Appendix F

Paleontological Resources Technical Studies

Paleontological Resources Survey for Recurrent Energy's Cinco Generator Intertie Project, Kern County, California

Paleontological Resources Use Permit #CA-12-00-005P

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EXECUTIVE SUMMARY

At the request of Recurrent Energy (RE), on behalf of the Bureau of Land Management (BLM) California Desert District Office (CDD), Applied EarthWorks, Inc. (Æ) was retained to conduct a paleontological field survey for the RE Cinco Generator Intertie (Gen-tie) Project (Project) located in Kern County, California. The field survey was conducted in order to visually inspect the ground surface in areas of proposed disturbance for exposed fossils and to evaluate geologic exposures for their potential to contain preserved fossil material at the subsurface. Prior to fieldwork, Æ performed a comprehensive review of published and unpublished literature and museum collections. Using the results of a museum records search and literature review, Æ assessed the geologic units within the Project area and made recommendations regarding their Potential Fossil Yield Classification (PFYC) in accordance with BLM guidelines (2008). As a result of the study, the geologic units underlying the Project area were determined to have a very low (PFYC Class 1) to moderate (PFYC Class 3) ranking. A field survey was recommended for the geologic units identified as moderately sensitive (PFYC Class 3) (Clifford and DeBusk 2014).

No surface fossils were discovered in the Project area during the course of fieldwork; however, at least five scientifically significant vertebrate fossil localities have been recorded nearby from within Pleistocene alluvial deposits. Therefore, the likelihood of impacting *buried* vertebrate fossils as a result of Project development within areas underlain by geologic deposits ranked as PFYC Class 3 is low to moderate. A qualified and permitted paleontologist should be retained on an on-call basis in the event that paleontological resources are encountered during the course of Project construction. In addition, all construction workers and other on-site personnel should receive environmental awareness training on paleontological resources.

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1
INTRODUCTION

At the request of Recurrent Energy (RE), on behalf of the Bureau of Land Management (BLM) and the California Desert District Office (CDD), Applied EarthWorks, Inc. (Æ) was retained to conduct a paleontological field survey for the RE Cinco Generator Intertie (Gen-tie) Project (Project), Kern County, California (Figure 1-1).

1.1 PROJECT LOCATION AND DESCRIPTION

RE Barren Ridge Solar 1 LLC, a subsidiary of Recurrent Energy LLC, proposes to construct and operate the RE Cinco Gen-tie Project, an electrical gen-tie line. The Project footprint includes federally owned land within the BLM's California Desert Conservation Area (CDCA) planning area, as well as privately held lands. The Project area is mapped within portions of Township 31 South, Range 36 East, Sections 13 and 24-25; Township 31 South, Range 36.5 East, Sections 13 and 24-25; and Township 31 South, Range 37 East, Sections 18-19 and 30 on the Mojave NE, CA 7.5' U.S. Geological Survey quadrangle (Figure 1-2). The Project area is located in the Mojave Desert within unincorporated Kern County approximately 12 miles northeast of the community of Mojave.

The Project involves construction of a gen-tie line that will connect a planned 60-megawatt solar photovoltaic power generating facility to the Los Angeles Department of Water and Power's (LADWP) Barren Ridge Switching Station. The proposed gen-tie route consists of three alternative alignments. The preferred alignment would be 1.9 miles long with a 150-ft Right-of-Way (ROW), encompassing 36.3 acres (ac) east of State Route (SR) 14. Under the preferred alignment, 1.9 ac would be permanently impacted (1.2 ac on BLM lands and 0.7 ac on private) and 9.8 ac would be temporarily disturbed (6.3 ac on public and 3.5 ac on private lands).

According to the Plan of Development (Recurrent Energy 2014), ground-disturbing activities associated with this Project include the following:

- Tubular steel monopoles (poles), 70 to 75 feet (ft) in length, and lattice towers measuring 130 ft, would be installed along each of the alternative alignments. Depth of excavation for the poles will be 15 to 20 ft below ground surface and 3 ft in width. Pole excavation will be accomplished using a truck-mounted drill rig. Each pole would have a buffer zone of 60 ft wherein vegetation would be cleared and the ground would be temporarily disturbed by equipment staging and other activities associated with pole excavation and installation;

- An adjacent service road, 12 ft wide, will be constructed within the ROW on BLM managed public lands. The roadway would be constructed with bulldozers and graders, and compactors. Excavation to a depth of 1-2 ft is expected; and

than 11 years of professional experience and holds statewide BLM paleontological use permits in California and Nevada. Staff Paleontologist Heather Clifford was the primary author of the geology and paleontology sections of this report. Staff Paleontologist and BLM-permitted Field Agent Stephanie Lukowski led the field survey and Elizabeth Cisneros, Field Technician, assisted with the fieldwork. Geographic Information Systems (GIS) Specialist Michael Mirro produced all graphics.

