range extends through all states west of the Mississippi Valley and into Mexico, Central America, and South America. In California, it typically inhabits lowlands, including those in the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. For shelters, the burrowing owl uses rodent burrows in sparse grassland, desert, and agricultural habitats, as well as open areas of pinyon-juniper or ponderosa pine habitats (CDFW [as California Department of Fish and Game (CDFG)] 2008). Breeding populations generally display greater site fidelity than winter populations, which tend to move about more, even taking refuge into vegetation instead of nearby burrows (Poulin et al. 2011). Individuals in California, particularly southern California, are mostly residents. Nesting begins from late March to August, peaking in April and May (CDFW [as CDFG] 2008). While some pairs have been observed to have double broods within a single breeding season, it is considered to be uncommon and is not always successful (Poulin et al. 2011). Burrowing owls are typically active at dusk and dawn, but can sometimes be active at night as well.

Observations of burrowing owl within one mile of the BSA have been noted by parks in spring 2018 (in Campbell Wash, south of the BSA) and in Summer of 2018 (west of the confluence of Bus Wash and Arroyo Salado), indicating that burrowing owls do occur in the vicinity. These observations are not shown on the figures. Approximate coordinates to both observations are as follows: Summer 2018: 11S 592193 E 3679421 N and Spring 2018: 11S 597759 E 3673009 N.

Suitable burrows for burrowing owls were observed during the survey, but no burrowing owls and no sign of burrowing owls were detected. Burrowing owls have a moderate potential to occur within the BSA.

3.3.2 Prairie Falcon

The prairie falcon (*Falco mexicanus*) is designated by the USFWS as a Species of Special Concern and by CDFW as a Watch List species. It inhabits dry, open terrain in level and hilly areas. Breeding sites are located on cliffs. Foraging habitat includes marshlands and ocean shores (CNDDB 2018).

There are two State Park records of this species within the BSA (State Parks 2017). Suitable habitat for this species occurs within the BSA. The prairie falcon has a high potential to utilize the BSA, but a low potential to nest within the BSA.

3.3.3 Palm Springs Pocket Mouse

The Palm Springs pocket mouse (*Perognathus longimembris bangsi*) is designated by the CDFW as a Species of Special Concern and by BLM as sensitive. It occurs in desert dunes, Mojavean desert scrub, and Sonoran desert scrub in central Riverside, eastern San Diego, and Imperial Counties. It often occurs in habitat with gently sloping topography, sparse to moderate vegetative cover, and loosely packed or sandy soils (Dodd 1996).

There are three CNDDB records of this species in the general vicinity of the Project area (CDFW 2018). Suitable habitat for this species occurs within the BSA. The Palm Springs pocket mouse has a moderate potential to occur.

3.3.4 Flat-tailed Horned Lizard

The flat-tailed horned lizard is designated by the CDFW as a Species of Special Concern and by BLM as sensitive. It has the smallest range of all horned lizards (Sherbrooke 2003), being restricted to southeastern California, extreme southwestern Arizona, and adjacent portions of northeastern Baja California and northwestern Sonora, Mexico (Funk 1981). In California, it is distributed throughout much of the Salton Trough, sections of San Diego County, central Riverside County, and western and southern Imperial County (CDFW 2018). Flat-tailed horned lizard occurs in desert dunes, Mojavean desert scrub, and Sonoran desert scrub with sandy soils in central Riverside, eastern San Diego, and Imperial Counties. It requires loose, friable soils for burrowing, and scattered perennial vegetation for cover and thermoregulation, as well as a sufficient population of ants (Barrows and Allen 2009).

Nine flat-tailed horned lizards were observed during the surveys, plus two dead individuals. Suitable burrows for the species were observed intermittently throughout the BSA.

3.3.5 Le Conte's Thrasher

Le Conte's thrasher (*Toxostoma lecontei*) is a Species of Special Concern and a USFWS Bird of Conservation Concern. In California, Le Conte's thrasher is a resident species in the San Joaquin Valley and the Mojave and Colorado deserts in southeastern California. It occurs in desert washes, desert scrub, alkali desert scrub, and desert succulent shrub habitat (CDFW 2018). Because creosote bush is unable to sufficiently support nests, Le Conte's thrashers typically do not occur in monotypic creosote bush scrub habitat or in massive Sonoran Desert woodlands (Prescott 2005). Preferred nest substrate includes thorny shrubs or cholla cactus (Sheppard 1996). Breeding activity occurs from January to early June, peaking from mid-March to mid-April (CDFW [as CDFG] 2008). Pairs typically attempt up to three broods each year. Le Conte's thrashers forage for food by digging and probing in the soil with their bills, searching for arthropods (the majority of their diet), small lizards and snakes, other vertebrates, and seeds and fruit (Sheppard 1996, CDFW [as CDFG] 2008).

No Le Conte's thrashers were observed during the survey. Some suitable habitat is present within the BSA, and Le Conte's thrasher has a moderate potential to occur.

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4.0 RECOMMENDATIONS

The following recommendations are provided for avoidance and minimization of effects to biological resources during the seismic survey:

1. Coordinate with State Parks, BLM, and CDFW to obtain any necessary permits, memorandums of understanding, or permissions prior to seismic activities.
2. A qualified biologist(s) will monitor all off-road seismic testing activities to ensure that standard and special-status species-specific avoidance and minimization recommendations are adhered to. The monitor will retain stop work authority in the event there is the likelihood of eminent take of special-status species. The monitor will conduct a daily survey in and around work areas before seismic surveys start, including the drive path of any off-road vehicular seismic testing activities, as previously observed potential burrows may no longer exist and new burrows may be present, as well as wildlife entering the work area. All biological monitors will be approved by State Parks, BLM, and CDFW prior to commencement of the geophysical data acquisition seismic survey.
3. A worker environmental awareness program will be prepared and presented to all employees working on the Project site in listed species habitat. The education program will include identification of target species and their habitats, any Project mitigation measures and stipulations, reporting requirements, and penalties for failure of compliance.
4. Should seismic surveys occur between February 15 and August 15, the time period typically referenced in California for the general bird nesting season, daily nesting surveys will be conducted in and around work areas before seismic surveys start, including the drive path of any off-road vehicular seismic testing activities. If no active bird nests are found within this area, no further mitigation is required. If an active nest is found, a buffer shall be instated around the nest if it belongs to a non-listed or migratory bird. If the nest belongs to a listed or fully-protected species, a larger buffer shall be instated around the nest, at a distance approved prior to seismic survey activities.
5. Avoid burrows that may be utilized by special-status wildlife species with a minimum buffer of 20-feet from burrows suitable for flat-tailed horned lizard and a minimum buffer of 30-feet from burrows suitable for burrowing owls for seismic testing. Buggies may drive within five-feet of these burrows with a biological monitor present.
6. If burrowing owls are observed within the Project area prior to or during the seismic survey, occupied burrows shall not be disturbed during the owl nesting season, February 1 through August 31. If new burrows are found during the non-breeding season the agreed upon project, minimum buffer of 30-feet (reduced buffered approved by CDFW for this data acquisition seismic survey phase of the project [CDFW 2016c]), or a buffer deemed appropriate by the qualified biological monitor, shall be instated until occupancy status is determined. If the buffer cannot be maintained during the non-breeding season, owls may be temporarily evicted from the burrows using accepted methodology as outlined in by CDFW (2012) and approved by resource agencies. Eviction will not occur during the breeding season. If flat-tailed horned lizards are observed within the seismic survey path, the qualified biological monitor, with prior approval through Project acquired permits or permissions from BLM and State Parks, will relocate the individual out of the seismic path, adjacent to where it was moved from.
7. Avoid special-status perennial plant species with a minimum buffer of 5 to 10 feet, depending on the root structure and as determined by the biological monitor.
8. Impacts to special-status species shall first be avoided where feasible, and where not feasible, impacts to special-status species shall be compensated on a case-by-case basis through methods agreed upon prior to seismic survey activities.

9. Any disturbance will be minimized to the maximum extent feasible. Access to sites will be via pre-existing access routes, to the greatest extent possible. Any newly identified biological resources will be temporarily flagged with pin-flags, which will be removed following seismic testing.
10. Vehicles and equipment will be maintained and free of leaks. All hazardous material, oil, hydraulic, or other fluid leaks will be contained and cleaned immediately to reduce the risk of negatively impacting water or soil quality.
11. To avoid attracting predators and nuisance species, the areas of survey testing will be kept clear of debris, where possible. All food-related trash items will be enclosed in sealed containers and regularly removed.
12. Project-related equipment will be washed prior to entering the Project area for the first time to reduce the chance of transporting noxious weed seeds from outside the area.
13. Fire extinguishers, water, and shovels shall be kept on-site during survey activities.

5.0 REFERENCES

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APPENDIX A PLANT SPECIES OBSERVED DURING THE FIELD SURVEY

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SCIENTIFIC NAME	COMMON NAME
ANGIOSPERMS (DICOTYLEDONS)	
AIZOACEAE	**FIG-MARIGOLD FAMILY**
*Mesembryanthemum nodiflorum**	slender-leaved iceplant
AMARANTHACEAE	**AMARANTH FAMILY**
Tidestromia oblongifolia	honeysweet
APODANTHACEAE	**STEMSUCKER FAMILY**
Pilostyles thurberi	Thurber's pilostyles
ASCLEPIADACEAE	**MILKWEED FAMILY**
Asclepias erosa	desert milkweed
Asclepias subulata	rush milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
Ambrosia dumosa	burro bush
Bebbia juncea	sweetbush
Chaenactis carphoclinia var. *carphoclinia*	pebble pincushion
Chaenactis carphoclinia var. *piersonii*	Peirson's pincushion
Dicoria canescens	bugseed
Encelia frutescens	rayless encelia
Geraea canescens	desert sunflower
Hymenoclea salsola	cheesebush
Isocoma acradenia	alkali goldenbush
*Lactuca serriola**	prickly lettuce
Malacothrix glabrata	desert dandelion
Palafoxia arida	Spanish needles
Perityle emoryi	Emory rock daisy
Pluchea sericea	arrow weed
*Sonchus asper**	prickly sow thistle
Stephanomeria pauciflora	wire lettuce
Sonchus oleraceus	common sow thistle
Xylorhiza orcuttii	Orcutt's woody aster
BORAGINACEAE	**BORAGE FAMILY**
Cryptantha angustifolia	narrowleaf cryptantha
Cryptantha bargigera	bearded fort-me-not
Cryptantha circumscissa	cushion cryptantha
Cryptantha maritima	Guadalupe forget-me-not
Johnstonella costata	ribbed cryptantha
Pectocarya heterocarpa	chuckwalla combseed
Tiquilia palmeri	Palmer's tiquilia
Tiquilia plicata	plicate tiquilia

SCIENTIFIC NAME	COMMON NAME
BRASSICACEAE	**MUSTARD FAMILY**
*Brassica tournefortii**	Sahara mustard
Lepidium densifolium	desert peppergrass
Lepidium sp.	peppergrass
CACTACEAE	**CACTUS FAMILY**
Cylindropuntia echinocarpa	golden cholla
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Allenrolfea occidentalis	iodine bush
Atriplex canescens	four-wing saltbush
Atriplex elegans	wheel scale
Atriplex hymenelytra	desert holly
Atriplex lentiformis	quail brush
Atriplex polycarpa	allscale
*Beta vulgaris**	beet
*Chenopodium murale**	nettle-leaved goosefoot
Salsola australis	Russian thistle
Salsola sp.*	Russian thistle
Suaeda nigra	bush seepweed
CLEOMACEAE	**SPIDERFLOWER FAMILY**
Cleomella obtusifolia	Mojave stinkweed
EUPHORBIACEAE	**SPURGE FAMILY**
Chamaesyce polycarpa	golondrina
Croton californicus	California croton
Stillingia spinulosa	Mohave stillingia
FABACEAE	**LEGUME FAMILY**
Acacia greggii	cat claw acacia
Astragalus crotalariae	Salton Sea milkvetch
Cercidium floridum	palo verde
*Cystus scoparius**	Scotch broom
Dalea mollis	silky dalea
Prosopis glandulosa	honey mesquite
Psorothamnus emoryi	dye plant
Psorothamnus schottii	indigobush
Psorothamnus spinosus	smokebush
FOUQUIERIACEAE	**OCOTILLO FAMILY**
Fouquieria splendens	ocotillo
GERANIACEAE	**GERANIUM FAMILY**
*Erodium botrys**	broad-lobed filaree
Erodium texanum	Texas filaree