1.4 REPORT ORGANIZATION

This report documents the results of Æ's paleontological survey of the Project area. Chapters 1 and 2 have provided the executive summary, introduced the scope of work, identified the Project location, described the Project, defined the purpose of the investigation, and identified key personnel. Chapter 3 outlines the regulatory framework governing the Project and Chapter 4 defines the paleontological significance and sensitivity criteria used for this study. Chapter 5 provides an overview of the geology and paleontology of the Project area and Chapter 6 presents the methods. Chapter 7 presents the results of the museum records search and field survey and Chapter 8 provides findings and recommendations. Conclusions are provided in Chapter 9 and lastly, Chapter 10 lists references cited.

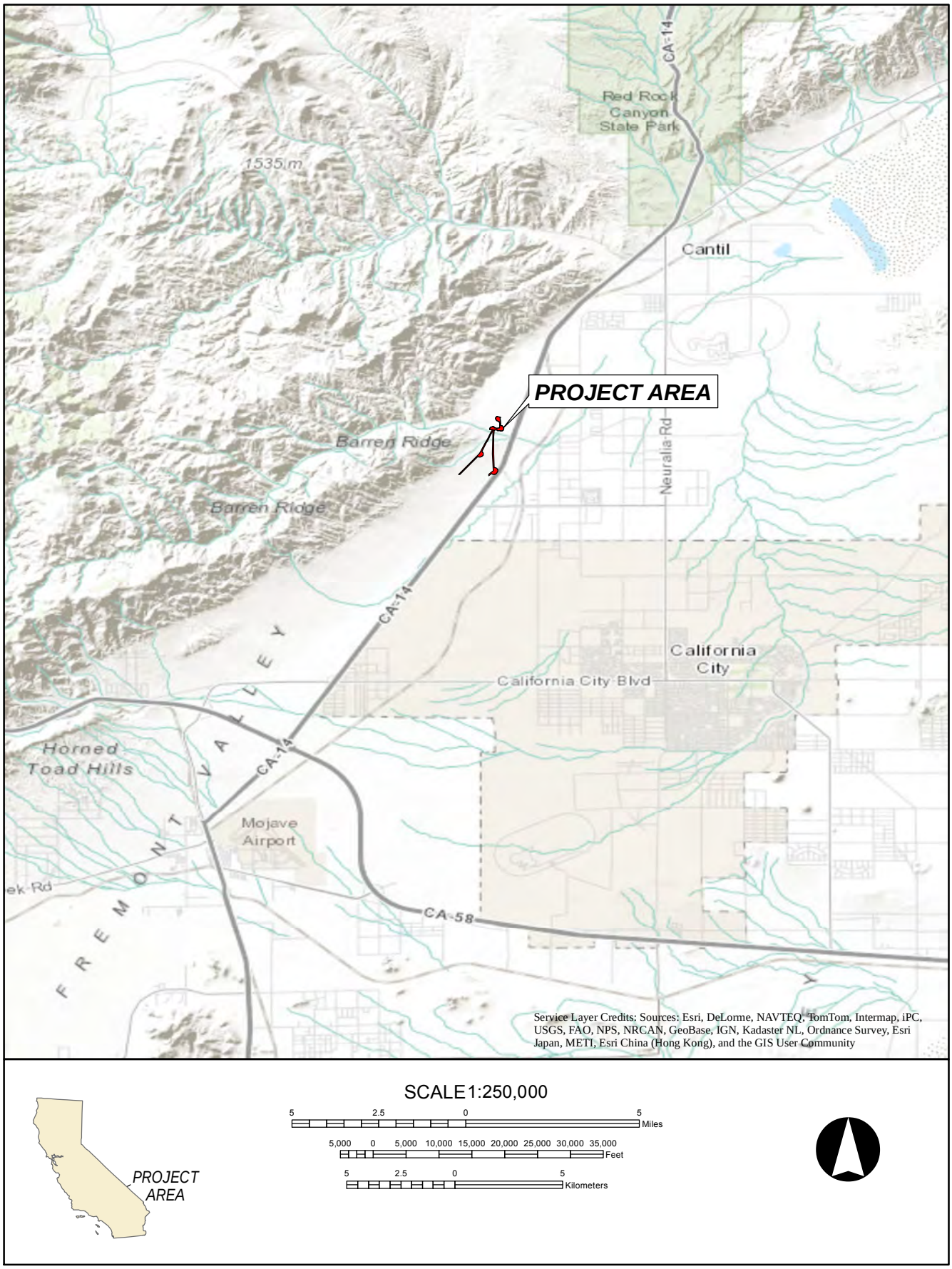

Figure 1-1 Project vicinity map.