SCIENTIFIC NAME	COMMON NAME
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Phacelia crenulata	purple phacelia
KRAMERIACEAE	**RHATANY FAMILY**
Krameria bicolor	white rhatany
LOASACEAE	**LOASA FAMILY**
Mentzelia involucrata	bracted blazing star
Petalonyx sp.	sandpaper plant
MALVACEAE	**MALLOW FAMILY**
Eremalche rotundifolia	desert five-spot
MONTIACEAE	**MINER'S LETTUCE FAMILY**
Cistanthe ambigua	desert pussypaws
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
Abronia villosa var. *aurita*	chaparral sand-verbena
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Chylismia cardiophylla	heartleaf suncup
Chylismia claviformis	brown-eyed evening primrose
Eremothera boothii	Booth's evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia minutiflora	pygmy goldenpoppy
PLANTAGINACEAE	**PLANTAIN FAMILY**
Plantago ovata	woolly plantain
POLEMONIACEAE	**PHLOX FAMILY**
Aliciella latifolia	broadleaf gilia
Langloisia setosissima	langlosia
POLYGONACEAE	**BUCKWHEAT FAMILY**
Chorizanthe brevicornu	brittle spineflower
Chorizanthe corrugata	wrinkled spineflower
Chorizanthe rigida	rigid spineflower
Eriogonum deflexum	flat-topped buckwheat
Eriogonum inflatum	desert trumpet
Eriogonum reniforme	buckwheat
Eriogonum thomasii	Thomas eriogonum
Eriogonum trichopes	little trumpet
PORTULACACEAE	**PURSLANE FAMILY**
Portulaca halimoides	desert portulaca
RESDACEAE	**MIGNONETTE FAMILY**
Oligomeris linifolia	narrow-leaved oligomeris

SCIENTIFIC NAME	COMMON NAME
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura discolor	desert thorn apple
Lycium andersonii	Anderson's box-thorn
Lycium brevipes	Baja desert-thorn
TAMARICACEAE	**TAMARISK FAMILY**
*Tamarix aphylla**	athel
*Tamarix ramosissima**	Mediterranean tamarisk
ZYGOPHYLLACEAE	**CALTROP FAMILY**
Larrea tridentata	creosote bush
ANGIOSPERMS (MONOCOTYLEDONS)	
ARECACEAE	**PALM FAMILY**
Arecastrum sp.*	palm
CYPERACEAE	**SEDGE FAMILY**
Schoenoplectus americanus	Olney's three-square rush
LILIACEAE	**LILY FAMILY**
Hesperocallis undulata	desert lily
POACEAE	**GRASS FAMILY**
Aristida adscensionis	six-week's three-awn
Distichlis spicata	saltgrass
Festuca sp.	fescue
*Phalaris minor**	Mediterranean canary grass
Pleuraphis rigida	galleta grass
*Schismus arabicus**	Arabian schismus
*Schismus barbatus**	Mediterranean schismus
TYPHACEAE	**CATTAIL FAMILY**
Typha sp.	cattail

APPENDIX B WILDLIFE SPECIES OBSERVED DURING THE FIELD SURVEY

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SCIENTIFIC NAME	COMMON NAME
CLASS INSECTA	**INSECTS**
POMPILIDAE	**SPIDER WASPS**
Pepsis sp.	tarantula hawk
DANAIDAE	**MILKWEED BUTTERFLIES**
Danaus gilippus	queen
PIERIDAE	**WHITES & SULPHURS**
Pontia bedkerii	Becker's white
Pontia protodice	checkered white
HESPERIIDAE	**TRUE SKIPPERS**
Hesperopsis libya	Mohave sootywing
CLASS REPTILIA	**REPTILES**
IGUANIDAE	**IGUANID LIZARDS**
Callisaurus draconoides draconoides	common zebra-tailed lizard
Dipsosaurus dorsalis	desert iguana
Phrynosoma sp.	horned lizard
Phrynosoma mcalli	flat-tailed horned lizard
Uma notata	Colorado Desert fringe-toed lizard
Uta stansburiana	common side-blotched lizard
TEIIDAE	**WHIPTAIL LIZARDS**
Cnemidophorus sp.	whiptail
COLUBRIDAE	**COLUBRID SNAKES**
Masticophis flagellum fulginosus	Baja California coachwhip
VIPERIDAE	**VIPERS**
Crotalus cerastes laterorepens	Colorado desert sidewinder
CLASS AVES	**BIRDS**
CATHARTIDAE	**NEW WORLD VULTURES**
Cathartes aura	turkey vulture
ACCIPITRIDAE	**HAWKS, KITES, EAGLES**
Buteo jamaicensis	red-tailed hawk
FALCONIDAE	**FALCONS**
Falco mexicanus	prairie falcon
Falco sparverius	American kestrel
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla gambelii	Gambel's quail
CHARADRIIDAE	**PLOVERS**
Charadrius vociferus	killdeer
COLUMBIDAE	**PIGEONS & DOVES**
Columba livia	rock pigeon
Zenaida macroura	mourning dove

SCIENTIFIC NAME	COMMON NAME
CAPRIMULGIDAE	**NIGHTHAWKS**
Chordeiles acutipennis	lesser nighthawk
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
TYRANNIDAE	**TYRANT FLYCATCHERS**
Empidonax difficilis	Pacific-slope flycatcher
Myiarchus cinerascens	ash-throated flycatcher
Sayornis saya	Say's phoebe
Tyrannus verticalis	western kingbird
ALAUDIDAE	**LARKS**
Eremophila alpestris	horned lark
HIRUNDINIDAE	**SWALLOWS**
Petrochelidon pyrrhonota	cliff swallow
Hirundo rustica	barn swallow
Stelgidopteryx serripennis	northern rough-winged swallow
CORVIDAE	**JAYS & CROWS**
Corvus corax	common raven
STURNIDAE	**STARLINGS**
Sturnus vulgaris	European starling
VIREONIDAE	**VIREOS**
Vireo gilvus	warbling vireo
PARULIDAE	**WOOD WARBLERS**
Vermivora celata	orange-crowned warbler
Vermivora ruficapilla	Nashville warbler
Dendroica townsendi	Townsend's warbler
Oporornis tolmiei	MacGillivray's warbler
Wilsonia pusilla	Wilson's warbler
ICTERIDAE	**BLACKBIRDS**
Icterus bullockii	Bullock's oriole
Icterus parisorum	Scott's oriole
Sturnella neglecta	western meadowlark
Quiscalus mexicanus	great-tailed grackle
EMBERIZIDAE	**EMBERIZIDS**
Passerculus sandwichensis	savannah sparrow
CARDINALIDAE	**CARDINALS**
Pheucticus melanocephalus	black-headed grosbeak
FRINGILLIDAE	**FINCHES**
Carpodacus mexicanus	house finch
PASSERIDAE	**OLD WORLD SPARROWS**
Passer domesticus	house sparrow

SCIENTIFIC NAME	COMMON NAME
CLASS MAMMALIA	**MAMMALS**
LEPORIDAE	**HARES & RABBITS**
Lepus californicus	black-tailed prabbit
Sylvilagus audubonii	desert cottontail
SCIURIDAE	**SQUIRRELS**
Spermophilus tereticaudus	round-tailed ground squirrel
HETEROMYIDAE	**POCKET MICE & KANGAROO RATS**
Dipodomys sp.	kangaroo rat
FELIDAE	**CATS**
Lynx rufus	bobcat
CANIDAE	**WOLVES & FOXES**
Canis latrans	coyote
Vulpes macrotis	kit fox

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APPENDIX C SPECIAL-STATUS PLANT SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

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SPECIAL-STATUS PLANT SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE
Abronia villosa var. aurita chaparral sand-verbena	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in chaparral, coastal scrub, and desert dunes, on sandy soils. From 245 to 5,250 feet in elevation.	March – September	**Present.** Observed within the BSA during the survey.
Astragalus crotalariae Salton milk-vetch	Fed: None State: None CNPS: 4.3	Perennial herb occurring in desert wash and Sonoran desert scrub, on sandy or gravelly soils. From 195 to 820 feet in elevation.	January – April	**Present.** Observed within the BSA during the survey.
Astragalus insularis var. *harwoodii* Harwood's milk-vetch	Fed: None State: None CNPS: 2B.2	Annual herb occurring on desert dunes, desert wash, and Mojavean desert scrub, on sandy or gravelly soils. From 0 to 2,330 feet in elevation.	January – May	**Moderate**. Suitable habitat occurs within the BSA.
Astragalus magdalenae var. *peirsonii* Peirson's milk-vetch	Fed: **THR** State: **END** CNPS: 1B.2	Perennial herb occurring on desert dunes. From 195 to 740 feet in elevation.	December – April	**Absent**. No suitable habitat occurs within the BSA.
Bursera microphylla littleleaf elephant tree	Fed: None State: None CNPS: 2B.3	Perennial deciduous tree occurring in desert wash, Sonoran desert scrub, on rocky soils. From 655 to 2,300 feet in elevation.	June – July	**Absent**. The BSA is below the known elevation range for the species.
Castela emoryi crucifixion thorn	Fed: None State: None CNPS: 2B.2	Perennial deciduous shrub occurring on alkali playa, desert wash, Mojavean desert scrub and Sonoran desert scrub, on gravelly soils. From 300 to 2,380 feet in elevation.	June – July	**Low**. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species.
Chaenactis carphoclinia var. *peirsonii* Peirson's pincushion	Fed: None State: None CNPS: 1B.3	Annual herb occurring in Sonoran desert scrub, on sandy soils. From 10 to 1,640 feet in elevation.	March – April	**Present.** Observed within the BSA during the survey.
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in coastal bluff scrub and coastal dunes. From 0 to 330 feet in elevation.	January – August	**Absent**. No suitable habitat occurs within the BSA.
Chorizanthe polygonoides var. *longispina* long-spined spineflower	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, ultramafic soils, and vernal pools in clay soils. From 100 to 5,020 feet in elevation.	April – June	**Absent**. No suitable habitat occurs within the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE
Croton wigginsii Wiggin's croton	Fed: None State: **Rare** CNPS: 2B.2 BLM: S	Perennial shrub occurring on desert dunes and Sonoran desert scrub, on sandy soils. From 165 to 330 feet in elevation.	March – May	**Moderate**. Suitable habitat occurs within the BSA.
Cylindropuntia fosbergii pink teddy-bear cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring in Sonoran desert scrub. From 280 to 2,790 feet in elevation.	March – May	**Low**. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species.
Cylindropuntia munzii Munz's cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring in Sonoran desert scrub, on sandy or gravelly soils. From 490 to 1,970 feet in elevation.	May	**Low**. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species.
Dieteria asteroids var. lagunensis Mount Laguna aster	Fed: None State: **Rare** CNPS: 2B.1 BLM: S	Perennial herb occurring in cismontane woodland and lower montane coniferous forest. From 2,590 to 7,875 feet in elevation.	July – August	**Absent**. The BSA is below the known elevation range for the species.
Euphorbia abramsiana Abram's spurge	Fed: None State: None CNPS: 2B.2	Annual herb occurring in Mojavean desert scrub and Sonoran desert scrub, on sandy soils. From -15 to 4,300 feet in elevation.	August – November	**Moderate**. Suitable habitat occurs within the BSA.
Euphorbia platysperma flat-seeded spurge	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in desert dunes and Sonoran desert scrub, on sandy soils. From 215 to 330 feet in elevation.	February – September	**Low**. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species, and there are no known occurrences within 10 miles.
Fremontodendron mexicanum Mexican flannelbush	Fed: **END** State: **Rare** CNPS: 1B.1	Perennial evergreen shrub occurring in chaparral, cismontane woodlands, and closed-cone coniferous forest, on gabbroic, metavolcanic, or serpentinite soils. From 30 to 2,350 feet in elevation.	March – June	**Absent**. No suitable habitat occurs within the BSA.
Grindelia hallii San Diego sunflower	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, meadows and seeps, and valley and foothill grassland. From 605 to 5,725 feet in elevation.	May – October	**Absent**. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Helianthus niveus ssp. *tephrodes* Algodones Dunes sunflower	Fed: None State: **END** CNPS: 1B.2 BLM: S	Perennial herb occurring on desert dunes. From 165 to 330 feet in elevation.	September – May	**Absent**. No suitable habitat occurs within the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE
Hulsea californica San Diego sunflower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, and upper montane coniferous forest in openings and burned areas. From 3,000 to 9,560 feet in elevation.	April – June	**Absent.** No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Johnstonella costata (=*Cryptantha costata*) ribbed cryptantha	Fed: None State: None CNPS: 4.3 BLM: S	Annual herb occurring in desert dunes, Mojavean desert scrub, and Sonoran desert scrub, on sandy soils. From -195 to 1,640 feet in elevation.	February – May	**Present.** Observed within the BSA during the survey.
Lepidium flavum var. *felipense* Borrego Valley pepper-grass	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinyon and juniper woodlands and Sonoran desert scrub, on sandy soils. From 1,490 to 2,755 feet in elevation.	March – May	**Absent.** The BSA is below the known elevation range for the species.
Lupinus excubitus var. *medius* Mountain Springs bush lupine	Fed: None State: None CNPS: 1B.3	Perennial shrub occurring in pinyon and juniper woodlands and Sonoran desert scrub. From 1,395 to 4,495 feet in elevation.	March – May	**Absent.** The BSA is below the known elevation range for the species.
Lycium parishii Parish's desert-thorn	Fed: None State: None CNPS: 2B.3	Perennial shrub occurring in coastal scrub and Sonoran desert scrub. From 440 to 3,280 feet in elevation.	March – April	**Absent.** The BSA is below the known elevation range for the species.
Malperia tenuis brown turbans	Fed: None State: None CNPS: 2B.3	Annual herb occurring in Sonoran desert scrub, on sandy or gravelly soils. From 50 to 1,100 feet in elevation.	March – April	**Low.** Suitable habitat occurs within the BSA, but there are no known occurrences within 10 miles.
Monardella nana ssp. *leptosiphon* San Felipe monardella	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in chaparral and lower montane coniferous forest. From 3,940 to 6,085 feet in elevation.	June – July	**Absent.** No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Monardella robisonii Robison's monardella	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in pinyon and juniper woodlands. From 2,000 to 4,920 feet in elevation.	April – September	**Absent.** No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Palafoxia arida var. *gigantea* giant Spanish needle	Fed: None State: None CNPS: 1B.3 BLM: S	Annual to perennial herb occurring on desert dunes. From 50 to 330 feet in elevation.	February – May	**Absent.** No suitable habitat occurs within the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE
Pholisma sonorae sand food	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial parasitic herb occurring on desert dunes and Sonoran desert scrub on sandy soils. From 0 to 655 feet in elevation.	April – June	**Moderate**. Suitable habitat occurs within the BSA.
Pilostyles thurberi Thurber's pilostyles	Fed: None State: None CNPS: 4.3	Perennial parasitic herb occurring on *Psorothamnus* in Sonoran desert scrub. From 0 to 1,120 feet in elevation.	December – April	**Present.** Observed within the BSA during the survey.
Salvia greatae Orocopia sage	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial evergreen shrub occurring in desert wash, Mojavean desert scrub, and Sonoran desert scrub. From -130 to 2,705 feet in elevation.	March – April	**Low**. Suitable habitat occurs within the BSA, but all known populations occur on northeastern portion of the Salton Sea.
Schoenoplectus americanus Olney's three-square bulrush	Fed: None State: None CNPS: None State Parks: S	Perennial rhizomatous herb occurring in mineral-rich or brackish marshes, shores, fens, seeps, and springs. Up to 7,220 feet in elevation.	May - August	**Present.** Observed within the BSA during the survey.
Senna covesii Cove's senna	Fed: None State: None CNPS: 2B.2	Perennial herb occurring in sandy desert washes and slopes, and in Sonoran desert scrub. From 740 to 4,250 feet in elevation.	March – June	**Absent**. The BSA is below the known elevation range for the species.
Streptanthus campestris Southern jewel-flower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in chaparral, lower montane coniferous forest, and pinyon and juniper woodlands, on rocky soils. From 2,950 to 7,545 feet in elevation.	May – July	**Absent**. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Symphyotrichum defoliatum San Bernardino aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, coastal scrub, lower montane coniferous forest, marsh and swamps, meadows and seeps, and valley and foothill grassland. From 5 to 6,690 feet in elevation.	July – November	**Absent**. No suitable habitat occurs within the BSA.
Thermopsis californica var. *semota* velvety false lupine	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and wetlands. From 3,280 to 6,150 feet in elevation	March – June	**Absent**. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE
Thysanocarpus rigidus ridge fringepod	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinyon and juniper woodlands, often on dry rocky slopes. From 1,970 to 7,220 feet in elevation.	February – May	**Absent**. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.
Xylorhiza cognata Mecca aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in Sonoran desert scrub. From 65 to 1,310 feet in elevation.	January – June	**Low**. Suitable habitat occurs within the BSA, but all known populations occur on northeastern portion of the Salton Sea.
Xylorhiza orcuttii Orcutt's woody aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in desert wash and Sonoran desert scrub. From 0 to 1,200 feet in elevation.	March – April	**Present.** Observed within the BSA during the survey.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.

Federal status
END = listed as Endangered under the federal Endangered Species Act
Delisted = previously listed under the federal Endangered Species Act but now removed
State status
END = listed as Endangered under the California Endangered Species Act
BLM status
S = designated as a Sensitive species
State Parks status
S = designated as a Sensitive species

SRPR State Rare Plant Rank
1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
1B: Considered rare, threatened, or endangered in California and elsewhere.
2A: Plants presumed extirpated in California, but more common elsewhere
2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3: Plants About Which More Information is Needed – A Review List
4: Plants of Limited Distribution - A Watch List

Threat Ranks/ Decimal notations: A California Native Plant Society extension added to the SSRPR
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

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APPENDIX D SPECIAL-STATUS WILDLIFE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

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SPECIAL-STATUS WILDLIFE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

SPECIES	STATUS	HABITAT	POTENTIAL FOR OCCURRENCE
Antrozous pallidus pallid bat	Fed: None State: SSC BLM: S	Occurs in chaparral, coastal scrub, desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, riparian woodland, Sonoran desert scrub, upper montane coniferous forest, and valley and foothills grassland. Most common in open, dry habitats with rock areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Low**. This species has been detected within the SVRA within five miles of the BSA (personal communication, State Parks 2017), and suitable foraging habitat for this species occurs within the BSA, but roosting habitat is of low quality, combined with frequent anthropogenic disturbance.
Athene cunicularia burrowing owl	Fed: None State: SSC BLM: S	Occurs in open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. This includes a wide variety of vegetation communities, including coastal prairies, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley and foothill grasslands. Depends on fossorial mammals for burrows.	**Moderate**. There is only one record of this species in the general Project vicinity (CDFW 2018), but two observations within one mile of the BSA have been recorded by State Parks (2018). There were occasional suitable burrows within the survey area that could support this species, but there were few insects observed for prey.
Charadrius alexandrines nivosus western snowy plower	Fed: **THR** State: SSC BLM: S	Occurs in Great Basin standing waters, sand shores, salt pond levees and shores of large alkali lakes, and wetlands. Requires sandy, gravelly, or friable soils for nesting.	**Absent**. No suitable habitat is present within the BSA.
Charadrius montanus mountain plover	Fed: None State: SSC BLM: S	Occurs in chenopod scrub, short grasslands, freshly-plowed fields, newly-sprouting grain fields, and occasionally sod farms. Needs a mixture of short vegetation and bare ground, along with flat topography. Prefers grazed areas and areas with fossorial rodents.	**Absent**. No suitable habitat is present within the BSA.
Falco mexicanus prairie falcon	Fed: None State: WL	Occurs in Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley and foothill grassland.	**Low.** While suitable foraging habitat occurs within the BSA, only some suitable nesting habitat for this species occurs.
Lasiurus blossevillii western red bat	Fed: None State: SSC	Occurs in cismontane woodland, lower montane coniferous forest, riparian forest, and riparian woodland. Roosts primarily in trees 2-40 feet above ground, preferring habitat edges and mosaics with trees that are protected from above and open below with opens areas for foraging.	**Low**. This species has been detected within the SVRA within five miles of the BSA (personal communication, State Parks 2017), but no suitable foraging or roosting habitat for this species occurs within the BSA.

SPECIES	STATUS	HABITAT	POTENTIAL FOR OCCURRENCE
Oliarces clara cheeseweed owlfly	Fed: None State: None	Occurs in the lower Colorado River drainage. It is found under rocks or in flight over streams. *Larrea tridentata* is the suspected larval host.	**Low**. *Larrea tridentata* occurs within the BSA, but one confirmed observation in the vicinity is more than five miles from the site.
Pelecanus occidentalis californicus California brown pelican	Fed: Delisted State: **FP** BLM: S	This colonial rooster and nester generally occurs on coastal islands outside of the survey line, but also nests on small islands of small to moderate size which afford immunity from attack by ground-dwelling predators.	**Absent**. No suitable habitat is present within the BSA.
Perognathus longimembris bangsi Palm Springs pocket mouse	Fed: None State: SSC BLM: S	Occurs in desert riparian, desert washes and Sonoran desert scrub. Most common in desert scrub dominated by creosote. Rarely found on rock sites.	**Moderate**. Suitable habitat for this species occurs within the BSA.
Phrynosoma mcallii flat-tailed horned lizard	Fed: None State: SSC BLM: S	Occurs in desert dunes, Mojavean desert scrub, and Sonoran desert scrub in central Riverside, eastern San Diego, and Imperial Counties.	**High**. Suitable habitat for this species occurs within the BSA.
Toxostoma lecontei Le Conte's thrasher	Fed: None State: SSC	Occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in dense, spiny shrubs or densely-branched cacti.	**Low**. Some suitable habitat for this species occurs within the BSA.
Xantusia gracilis sandstone night lizard	Fed: None State: None BLM: S	Known only from the Truckhaven Rocks in the eastern part of Anza-Borrego State Park. Found in fissures or under slabs of exfoliating sandstone and rodent burrows in compacted sandstone and mudstone.	**Absent**. The Truckhaven Rocks is a highly localized area more than five miles from the BSA.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.

Federal status
END = listed as Endangered under the federal Endangered Species Act
THR = listed as Threatened under the federal Endangered Species Act
State status
END = listed as Endangered under the California Endangered Species Act
THR = listed as Threatened under the California Endangered Species Act
SSC = designated as a Species of Concern
FP = designated as a Fully Protected species
WL = watch list species
BLM status
S = designated as a Sensitive species
Other
CNDDB = this species is only listed by the CNDDB and may be locally sensitive or its occurrences may be monitored to see if further protection is needed

APPENDIX C – PROPOSED WELL SITES BOTANICAL SURVEY REPORT

August 2017

ORMAT NEVADA, INC.

Truckhaven Geothermal Project

Proposed Well Sites
Botanical Survey Report

PROJECT NUMBER:
146567

PROJECT CONTACT:
Ken McDonald
EMAIL:
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(714) 507-2700

POWER ENGINEERS

Truckhaven Geothermal Project
Proposed Well Sites
Botanical Survey Report

PREPARED FOR: ORMAT NEVADA, INC.

PREPARED BY: KEN MCDONALD
PHONE: (714) 507-2700
EMAIL: KEN.MCDONALD@POWERENG.COM

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APPENDIX A VASCULAR PLANT SPECIES OBSERVED

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ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
BSA	biological survey area
CDFW	California Department of Fish and Wildlife
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
GPS	global positioning system
Ormat	Ormat Nevada, Inc.
Project	Truckhaven Geothermal Project
POWER	POWER Engineers, Inc.
SRPR	State Rare Plant Rank
USFWS	U.S. Fish and Wildlife Service

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1.0 INTRODUCTION

This document presents the findings of the focused special-status plant survey for the Ormat Nevada, Inc. (Ormat) Truckhaven Geothermal Project (Project). This survey focused exclusively on portions of the Project that will be physically disturbed to allow for construction of wells, well pads, and access roads.

1.1 Project Description

Ormat is proposing to construct six wells located on pads in the vicinity of the Salton Sea Airport in Imperial County, California (Figure 1), situated at the north end of the U.S. Department of the Interior, Bureau of Land Management (BLM) Truckhaven Geothermal Lease Area. Lands within the Project footprint are federal, state, and private. Future construction of a geothermal power plant that can make use of these wells will occur under separate environmental compliance and permitting documentation.

This report focuses on the proposed well pads, access roads, and sufficient buffer areas to allow for the adjusting of pads and roads should the need arise. The biological survey area (BSA) is depicted in Figure 2.

1.2 Project Location

The proposed Project site is located within and south of Salton City, west of the Salton Sea in the northern portion of Imperial Valley, California. The BSA consists of several discontinuous polygons adjacent to and surrounding the Salton Sea Airport (Figure 2). The elevation of the site ranges from approximately 50 feet below mean sea level to 130 feet below mean sea level. Land use in the BSA consists of low-density residential housing and associated infrastructure and open, natural areas sparsely vegetated with native and non-native plant species.

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Legend

Project Area

ORMAT-NEVADA, INC. TRUCKHAVEN

Figure 1
Regional Location

0 2 4 6 8 10
Miles

N

POWER ENGINEERS

Date: 7/7/2017

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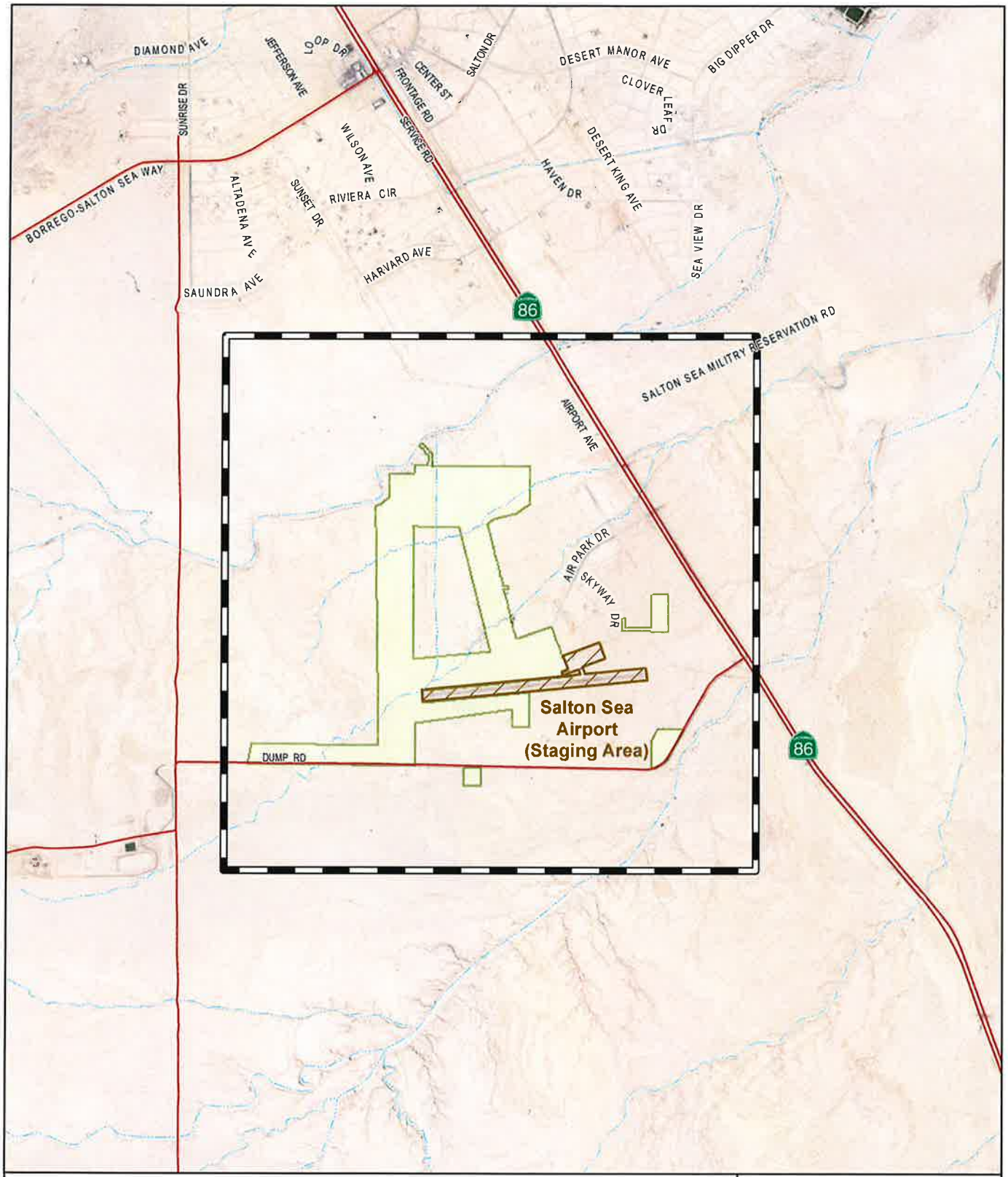

Legend

- Project Area
- Botanical Survey Area
- Salton Sea Airport (Staging Area)
- Highway or Main Road
- Intermittent Stream, Wash, or Ditch

Aerial Photography: 2016 NAIP

ORMAT-NEVADA, INC. TRUCKHAVEN

Figure 2
Biological Survey Area

0 500 1,000 1,500

Meters

N

POWER ENGINEERS

Date: 7/7/2017

EEC ORIGINAL PKG

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2.0 SURVEY AREA

The BSA consists of four polygons of various sizes encompassing the proposed well pads and associated access roads, with sufficient buffer to refine the final disturbance footprint (Figure 2). The BSA includes federal, state, and private lands on the following U.S. Geological Survey 7.5' quadrangles: Truckhaven, Kane Spring NW, Shell Reef, and Seventeen Palms. The federal lands are administered by BLM and state lands by the State Lands Commission.

2.1 Vegetation Communities

Descriptions of vegetation types that occur within the BSA are provided below. Vegetation was classified using Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* as a guide and primary reference (Holland 1986). Communities were classified to the closest described vegetation type. Composition of any community will vary due to various site specific factors, such as elevation, slope, aspect, and disturbance regime, and can appear dissimilar while remaining within the greater classified vegetation community. Vegetation communities within and adjacent to the BSA are presented in Figure 3.

Sonoran Creosote Bush Scrub

Sonoran creosote bush scrub is a widely spaced open community generally dominated by creosote (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*), usually with abundant bare ground between larger shrubs. Growth in this community occurs from winter to early spring, and later with sufficient rainfall, with the shrubs often dormant for long periods. During years of sufficient rainfall, the bare ground is filled with ephemeral herbs. This community typically occurs on well-drained secondary soils of slopes, fans, and valley, rather than upland sites, with winter temperatures seldom below freezing (Holland 1986).

This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" Sonoran creosote bush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.

Desert Saltbush Scrub

Desert saltbush scrub is a low-growing open community dominated by chenopod bushes (*Atriplex* spp.), usually with a low-growing herbaceous cover. Total cover in this community is often low, with abundant bare ground between widely spaced shrubs. Stands of shrubs are typically dominated by a single Atriplex species. Common species in this community include four-wing saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenolytra*), shadscale (*Atriplex confertifolia*), allscale (*Atriplex polycarpa*), and hop sage (*Grayia spinosa*). This community typically occurs on fine-textured, poorly drained soils with high alkalinity and/or salinity (Holland 1986).

This community was noted to be very sparse in areas constituting a separate mapping layer of "sparse" saltbush scrub. In these areas, the community appeared to be essentially bare of vegetation, but remnant components of the community were present in sufficient number to classify the vegetation type.

Desert Wash

Desert wash is a sparsely vegetated to bare community occurring throughout the BSA. These sandy to hardened silty-mud substrate washes most closely resemble the Holland (1986) vegetation descriptions of tamarisk scrub and arrow weed scrub communities. Where vegetation occurs in the washes, tamarisk (*Tamarix* sp.) was the largest shrub, while arrow weed (*Pluchea sericea*) was the

most common. Occasionally, these washes also harbored Sonoran creosote bush scrub and desert saltbush scrub vegetation. Seeps occurred intermittently within desert washes, and were comprised mainly of salt grass (*Distichlis spicata*).

Bare Ground/Disturbed

Bare ground and disturbed areas within the BSA occurred mainly adjacent to developed areas and infrastructure, generally in the form of bare, compacted soils from human activities. Vegetation in these areas tended to be sparse and weedy. Occasional individuals of the special-status Salton milk-vetch (*Astragalus crotalariae*), which thrives on disturbance, occur in disturbed areas and the edges of developed areas.

Developed

Developed areas include roads, built structures, and associated infrastructure. Areas generally considered developed include dirt and paved roads, transmission lines, underground gas pipelines, railroads, and any other permanent structures. Examples of this habitat type within the BSA are found throughout the Project area in the form of roads, with the highest concentrations found near the north eastern portion of the site.

ORMAT-NEVADA, INC. TRUCKHAVEN

Figure 3
Biological Resources

Legend

Project Components
- Botanical Survey Area

Sensitive Areas

Flora
- Abronia villosa var. aurita
- Astragalus crotalariae
- Chaenactis carphoclinia ssp. peirsonii

Fauna
- FTHL
- FTHL: potential burrow
- CORA: nest
- BUOW: potential burrow

Other Biological Areas
- Seep

Vegetation
- Sonoran creosote bush scrub
- sparse Sonoran creosote bush scrub
- desert saltbush scrub
- sparse desert saltbush scrub
- desert wash
- seep
- bare ground/disturbed

Base Data
- State Highway
- Local Road
- Dirt Road
- Trail
- Section
- Intermittent Stream, Wash, or Ditch
- Ocotillo Wells SVRA

0 200 400 600
Meters

N

POWER ENGINEERS

Date: 7/7/2017

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3.0 SURVEY METHODOLOGY

Focused special-status plant species surveys were conducted in late-spring and early summer, 2017. The surveys were conducted during the appropriate blooming periods for special-status plant species. The survey methodology followed the U.S. Fish and Wildlife Service's (USFWS) *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996), the recommended botanical survey guidelines of the California Department of Fish and Wildlife (CDFW; CDFW 2000), the protocols for surveying and evaluating impacts (CDFW 2009), the BLM (BLM 2005), and the California Native Plant Society (CNPS; CNPS 2001).

3.1 Pre-field Preparations

Before conducting the botanical surveys, pre-field research was conducted to determine which special-status plants had potential to occur within the Project area. This list of potentially occurring special-status plant species was compiled using lists and databases from the USFWS (USFWS 2017), CDFW (CDFW 2017a, b, c), the BLM (BLM 2017), and the CNPS (CNPS 2017), and the Habitat Assessment conducted for the Project area (Power 2017). For each potentially occurring species, information was compiled on distribution, habitat preferences, blooming times, elevation, and conservation status from the sources listed above.

A plant was considered to be of special-status if it met one or more of the following criteria:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (50 Code of Federal Regulations Part 17.12 [listed plants]);
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CDFW 2017);
- Identified by the CDFW as species of concern or fully protected species, including fish and wildlife that do not have State or federal threatened or endangered status, but may still be threatened with extinction (CDFW 2017);
- Included in the CNPS Rare Plant Inventory (CNPS 2017);
- Otherwise defined as rare, threatened, or endangered under the California Environmental Quality Act;
- Identified by State Parks Ocotillo Wells Field Office as a sensitive species; or
- Identified by the BLM or the BLM El Centro Field Office as a sensitive species.

Plants meeting one or more of these criteria were considered to have potential to occur within the Project area if suitable habitat occurs within or near the Project area and if their range includes the Project area or its vicinity.

The preliminary list was revised after reviewing information on habitat preferences and range for each species. Species were eliminated from the preliminary list if suitable habitat was absent, or if the species range and elevation requirements did not extend into the Project area or its vicinity.

Species determined to be absent were perennially visible sub-shrubs to trees that are easily observed and identified year-round and were not observed during the botanical surveys, or species with habitat requirements that do not occur in the Project area, including species dependent on mesic conditions or alkaline seeps, granite outcroppings or cliffs, specific elevation ranges, and vernal pool species.

Of the 38 potentially occurring special-status plant species for the desert portion of the survey, seven species were determined to have high potential to occur in the BSA based on known occurrences in the Project vicinity and suitable habitat present on-site, three species had moderate potential to occur, seven had a low potential to occur, and the remaining seven species were determined to be absent from

the Project area based on lack of suitable habitat. Special-status species with potential to occur are summarized in Table 1.

TABLE 1 SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR AND FINAL DETERMINATION

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE
Abronia villosa var. *aurita* chaparral sand-verbena	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in chaparral, Coastal scrub, and Desert dunes, on sandy soils. From 245 to 5,250 feet in elevation.	March – September	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were negative.
Astragalus crotalariae Salton milk-vetch	Fed: None State: None CNPS: 4.3	Perennial herb occurring in desert wash and Sonoran desert scrub, on sandy or gravelly soils. From 195 to 820 feet in elevation.	January – April	High. Occurs in the nearby vicinity.	Observed during the focused surveys.
Astragalus insularis var. harwoodii Harwood's milk-vetch	Fed: None State: None CNPS: 2B.2	Annual herb occurring on desert dunes, desert wash, and Mojavean desert scrub, on sandy or gravelly soils. From 0 to 2,330 feet in elevation.	January – May	Moderate. Suitable habitat occurs within the BSA.	Not observed during the focused surveys. Reference population surveys were positive.
Astragalus magdalenae var. *peirsonii* Peirson's milk-vetch	Fed: THR State: END CNPS: 1B.2	Perennial herb occurring on desert dunes. From 195 to 740 feet in elevation.	December – April	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. Reference population was not readily accessible.
Bursera microphylla littleleaf elephant tree	Fed: None State: None CNPS: 2B.3	Perennial deciduous tree occurring in desert wash, Sonoran desert scrub, on rocky soils. From 655 to 2,300 feet in elevation.	June – July	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. Reference population surveys were positive.
Castela emoryi crucifixion thorn	Fed: None State: None CNPS: 2B.2	Perennial deciduous shrub occurring on alkali playa, desert wash, Mojavean desert scrub and Sonoran desert scrub, on gravelly soils. From 300 to 2,380 feet in elevation.	June – July	Low. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species..	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Chaenactis carphoclinia var. *peirsonii* Peirson's pincushion	Fed: None State: None CNPS: 1B.3	Annual herb occurring in Sonoran desert scrub, on sandy soils. From 10 to 1,640 feet in elevation.	March – April	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were positive.
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	Fed: None State: None CNPS: 1B.1 BLM: S	Annual herb occurring in coastal bluff scrub and coastal dunes. From 0 to 330 feet in elevation.	January – August	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Chorizanthe polygonoides var. *longispina* long-spined spineflower	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, ultramafic soils, and vernal pools in clay soils. From 100 to 5,020 feet in elevation.	April – June	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE
Croton wigginsii Wiggin's croton	Fed: None State: Rare CNPS: 2B.2 BLM:	Perennial shrub occurring on desert dunes and Sonoran desert scrub, on sandy soils. From 165 to 330 feet in elevation.	March – May	Moderate. Suitable habitat occurs within the BSA.	Not observed during the focused surveys. Reference population was not readily accessible.
Cylindropuntia fosbergii Pink teddy-bear cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring in Sonoran desert scrub. From 280 to 2,790 feet in elevation.	March – May	Low. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species..	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Cylindropuntia munzii Munz's cholla	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial stem succulent occurring Sonoran desert scrub, on sandy or gravelly soils. From 490 to 1,970 feet in elevation.	May	Low. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Dieteria asteroids var. *lagunensis* Mount Laguna aster	Fed: None State: Rare CNPS: 2B.1 BLM: S	Perennial herb occurring in cismontane woodland and lower montane coniferous forest. From 2,590 to 7,875 feet in elevation.	July – August	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Euphorbia abramsiana Abram's spurge	Fed: None State: None CNPS: 2B.2	Annual herb occurring in Mojavean desert scrub and Sonoran desert scrub, on sandy soils. From -15 to 4,300 feet in elevation.	August – November	Moderate. Suitable habitat occurs within the BSA.	Not observed during the focused surveys. Reference population surveys were negative.
Euphorbia platysperma Flat-seeded spurge	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in desert dunes and Sonoran desert scrub, on sandy soils. From 215 to 330 feet in elevation.	February – September	Low. Suitable habitat occurs on site, but the BSA is below the known elevation range for the species, and there are no known occurrences within 10 miles.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Fremontodendron mexicanum Mexican flannelbush	Fed: END State: Rare CNPS: 1B.1	Perennial evergreen shrub occurring in chaparral, cismontane woodlands, and closed-cone coniferous forest, on gabbroic, metavolcanic, or serpentinite soils. From 30 to 2,350 feet in elevation.	March – June	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Grindelia hallii San Diego sunflower	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, meadows and seeps, and valley and foothill grassland. From 605 to 5,725 feet in elevation.	May – October	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE
Helianthus niveus ssp. *tephrodes* Algodones Dunes sunflower	Fed: None State: END CNPS: 1B.2 BLM: S	Perennial herb occurring on desert dunes. From 165 to 330 feet in elevation.	September – May	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Hulsea californica San Diego sunflower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial herb occurring in chaparral, lower montane coniferous forest, and upper montane coniferous forest in openings and burned areas. From 3,000 to 9,560 feet in elevation.	April – June	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Johnstonella costata (=*Cryptantha costata*) ribbed cryptantha	Fed: None State: None CNPS: 4.3 BLM: S	Annual herb occurring in desert dunes, Mojavean desert scrub, and Sonoran desert scrub, on sandy soils. From -195 to 1,640 feet in elevation.	February – May	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were positive.
Lepidium flavum var. *felipense* Borrego Valley pepper-grass	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinon and juniper woodlands and Sonoran desert scrub, on sandy soils. From 1,490 to 2,755 feet in elevation.	March – May	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Lupinus excubitus var. *medius* Mountain Springs bush lupine	Fed: None State: None CNPS: 1B.3	Perennial shrub occurring in pinyon and juniper woodlands and Sonoran desert scrub. From 1,395 to 4,495 feet in elevation.	March – May	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Lycium parishii Parish's desert-thorn	Fed: None State: None CNPS: 2B.3	Perennial shrub occurring in coastal scrub and Sonoran desert scrub. From 440 to 3,280 feet in elevation.	March – April	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Malperia tenuis brown turbans	Fed: None State: None CNPS: 2B.3	Annual herb occurring in Sonoran desert scrub, on sandy or gravelly soils. From 50 to 1,100 feet in elevation.	March – April	Low. Suitable habitat occurs within the BSA, but there are no known occurrences within 10 miles.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Monardella nana ssp. *leptosiphon* San Felipe monardella	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in chaparral and lower montane coniferous forest. From 3,940 to 6,085 feet in elevation.	June – July	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE
Monardella robisonii Robison's monardella	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in pinon & juniper woodlands. From 2,000 to 4,920 feet in elevation.	April – September	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Palafoxia arida var. *gigantea* giant Spanish needle	Fed: None State: None CNPS: 1B.3 BLM: S	Annual to perennial herb occurring on desert dunes. From 50 to 330 feet in elevation.	February – May	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Phoïsma sonorae sand food	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial parasitic herb occurring on desert dunes and Sonoran desert scrub on sandy soils. From 0 to 655 feet in elevation.	April – June	Moderate. Suitable habitat occurs within the BSA.	Not observed during the focused surveys. Reference population was not readily accessible.
Pilostyles thurberi Thurber's pilostyles	Fed: None State: None CNPS: 4.3	Perennial parasitic herb occurring on Psorothamnus in Sonoran desert scrub. From 0 to 1,120 feet in elevation.	December – April	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were positive.
Salvia greatae Orocopia sage	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial evergreen shrub occurring in desert wash, Mojavean desert scrub, and Sonoran desert scrub. From -130 to 2,705 feet in elevation.	March – April	Low. Suitable habitat occurs within the BSA, but all known populations occur on northeastern portion of the Salton Sea.	Not observed during the focused surveys. Reference population surveys were negative.
Schoenoplectus americanus Olney's three-square bulrush	Fed: None State: None CNPS: None State Parks: S	Perennial rhizomatous herb occurring in mineral-rich or brackish marshes, shores, fens, seeps, and springs. Up to 7,220 feet in elevation.	May - August	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were positive.
Senna covesii Cove's senna	Fed: None State: None CNPS: 2B.2	Perennial herb occurring in sandy desert washes and slopes, and in Sonoran desert scrub. From 740 to 4,250 feet in elevation.	March – June	Absent. The BSA is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Streptanthus campestris Southern jewel-flower	Fed: None State: None CNPS: 1B.3 BLM: S	Perennial rhizomatous herb occurring in chaparral, lower montane coniferous forest, and pinon and juniper woodlands, on rocky soils. From 2,950 to 7,545 feet in elevation.	May – July	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE
Symphyotrichum defoliatum San Bernardino aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, coastal scrub, lower montane coniferous forest, marsh and swamps, meadows and seeps, and valley and foothill grassland. From 5 to 6,690 feet in elevation.	July – November	Absent. No suitable habitat occurs within the BSA.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Thermopsis californica var. *semota* velvety false lupine	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial rhizomatous herb occurring in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and wetlands. From 3,280 to 6,150 feet in elevation	March – June	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Thysanocarpus rigidus ridge fringepod	Fed: None State: None CNPS: 1B.2 BLM: S	Annual herb occurring in pinon and juniper woodlands, often on dry rocky slopes. From 1,970 to 7,220 feet in elevation.	February – May	Absent. No suitable habitat occurs within the BSA, and is below the known elevation range for the species.	Not observed during the focused surveys. No reference populations occur within 10 miles of the BSA.
Xylorhiza cognata Mecca aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in Sonoran desert scrub. From 65 to 1,310 feet in elevation.	January – June	Low. Suitable habitat occurs within the BSA, but all known populations occur on northeastern portion of the Salton Sea.	Not observed during the focused surveys. Reference population surveys were positive.
Xylorhiza orcuttii Orcutt's woody aster	Fed: None State: None CNPS: 1B.2 BLM: S	Perennial herb occurring in desert wash and Sonoran desert scrub. From 0 to 1,200 feet in elevation.	March – April	High. Occurs in the nearby vicinity.	Not observed during the focused surveys. Reference population surveys were positive.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE	PRESENCE/ABSENCE

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.

Federal status
END = listed as Encangered under the federal Endangered Species Act
Delisted = previously listed under the federal Endangered Species Act but now removed
State status
END = listed as Encangered under the California Endangered Species Act
BLM status
S = designated as a Sensitive species
State Parks status
S = designated as a Sensitive species

SRPR State Rare Plant Rank
1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
1B: Considered rare, threatened, or endangered in California and elsewhere.
2A: Plants presumed extirpated in California, but more common elsewhere
2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3: Plants About Which More Information is Needed – A Review List
4: Plants of Limited Distribution - A Watch List
Threat Ranks/ Decimal notations: A California Native Plant Society extension added to the SRPR
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

3.2 Field Survey Methods

The 2017 botanical surveys were conducted by POWER botanists Ken McDonald and Melissa Lippincott. Floral surveys were conducted on May 9 through May 12 and June 14 through June 16. Surveys consisted of walking pedestrian transects within the BSA polygons, with special consideration towards impact areas such as proposed well pads and access road footprints.

Surveys were conducted within all areas containing potential habitat for special-status plants. The intuitive approach uses the botanist's knowledge of the preferred habitat of special-status plants to focus the survey effort on sites most likely to support them. The botanical surveys were floristic in nature, meaning that all taxa were identified to the level necessary to determine if they were of special-status. Botanists identified all plant species detected during field surveys using personal knowledge of the plants and keys in *The Jepson Manual* (Hickman 1993) and Jepson Online Interchange (2017). Scientific nomenclature in this report follows Hickman (1993) and common names are derived from Hickman (1993) and CalFlora (2017).

Botanists recorded observations with Garmin hand-held Global Positioning System (GPS) units. These units were pre-loaded with maps of the BSA boundaries. GPS units were used for navigation, and to collect locational data (points and polygons) for special-status plant species observations. Incidental detections of animal burrows suitable for flat-tailed horned lizard (*Phrynosoma mcallii*) or burrowing owl (*Athene cunicularia*) were also noted, and presented in Figure 3. Current aerial figures of the project site were also used in navigation and noting observations. Additionally, reference population surveys of several special-status target species were conducted to insure that they were in bloom or could otherwise be identified at the time of the botanical surveys.

A list of plant species observed during the surveys within the BSA is presented in Appendix A.

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4.0 RESULTS

More than 65 plant species were detected during the course of the surveys, representing 27 families. A list of plant species observed in the BSA during the surveys is presented in Appendix A.

One special-status plant species was detected within the BSA during the 2017 botanical surveys, and is discussed below. No other special-status plant species were observed during the surveys.

Salton milk-vetch (*Astragalus crotalariae*)

Salton milk-vetch (*Astragalus crotalariae*) is included on List 4.3 of the CNPS online Inventory (CNPS 2017). It is a red-purple to white flowered perennial herb in the Pea Family (Fabaceae). Salton milk-vetch occurs from the south easternmost portion of California and into Arizona; documented in Imperial, Riverside, and San Diego counties. This species occurs in desert wash and Sonoran desert scrub, on sandy or gravelly soils. It ranges from 195 to 820 feet in elevation, and blooms from January to April. Suitable habitat for this species occurs within the BSA. Salton milk-vetch was observed within the BSA during the survey. The locations of Salton milk-vetch detected within the BSA are shown in Figure 3.

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5.0 RECOMMENDATIONS

The following recommendations are provided for avoidance and minimization of effects to botanical resources:

1. A qualified biologist will conduct a general preconstruction survey no more than 14 days prior to the start of construction to verify that no new special-status species are in the project area or its buffers.
2. Impacts to special-status plant species shall first be avoided where feasible, and where not feasible, impacts shall be compensated through approved methods, including reseeding.
3. The footprint of disturbance will be minimized to the maximum extent feasible. Access to sites will be via pre-existing access routes, to the greatest extent possible, and the work area boundaries will be delineated with staking, flagging, or other comparable markings to minimize surface disturbance associated with vehicle straying. Signs and/or fencing will be placed around the project area to restrict access to project-related vehicles.
4. Vehicles and equipment should be maintained and free of leaks. All hazardous material, oil, hydraulic, or other fluid leaks should be contained and cleaned immediately to reduce the risk of negatively impacting water or soil quality.
5. If required, the area of project-related disturbance will be revegetated (reseeded) in consultation with requirements set forth by the County. Mitigation ratios for disturbing habitat are assumed to be 1:1 for temporary disturbance and 2:1 for permanent disturbance.
6. Prior to construction, a plan should be created that will address post-construction clean-up, soil stabilization and erosion control, and any required revegetation for land disturbed by construction related activities, in coordiation with appropriate land owners and regulating agencies. The plan should include a monitoring schedule, responsible parties, minimum standards, and contingecy plans.
7. Project-related equipment will be washed prior to entering the project area for the first time to reduce the chance of transporting noxious weed seeds from outside the area.
8. Straw or hay bales that are used during construction will be certified weed-free.

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6.0 CONCLUSIONS

One special-status plant species was observed within the BSA during the 2017 botanical surveys. Salton milk-vetch would potentially be affected by Project activities. While Salton milk-vetch has no federal or State status, it is considered a plant of limited distribution, and should be avoided, if feasible. Although reference population surveys of several of the other target species were conducted, with most species being observed, no other special-status plant species were detected within the BSA during the focused floral surveys.

The conclusion determined from the survey data indicates that the majority of the BSA does not support any other special-status plant species. The locations of the detected special-status species are shown in Figure 3.

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APPENDIX A VASCULAR PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME
ANGIOSPERMS (DICOTYLEDONS)	
AIZOACEAE	**FIG-MARIGOLD FAMILY**
*Mesembryanthemum nodiflorum**	slender-leaved iceplant
AMARANTHACEAE	**AMARANTH FAMILY**
Tidestromia oblongifolia	honeysweet
ASCLEPIADACEAE	**MILKWEED FAMILY**
Asclepias subulata	rush milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
Ambrosia dumosa	burro bush
Bebbia juncea	sweetbush
Dicoria canescens	bugseed
Encelia frutescens	rayless encelia
Geraea canescens	desert sunflower
Isocoma acradenia	alkali goldenbush
Palafoxia arida	Spanish needles
Perityle emoryi	emory rock daisy
Pluchea sericea	arrow weed
*Sonchus asper**	prickly sow thistle
Stephanomeria pauciflora	wire lettuce
BORAGINACEAE	**BORAGE FAMILY**
Cryptantha angustifolia	narrowleaf cryptantha
Cryptantha circumscissa	cushion cryptantha
Cryptantha maritima	Guadalupe forget-me-not
Pectocarya heterocarpa	chuckwalla combseed
BRASSICACEAE	**MUSTARD FAMILY**
*Brassica tournefortii**	Sahara mustard
Lepidium densifolium	desert peppergrass
Lepidium sp.	peppergrass
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Atriplex canescens	four-wing saltbush
Atriplex hymenelytra	desert holly
Atriplex lentiformis	quail brush
Atriplex polycarpa	allscale
*Beta vulgaris**	beet
*Chenopodium murale**	nettle-leaved goosefoot
*Salsola sp.**	Russian thistle
Suaeda nigra	bush seepweed
CLEOMACEAE	**SPIDERFLOWER FAMILY**
Cleomella obtusifolia	Mojave stinkweed
EUPHORBIACEAE	**SPURGE FAMILY**
Stillingia spinulosa	Mohave stillingia
FABACEAE	**LEGUME FAMILY**
Astragalus crotalariae	Salton milkvetch
Cercidium floridum	palo verde

SCIENTIFIC NAME	COMMON NAME
Prosopis glandulosa	honey mesquite
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Phacelia crenulata	purple phacelia
KRAMERIACEAE	**RHATANY FAMILY**
Krameria bicolor	white rhatany
LOASACEAE	**LOASA FAMILY**
Mentzelia involucrata	bracted blazing star
MALVACEAE	**MALLOW FAMILY**
Eremalche rotundifolia	desert five-spot
MONTIACEAE	**MINER'S LETTUCE FAMILY**
Cistanthe ambigua	desert pussypaws
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Chylismia cardiophylla	heartleaf suncup
Chylismia claviformis	brown-eyed evening primrose
Eremothera boothii	Booth's evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia minutiflora	pygmy goldenpoppy
PLANTAGINACEAE	**PLANTAIN FAMILY**
Plantago ovata	woolly plantain
POLEMONIACEAE	**PHLOX FAMILY**
Aliciella latifolia	broadleaf gilia
Langloisia setosissima	langlosia
POLYGONACEAE	**BUCKWHEAT FAMILY**
Chorizanthe brevicornu	brittle spineflower
Chorizanthe corrugata	wrinkled spineflower
Chorizanthe rigida	rigid spineflower
Eriogonum deflexum	flat-topped buckwheat
Eriogonum inflatum	desert trumpet
Eriogonum reniforme	buckwheat
Eriogonum thomasii	Thomas eriogonum
Eriogonum trichopes	little trumpet
PORTULACACEAE	**PURSLANE FAMILY**
Portulaca halimoides	desert portulaca
RESDACEAE	**MIGNONETTE FAMILY**
Oligomeris linifolia	narrow-leaved oligomeris
SOLANACEAE	**NIGHTSHADE FAMILY**
Lycium brevipes	Baja desert-thorn
TAMARICACEAE	**TAMARISK FAMILY**
*Tamarix aphylla**	athel
*Tamarix ramosissima**	Mediterranean tamarisk
ZYGOPHYLLACEAE	**CALTROP FAMILY**
Larrea tridentata	creosote bush
ANGIOSPERMS (MONOCOTYLEDONS)	
LILIACEAE	**LILY FAMILY**
Hesperocallis undulata	desert lily

SCIENTIFIC NAME	COMMON NAME
POACEAE	GRASS FAMILY
Aristida adscensionis	six-week's three-awn
*Phalaris minor**	Mediterranean canary grass
Pleuraphis rigida	galleta grass
*Schismus arabicus**	Arabian schismus

*Non-native species

EEC ORIGINAL PKG

APPENDIX G – CalEEMod GREENHOUSE GAS EMISSIONS MODEL RUN PRINTOUTS

Truckhaven Geothermal Exploration Wells - 1 Well Calculations

Imperial County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	160.00	1000sqft	3.67	160,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2021
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Annual

Project Characteristics -

Land Use - 1 Well Pad = 400 ft x 400 ft = 3.67 acres

Construction Phase - Construction Schedule Provided by Applicant

Off-road Equipment - Well Cleanup - 1 Rubber Tired Loader, 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Drilling - 1 Drill Rig 24-hours, 1 Mud Tank (Pump) 24-hours, 1 diesel generator (for lights) 12 hours, 1 Forklift 8 hours, 1 air compressor 8 hours

Off-road Equipment - Well Pad - 1 Rubber Tired Dozer, 1 Grader, and 2 Tractor/Loader/Backhoe

Off-road Equipment - Well Testing - 1 Crane 8 hours, 1 pump 24 hours, 1 Tractor/Loader/Backhoe 8 hours

Trips and VMT - 6 vendor truck trips per day added to Well Pad Construction and Well Cleanup to account for Water Trucks (already accounted for in Well Drilling)

On-road Fugitive Dust - 90% of construction trips on pavement

Grading -

Construction Off-road Equipment Mitigation - Water Exposed Area 2x per day selected to account for ICAPCD Regulation VIII minimum requirements

Off-road Equipment - Geo Survey - 4 Off-hwy trucks 8 hr/dy

Off-road Equipment - Well Pad - 1 Grader, 1 Dozer, 2 Tractors

Vehicle Trips - 2 trips per week

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	230.00	45.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Annual

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	PhaseName		Well Pad Construction
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Drilling
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Testing
tblOffRoadEquipment	PhaseName		Well Cleanup-Abandoment
tblOffRoadEquipment	PhaseName		Geophysical Survey
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	HaulingPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	VendorPercentPave	50.00	90.00

tblOnRoadDust	VendorPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
tblOnRoadDust	WorkerPercentPave	50.00	90.00
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tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	10.00	20.00
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.02

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1167	1.0852	0.8849	2.2700e-003	2.7096	0.0471	2.7566	0.2932	0.0453	0.3385	0.0000	199.2134	199.2134	0.0395	0.0000	200.2013
Maximum	**0.1167**	**1.0852**	**0.8849**	**2.2700e-003**	**2.7096**	**0.0471**	**2.7566**	**0.2932**	**0.0453**	**0.3385**	**0.0000**	**199.2134**	**199.2134**	**0.0395**	**0.0000**	**200.2013**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1167	1.0852	0.8849	2.2700e-003	2.6825	0.0471	2.7296	0.2793	0.0453	0.3246	0.0000	199.2132	199.2132	0.0395	0.0000	200.2011
Maximum	**0.1167**	**1.0852**	**0.8849**	**2.2700e-003**	**2.6825**	**0.0471**	**2.7296**	**0.2793**	**0.0453**	**0.3246**	**0.0000**	**199.2132**	**199.2132**	**0.0395**	**0.0000**	**200.2011**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	1.00	0.00	0.98	4.74	0.00	4.10	0.00	0.00	0.00	0.00	0.00	0.00

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	3-1-2020	5-31-2020	0.9934	0.9934
		Highest	0.9934	0.9934

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0138	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	2.3000e-004	1.7400e-003	2.3000e-003	1.0000e-005	0.1550	0.0000	0.1550	0.0155	0.0000	0.0155	0.0000	0.5560	0.5560	5.0000e-005	0.0000	0.5572
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0141**	**1.7500e-003**	**3.7800e-003**	**1.0000e-005**	**0.1550**	**1.0000e-005**	**0.1550**	**0.0155**	**1.0000e-005**	**0.0155**	**0.0000**	**0.5589**	**0.5589**	**6.0000e-005**	**0.0000**	**0.5603**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0138	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	2.3000e-004	1.7400e-003	2.3000e-003	1.0000e-005	0.1550	0.0000	0.1550	0.0155	0.0000	0.0155	0.0000	0.5560	0.5560	5.0000e-005	0.0000	0.5572
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0141**	**1.7500e-003**	**3.7800e-003**	**1.0000e-005**	**0.1550**	**1.0000e-005**	**0.1550**	**0.0155**	**1.0000e-005**	**0.0155**	**0.0000**	**0.5589**	**0.5589**	**6.0000e-005**	**0.0000**	**0.5603**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	C02e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 00

3.0 Construction Detail

Construction Phase

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Geophysical Survey	Trenching	2/11/2020	2/29/2020	5	14	
2	Well Pad Construction	Site Preparation	3/1/2020	3/14/2020	5	10	
3	Well Drilling	Building Construction	3/15/2020	4/28/2020	7	45	
4	Well Testing	Trenching	4/29/2020	4/30/2020	5	2	
5	Well Cleanup-Abandoment	Grading	5/1/2020	5/7/2020	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.67

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Truckhaven Geothermal Exploration Wells - 1 Well Calculations - Imperial County, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Well Pad Construction	Graders	1	8.00	187	0.41
Well Pad Construction	Rubber Tired Dozers	1	8.00	247	0.40
Well Pad Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Well Drilling	Air Compressors	1	8.00	78	0.48
Well Drilling	Bore/Drill Rigs	1	24.00	221	0.50
Well Drilling	Forklifts	1	8.00	89	0.20
Well Drilling	Generator Sets	1	12.00	84	0.74
Well Drilling	Pumps	1	24.00	84	0.74
Well Testing	Cranes	1	8.00	231	0.29
Well Testing	Pumps	1	24.00	84	0.74
Well Testing	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Well Cleanup-Abandoment	Rubber Tired Loaders	1	8.00	203	0.36
Well Cleanup-Abandoment	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Geophysical Survey	Off-Highway Trucks	4	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Well Pad Construction	4	10.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Drilling	10	67.00	26.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Testing	3	8.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Well Cleanup-Abandoment	6	8.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Geophysical Survey	4	20.00	6.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Geophysical Survey - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0186	0.1770	0.1067	3.7000e-004		6.4500e-003	6.4500e-003		5.9300e-003	5.9300e-003	0.0000	32.4785	32.4785	0.0105	0.0000	32.7411
Total	**0.0186**	**0.1770**	**0.1067**	**3.7000e-004**		**6.4500e-003**	**6.4500e-003**		**5.9300e-003**	**5.9300e-003**	**0.0000**	**32.4785**	**32.4785**	**0.0105**	**0.0000**	**32.7411**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9000e-004	4.8900e-003	1.3800e-003	1.0000e-005	0.0535	3.0000e-005	0.0536	5.4000e-003	3.0000e-005	5.4300e-003	0.0000	1.2763	1.2763	7.0000e-005	0.0000	1.2781
Worker	8.1000e-004	6.2000e-004	5.7900e-003	1.0000e-005	0.1462	1.0000e-005	0.1462	0.0147	0.0000	0.0147	0.0000	0.6511	0.6511	5.0000e-005	0.0000	0.6524
Total	**1.0000e-003**	**5.5100e-003**	**7.1700e-003**	**2.0000e-005**	**0.1997**	**4.0000e-005**	**0.1997**	**0.0201**	**3.0000e-005**	**0.0201**	**0.0000**	**1.9274**	**1.9274**	**1.2000e-004**	**0.0000**	**1.9304**

3.2 Geophysical Survey - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0186	0.1770	0.1067	3.7000e-004		6.4500e-003	6.4500e-003		5.9300e-003	5.9300e-003	0.0000	32.4785	32.4785	0.0105	0.0000	32.7411
Total	**0.0186**	**0.1770**	**0.1067**	**3.7000e-004**		**6.4500e-003**	**6.4500e-003**		**5.9300e-003**	**5.9300e-003**	**0.0000**	**32.4785**	**32.4785**	**0.0105**	**0.0000**	**32.7411**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9000e-004	4.8900e-003	1.3800e-003	1.0000e-005	0.0535	3.0000e-005	0.0536	5.4000e-003	3.0000e-005	5.4300e-003	0.0000	1.2763	1.2763	7.0000e-005	0.0000	1.2781
Worker	8.1000e-004	6.2000e-004	5.7900e-003	1.0000e-005	0.1462	1.0000e-005	0.1462	0.0147	0.0000	0.0147	0.0000	0.6511	0.6511	5.0000e-005	0.0000	0.6524
Total	**1.0000e-003**	**5.5100e-003**	**7.1700e-003**	**2.0000e-005**	**0.1997**	**4.0000e-005**	**0.1997**	**0.0201**	**3.0000e-005**	**0.0201**	**0.0000**	**1.9274**	**1.9274**	**1.2000e-004**	**0.0000**	**1.9304**

3.3 Well Pad Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0328	0.0000	0.0328	0.0168	0.0000	0.0168	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.8700e-003	0.1093	0.0525	1.1000e-004		5.1200e-003	5.1200e-003		4.7100e-003	4.7100e-003	0.0000	9.3966	9.3966	3.0400e-003	0.0000	9.4726
Total	**9.8700e-003**	**0.1093**	**0.0525**	**1.1000e-004**	**0.0328**	**5.1200e-003**	**0.0379**	**0.0168**	**4.7100e-003**	**0.0216**	**0.0000**	**9.3966**	**9.3966**	**3.0400e-003**	**0.0000**	**9.4726**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3000e-004	3.4900e-003	9.9000e-004	1.0000e-005	0.0382	2.0000e-005	0.0383	3.8600e-003	2.0000e-005	3.8800e-003	0.0000	0.9116	0.9116	5.0000e-005	0.0000	0.9129
Worker	2.9000e-004	2.2000e-004	2.0700e-003	0.0000	0.0522	0.0000	0.0522	5.2500e-003	0.0000	5.2500e-003	0.0000	0.2325	0.2325	2.0000e-005	0.0000	0.2330
Total	**4.2000e-004**	**3.7100e-003**	**3.0600e-003**	**1.0000e-005**	**0.0904**	**2.0000e-005**	**0.0905**	**9.1100e-003**	**2.0000e-005**	**9.1300e-003**	**0.0000**	**1.1442**	**1.1442**	**7.0000e-005**	**0.0000**	**1.1459**

3.3 Well Pad Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0147	0.0000	0.0147	7.5800e-003	0.0000	7.5800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.8700e-003	0.1093	0.0525	1.1000e-004		5.1200e-003	5.1200e-003		4.7100e-003	4.7100e-003	0.0000	9.3966	9.3966	3.0400e-003	0.0000	9.4726
Total	**9.8700e-003**	**0.1093**	**0.0525**	**1.1000e-004**	**0.0147**	**5.1200e-003**	**0.0199**	**7.5800e-003**	**4.7100e-003**	**0.0123**	**0.0000**	**9.3966**	**9.3966**	**3.0400e-003**	**0.0000**	**9.4726**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3000e-004	3.4900e-003	9.9000e-004	1.0000e-005	0.0382	2.0000e-005	0.0383	3.8600e-003	2.0000e-005	3.8800e-003	0.0000	0.9116	0.9116	5.0000e-005	0.0000	0.9129
Worker	2.9000e-004	2.2000e-004	2.0700e-003	0.0000	0.0522	0.0000	0.0522	5.2500e-003	0.0000	5.2500e-003	0.0000	0.2325	0.2325	2.0000e-005	0.0000	0.2330
Total	**4.2000e-004**	**3.7100e-003**	**3.0600e-003**	**1.0000e-005**	**0.0904**	**2.0000e-005**	**0.0905**	**9.1100e-003**	**2.0000e-005**	**9.1300e-003**	**0.0000**	**1.1442**	**1.1442**	**7.0000e-005**	**0.0000**	**1.1459**

3.4 Well Drilling - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0713	0.6731	0.6010	1.4200e-003		0.0330	0.0330		0.0322	0.0322	0.0000	123.6206	123.6206	0.0230	0.0000	124.1942
Total	**0.0713**	**0.6731**	**0.6010**	**1.4200e-003**		**0.0330**	**0.0330**		**0.0322**	**0.0322**	**0.0000**	**123.6206**	**123.6206**	**0.0230**	**0.0000**	**124.1942**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6100e-003	0.0681	0.0193	1.9000e-004	0.7455	4.1000e-004	0.7459	0.0753	3.9000e-004	0.0756	0.0000	17.7769	17.7769	9.8000e-004	0.0000	17.8014
Worker	8.7500e-003	6.7000e-003	0.0623	8.0000e-005	1.5739	6.0000e-005	1.5740	0.1583	5.0000e-005	0.1584	0.0000	7.0105	7.0105	5.7000e-004	0.0000	7.0247
Total	**0.0114**	**0.0748**	**0.0816**	**2.7000e-004**	**2.3194**	**4.7000e-004**	**2.3199**	**0.2336**	**4.4000e-004**	**0.2340**	**0.0000**	**24.7873**	**24.7873**	**1.5500e-003**	**0.0000**	**24.8262**

3.4 Well Drilling - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0713	0.6731	0.6010	1.4200e-003		0.0330	0.0330		0.0322	0.0322	0.0000	123.6204	123.6204	0.0230	0.0000	124.1941
Total	**0.0713**	**0.6731**	**0.6010**	**1.4200e-003**		**0.0330**	**0.0330**		**0.0322**	**0.0322**	**0.0000**	**123.6204**	**123.6204**	**0.0230**	**0.0000**	**124.1941**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6100e-003	0.0681	0.0193	1.9000e-004	0.7455	4.1000e-004	0.7459	0.0753	3.9000e-004	0.0756	0.0000	17.7769	17.7769	9.8000e-004	0.0000	17.8014
Worker	8.7500e-003	6.7000e-003	0.0623	8.0000e-005	1.5739	6.0000e-005	1.5740	0.1583	5.0000e-005	0.1584	0.0000	7.0105	7.0105	5.7000e-004	0.0000	7.0247
Total	**0.0114**	**0.0748**	**0.0816**	**2.7000e-004**	**2.3194**	**4.7000e-004**	**2.3199**	**0.2336**	**4.4000e-004**	**0.2340**	**0.0000**	**24.7873**	**24.7873**	**1.5500e-003**	**0.0000**	**24.8262**

3.5 Well Testing - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.9300e-003	0.0181	0.0157	3.0000e-005		9.8000e-004	9.8000e-004		9.5000e-004	9.5000e-004	0.0000	2.4754	2.4754	3.5000e-004	0.0000	2.4842
Total	**1.9300e-003**	**0.0181**	**0.0157**	**3.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.5000e-004**	**9.5000e-004**	**0.0000**	**2.4754**	**2.4754**	**3.5000e-004**	**0.0000**	**2.4842**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.3000e-004	7.0000e-005	0.0000	2.5500e-003	0.0000	2.5500e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0608	0.0608	0.0000	0.0000	0.0609
Worker	5.0000e-005	4.0000e-005	3.3000e-004	0.0000	8.3500e-003	0.0000	8.3500e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0372	0.0372	0.0000	0.0000	0.0373
Total	**6.0000e-005**	**2.7000e-004**	**4.0000e-004**	**0.0000**	**0.0109**	**0.0000**	**0.0109**	**1.1000e-003**	**0.0000**	**1.1000e-003**	**0.0000**	**0.0980**	**0.0980**	**0.0000**	**0.0000**	**0.0981**

3.5 Well Testing - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.9300e-003	0.0181	0.0157	3.0000e-005		9.8000e-004	9.8000e-004		9.5000e-004	9.5000e-004	0.0000	2.4754	2.4754	3.5000e-004	0.0000	2.4842
Total	**1.9300e-003**	**0.0181**	**0.0157**	**3.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.5000e-004**	**9.5000e-004**	**0.0000**	**2.4754**	**2.4754**	**3.5000e-004**	**0.0000**	**2.4842**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	2.3000e-004	7.0000e-005	0.0000	2.5500e-003	0.0000	2.5500e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0608	0.0608	0.0000	0.0000	0.0609
Worker	5.0000e-005	4.0000e-005	3.3000e-004	0.0000	8.3500e-003	0.0000	8.3500e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0372	0.0372	0.0000	0.0000	0.0373
Total	**6.0000e-005**	**2.7000e-004**	**4.0000e-004**	**0.0000**	**0.0109**	**0.0000**	**0.0109**	**1.1000e-003**	**0.0000**	**1.1000e-003**	**0.0000**	**0.0980**	**0.0980**	**0.0000**	**0.0000**	**0.0981**

3.6 Well Cleanup-Abandoment - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0164	0.0000	0.0164	8.4200e-003	0.0000	8.4200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9800e-003	0.0216	0.0155	3.0000e-005		1.0300e-003	1.0300e-003		9.5000e-004	9.5000e-004	0.0000	2.7367	2.7367	8.9000e-004	0.0000	2.7589
Total	**1.9800e-003**	**0.0216**	**0.0155**	**3.0000e-005**	**0.0164**	**1.0300e-003**	**0.0174**	**8.4200e-003**	**9.5000e-004**	**9.3700e-003**	**0.0000**	**2.7367**	**2.7367**	**8.9000e-004**	**0.0000**	**2.7589**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-005	1.7500e-003	4.9000e-004	0.0000	0.0191	1.0000e-005	0.0191	1.9300e-003	1.0000e-005	1.9400e-003	0.0000	0.4558	0.4558	3.0000e-005	0.0000	0.4565
Worker	1.2000e-004	9.0000e-005	8.3000e-004	0.0000	0.0209	0.0000	0.0209	2.1000e-003	0.0000	2.1000e-003	0.0000	0.0930	0.0930	1.0000e-005	0.0000	0.0932
Total	**1.9000e-004**	**1.8400e-003**	**1.3200e-003**	**0.0000**	**0.0400**	**1.0000e-005**	**0.0400**	**4.0300e-003**	**1.0000e-005**	**4.0400e-003**	**0.0000**	**0.5488**	**0.5488**	**4.0000e-005**	**0.0000**	**0.5497**

3.6 Well Cleanup-Abandoment - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.3700e-003	0.0000	7.3700e-003	3.7900e-003	0.0000	3.7900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9800e-003	0.0216	0.0155	3.0000e-005		1.0300e-003	1.0300e-003		9.5000e-004	9.5000e-004	0.0000	2.7367	2.7367	8.9000e-004	0.0000	2.7589
Total	**1.9800e-003**	**0.0216**	**0.0155**	**3.0000e-005**	**7.3700e-003**	**1.0300e-003**	**8.4000e-003**	**3.7900e-003**	**9.5000e-004**	**4.7400e-003**	**0.0000**	**2.7367**	**2.7367**	**8.9000e-004**	**0.0000**	**2.7589**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.0000e-005	1.7500e-003	4.9000e-004	0.0000	0.0191	1.0000e-005	0.0191	1.9300e-003	1.0000e-005	1.9400e-003	0.0000	0.4558	0.4558	3.0000e-005	0.0000	0.4565
Worker	1.2000e-004	9.0000e-005	8.3000e-004	0.0000	0.0209	0.0000	0.0209	2.1000e-003	0.0000	2.1000e-003	0.0000	0.0930	0.0930	1.0000e-005	0.0000	0.0932
Total	**1.9000e-004**	**1.8400e-003**	**1.3200e-003**	**0.0000**	**0.0400**	**1.0000e-005**	**0.0400**	**4.0300e-003**	**1.0000e-005**	**4.0400e-003**	**0.0000**	**0.5488**	**0.5488**	**4.0000e-005**	**0.0000**	**0.5497**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.3000e-004	1.7400e-003	2.3000e-003	1.0000e-005	0.1550	0.0000	0.1550	0.0155	0.0000	0.0155	0.0000	0.5560	0.5560	5.0000e-005	0.0000	0.5572
Unmitigated	2.3000e-004	1.7400e-003	2.3000e-003	1.0000e-005	0.1550	0.0000	0.1550	0.0155	0.0000	0.0155	0.0000	0.5560	0.5560	5.0000e-005	0.0000	0.5572

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	3.20	0.00	832	832
Total	0.00	3.20	0.00	832	832

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	6.70	5.00	8.90	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.509486	0.032430	0.160670	0.124446	0.017653	0.005129	0.019157	0.119824	0.003361	0.001189	0.005223	0.000739	0.000694

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0138	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003
Unmitigated	0.0138	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.3400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0103					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4000e-004	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003
Total	**0.0138**	**1.0000e-005**	**1.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.8600e-003**	**2.8600e-003**	**1.0000e-005**	**0.0000**	**3.0500e-003**

6.2 Area by SubCategory

Mitigated

SubCategory	ROG	NCx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Architectural Coating	3.3400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0103					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4000e-004	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8600e-003	2.8600e-003	1.0000e-005	0.0000	3.0500e-003
Total	**0.0138**	**1.0000e-005**	**1.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.8600e-003**	**2.8600e-003**	**1.0000e-005**	**0.0000**	**3.0500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EEC ORIGINAL PKG

APPENDIX H – NOISE CALCULATION MODEL RUN PRINTOUTS

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Pad & Access Rd

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 32-5	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		1800	0
Dozer	No	40		81.7	1800	0
Tractor	No	40	84		1800	0

	Calculated (dBA)		Results	Noise Limits (dBA)		
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	53.2	46.2	N/A	N/A	N/A	N/A
Dozer	49.8	46.8	N/A	N/A	N/A	N/A
Tractor	49.5	46.5	N/A	N/A	N/A	N/A
Total	**53**	**53**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-5	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment **Spec** Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		2320	0
Dozer	No	40		81.7	2320	0
Tractor	No	40.0	84		2320	0

	Calculated (dBA)		Results	Noise Limits (dBA)		
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	52	48	N/A	N/A	N/A	N/A
Dozer	48	44	N/A	N/A	N/A	N/A
Tractor	51	47	N/A	N/A	N/A	N/A
Total	**52**	**51**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Pad & Access Rd

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 18-32	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		2110	0
Dozer	No	40.0		81.7	2110	0
Tractor	No	40.0	84		2110	0

	Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	52.5	48.5	N/A	N/A	N/A	N/A
Dozer	49.2	45.2	N/A	N/A	N/A	N/A
Tractor	51.5	47.5	N/A	N/A	N/A	N/A
Total	**53**	**52**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-32	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		1060	0
Dozer	No	40		81.7	1060	0
Tractor	No	40	84		1060	0

	Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	58.5	54.5	N/A	N/A	N/A	N/A
Dozer	55.1	51.2	N/A	N/A	N/A	N/A
Tractor	57.5	53.5	N/A	N/A	N/A	N/A
Total	**59**	**58**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Pad & Access Rd

---- Receptor #5 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 14-4	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		1480	0
Dozer	No	40		81.7	1480	0
Tractor	No	40	84		1480	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		55.6	51.6	N/A	N/A	N/A	N/A
Dozer		52.2	48.3	N/A	N/A	N/A	N/A
Tractor		54.6	50.6	N/A	N/A	N/A	N/A
	Total	**56**	**55**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 17-4	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		3060	0
Dozer	No	40		81.7	3060	0
Tractor	No	40	84		3060	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		49.3	45.3	N/A	N/A	N/A	N/A
Dozer		45.9	42.0	N/A	N/A	N/A	N/A
Tractor		48.3	44.3	N/A	N/A	N/A	N/A
	Total	**49**	**49**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 32-5	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1800	0
Pumps	No	50		80.9	1800	0
Generator	No	50		80.6	1800	0
Gradall	No	40		83.4	1800	0
Compressor (air)	No	40		77.7	1800	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		53.2	46.2	N/A	N/A	N/A	N/A
Pumps		49.8	46.8	N/A	N/A	N/A	N/A
Generator		49.5	46.5	N/A	N/A	N/A	N/A
Gradall		52.3	48.3	N/A	N/A	N/A	N/A
Compressor (air)		46.5	42.6	N/A	N/A	N/A	N/A
	Total	**53**	**53**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)			---- Receptor #2 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 47-5	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20.0		84.4	2320	0
Pumps	No	50		80.9	2320	0
Generator	No	50		80.6	2320	0
Gradall	No	40		83.4	2320	0
Compressor (air)	No	40		77.7	2320	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		51.0	44.0	N/A	N/A	N/A	N/A
Pumps		47.6	44.6	N/A	N/A	N/A	N/A
Generator		47.3	44.3	N/A	N/A	N/A	N/A
Gradall		50.1	46.1	N/A	N/A	N/A	N/A
Compressor (air)		44.3	40.4	N/A	N/A	N/A	N/A
	Total	**51**	**51**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)		---- Receptor #3 ----
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 18-32	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax **(dBA)**	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	2110	0
Pumps	No	50		80.9	2110	0
Generator	No	50		80.6	2110	0
Gradall	No	40		83.4	2110	0
Compressor (air)	No	40		77.7	2110	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		51.9	44.9	N/A	N/A	N/A	N/A
Pumps		48.4	45.4	N/A	N/A	N/A	N/A
Generator		48.1	45.1	N/A	N/A	N/A	N/A
Gradall		50.9	46.9	N/A	N/A	N/A	N/A
Compressor (air)		45.2	41.2	N/A	N/A	N/A	N/A
	Total	**52**	**52**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)		---- Receptor #4 ----
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 47-32	Residential	55	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1060	0
Pumps	No	50.0		80.9	1060	0
Generator	No	50		80.6	1060	0
Gradall	No	40		83.4	1060	0
Compressor (air)	No	40		77.7	1060	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		57.8	50.8	N/A	N/A	N/A	N/A
Pumps		54.4	51.4	N/A	N/A	N/A	N/A
Generator		54.1	51.1	N/A	N/A	N/A	N/A
Gradall		56.9	52.9	N/A	N/A	N/A	N/A
Compressor (air)		51.1	47.2	N/A	N/A	N/A	N/A
	Total	**58**	**58**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)			---- Receptor #5 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 14-4	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1480	0
Pumps	No	50		80.9	1480	0
Generator	No	50		80.6	1480	0
Gradall	No	40		83.4	1480	0
Compressor (air)	No	40		77.7	1480	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		54.9	47.9	N/A	N/A	N/A	N/A
Pumps		51.5	48.5	N/A	N/A	N/A	N/A
Generator		51.2	48.2	N/A	N/A	N/A	N/A
Gradall		54.0	50.0	N/A	N/A	N/A	N/A
Compressor (air)		48.2	44.3	N/A	N/A	N/A	N/A
	Total	**55**	**55**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling

		Baselines (dBA)			---- Receptor #6 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 17-4	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	3060	0
Pumps	No	50		80.9	3060	0
Generator	No	50		80.6	3060	0
Gradall	No	40		83.4	3060	0
Compressor (air)	No	40		77.7	3060	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		48.6	41.6	N/A	N/A	N/A	N/A
Pumps		45.2	42.2	N/A	N/A	N/A	N/A
Generator		44.9	41.9	N/A	N/A	N/A	N/A
Gradall		47.7	43.7	N/A	N/A	N/A	N/A
Compressor (air)		41.9	38.0	N/A	N/A	N/A	N/A
	Total	**49**	**49**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 32-5	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1800	15
Pumps	No	50		80.9	1800	15
Generator	No	50		80.6	1800	15
Gradall	No	40		83.4	1800	15
Compressor (air)	No	40		77.7	1800	15

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		38.2	31.2	N/A	N/A	N/A	N/A
Pumps		34.8	31.8	N/A	N/A	N/A	N/A
Generator		34.5	31.5	N/A	N/A	N/A	N/A
Gradall		37.3	33.3	N/A	N/A	N/A	N/A
Compressor (air)		31.5	27.6	N/A	N/A	N/A	N/A
	Total	**38**	**38**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

				---- Receptor #2 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 47-5	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20.0		84.4	2320	15
Pumps	No	50		80.9	2320	15
Generator	No	50		80.6	2320	15
Gradall	No	40		83.4	2320	15
Compressor (air)	No	40		77.7	2320	15

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		36.0	29.0	N/A	N/A	N/A	N/A
Pumps		32.6	29.6	N/A	N/A	N/A	N/A
Generator		32.3	29.3	N/A	N/A	N/A	N/A
Gradall		35.1	31.1	N/A	N/A	N/A	N/A
Compressor (air)		29.3	25.4	N/A	N/A	N/A	N/A
	Total	**36**	**36**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

				---- Receptor #3 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 18-32	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax **(dBA)**	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	2110	15
Pumps	No	50		80.9	2110	15
Generator	No	50		80.6	2110	15
Gradall	No	40		83.4	2110	15
Compressor (air)	No	40		77.7	2110	15

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		36.9	29.9	N/A	N/A	N/A	N/A
Pumps		33.4	30.4	N/A	N/A	N/A	N/A
Generator		33.1	30.1	N/A	N/A	N/A	N/A
Gradall		35.9	31.9	N/A	N/A	N/A	N/A
Compressor (air)		30.2	26.2	N/A	N/A	N/A	N/A
	Total	**37**	**37**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

				---- Receptor #4 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 47-32	Residential	55	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1060	15
Pumps	No	50.0		80.9	1060	15
Generator	No	50		80.6	1060	15
Gradall	No	40		83.4	1060	15
Compressor (air)	No	40		77.7	1060	15

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		42.8	35.8	N/A	N/A	N/A	N/A
Pumps		39.4	36.4	N/A	N/A	N/A	N/A
Generator		39.1	36.1	N/A	N/A	N/A	N/A
Gradall		41.9	37.9	N/A	N/A	N/A	N/A
Compressor (air)		36.1	32.2	N/A	N/A	N/A	N/A
	Total	**43**	**43**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

		Baselines (dBA)			---- Receptor #5 ----
Description	Land Use	Daytime	Evening	Night	
Nearest Home to Well 14-4	Residential	55	45	45	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	1480	15
Pumps	No	50		80.9	1480	15
Generator	No	50		80.6	1480	15
Gradall	No	40		83.4	1480	15
Compressor (air)	No	40		77.7	1480	15

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		39.9	32.9	N/A	N/A	N/A	N/A
Pumps		36.5	33.5	N/A	N/A	N/A	N/A
Generator		36.2	33.2	N/A	N/A	N/A	N/A
Gradall		39.0	35.0	N/A	N/A	N/A	N/A
Compressor (air)		33.2	29.3	N/A	N/A	N/A	N/A
	Total	**40**	**40**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Drilling Mitigated

				---- Receptor #6 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 17-4	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	3060	15
Pumps	No	50		80.9	3060	15
Generator	No	50		80.6	3060	15
Gradall	No	40		83.4	3060	15
Compressor (air)	No	40		77.7	3060	15

				Results			
		Calculated (dBA)			Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig		33.6	26.6	N/A	N/A	N/A	N/A
Pumps		30.2	27.2	N/A	N/A	N/A	N/A
Generator		29.9	26.9	N/A	N/A	N/A	N/A
Gradall		32.7	28.7	N/A	N/A	N/A	N/A
Compressor (air)		26.9	23.0	N/A	N/A	N/A	N/A
	Total	**34**	**34**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Testing

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 32-5	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	1800	0
Pumps	No	50		80.9	1800	0
Tractor	No	40	84		1800	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		49.4	41.5	N/A	N/A	N/A	N/A
Pumps		49.8	46.8	N/A	N/A	N/A	N/A
Tractor		52.9	48.9	N/A	N/A	N/A	N/A
	Total	**53**	**51**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-5	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	2320	0
Pumps	No	50.0		80.9	2320	0
Tractor	No	40	84		2320	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		51.7	47.7	N/A	N/A	N/A	N/A
Pumps		48.3	44.4	N/A	N/A	N/A	N/A
Tractor		50.7	46.7	N/A	N/A	N/A	N/A
	Total	**52**	**51**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Testing

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 18-32	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16.0		80.6	2110	0
Pumps	No	50.0		80.9	2110	0
Tractor	No	40.0	84		2110	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Crane	52.5	48.5	N/A	N/A	N/A	N/A
Pumps	49.2	45.2	N/A	N/A	N/A	N/A
Tractor	51.5	47.5	N/A	N/A	N/A	N/A
Total	**53**	**52**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-32	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	1060	0
Pumps	No	50		80.9	1060	0
Tractor	No	40	84		1060	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Crane	54.0	46.1	N/A	N/A	N/A	N/A
Pumps	54.4	51.4	N/A	N/A	N/A	N/A
Tractor	57.5	53.5	N/A	N/A	N/A	N/A
Total	**58**	**56**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Testing

---- Receptor #5 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 14-4	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16.0		80.6	1480	0
Pumps	No	**50**		80.9	1480	0
Tractor	No	40	84		1480	0

		Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		55.6	51.6	N/A	N/A	N/A	N/A
Pumps		52.2	48.3	N/A	N/A	N/A	N/A
Tractor		54.6	50.6	N/A	N/A	N/A	N/A
	Total	**56**	**55**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 17-4	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	3060	0
Pumps	No	50		80.9	3060	0
Tractor	No	40	84		3060	0

		Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		49.3	45.3	N/A	N/A	N/A	N/A
Pumps		45.9	42.0	N/A	N/A	N/A	N/A
Tractor		48.3	44.3	N/A	N/A	N/A	N/A
	Total	**49**	**49**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Cleanup

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 32-5	Residential	55	45	45.0

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	1800	0
Tractor	No	40	84		1800	0
Tractor	No	40	84		1800	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Front End Loader	48.0	44.0	N/A	N/A	N/A	N/A
Tractor	52.9	48.9	N/A	N/A	N/A	N/A
Tractor	52.9	48.9	N/A	N/A	N/A	N/A
Total	**53**	**53**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-5	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40.0		79.1	2320	0
Tractor	No	40	84		2320	0
Tractor	No	40	84		2320	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Front End Loader	51.7	47.7	N/A	N/A	N/A	N/A
Tractor	48.3	44.4	N/A	N/A	N/A	N/A
Tractor	50.7	46.7	N/A	N/A	N/A	N/A
Total	**52**	**51**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Cleanup

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 18-32	Residential	55.0	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40.0		79.1	2110	0
Tractor	No	40.0	84		2110	0
Tractor	No	40.0	84		2110	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	52.5	48.5	N/A	N/A	N/A	N/A
Tractor	49.2	45.2	N/A	N/A	N/A	N/A
Tractor	51.5	47.5	N/A	N/A	N/A	N/A
Total	**53**	**52**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home to Well 47-32	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40.0		79.1	1060	0
Tractor	No	40.0	84		1060	0
Tractor	No	40.0	84		1060	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	54.0	46.1	N/A	N/A	N/A	N/A
Tractor	54.4	51.4	N/A	N/A	N/A	N/A
Tractor	57.5	53.5	N/A	N/A	N/A	N/A
Total	**58**	**56**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2019
Case Description: Truckhaven Geothermal Exploration Wells - Well Cleanup

---- Receptor #5 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 14-4	Residential	55	45.0	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	1480	0
Tractor	No	40	84		1480	0
Tractor	No	40	84		1480	0

	Calculated (dBA)		Results Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	55.6	51.6	N/A	N/A	N/A	N/A
Tractor	52.2	48.3	N/A	N/A	N/A	N/A
Tractor	54.6	50.6	N/A	N/A	N/A	N/A
Total	**56**	**55**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home to Well 17-4	Residential	55	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	3060	0
Tractor	No	40	84		3060	0
Tractor	No	40	84		3060	0

	Calculated (dBA)		Results Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	49.3	45.3	N/A	N/A	N/A	N/A
Tractor	45.9	42.0	N/A	N/A	N/A	N/A
Tractor	48.3	44.3	N/A	N/A	N/A	N/A
Total	**49**	**49**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.