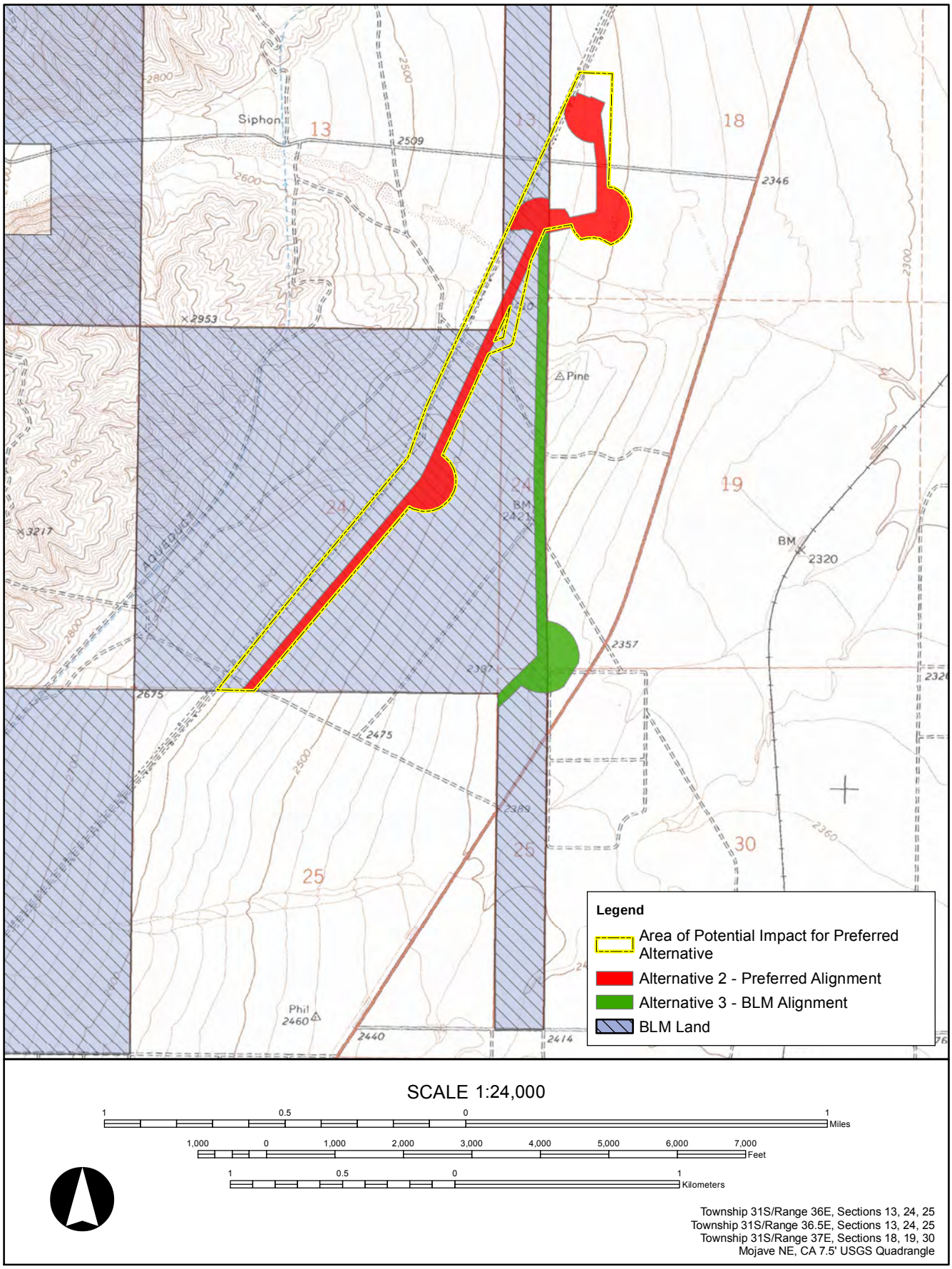

Figure 1-2 Project location map.

2
REGULATORY ENVIRONMENT

2.1 FEDERAL LAWS REGULATIONS AND GUIDELINES

Paleontological resources (i.e., fossils) are considered nonrenewable scientific resources because once destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal laws and regulations including the Antiquities Act of 1906, NEPA, the Federal Land Policy and Management Act of 1976, and Title 43 of the Code of Federal Regulations, among others. Additionally, the PRPA was recently enacted as a result of the passage of the Omnibus Public Lands Management Act of 2009. The PRPA requires federal land management agencies to manage and protect paleontological resources and affirms the authority of existing policies already in place.

Federal laws and regulations apply only when projects, such as this one, are located on federal lands or federally managed lands, or when they are federally funded. Portions of the Project area are on privately-owned land subject to state and local regulations; however, the BLM is the Lead Agency for this Project and federal laws will apply. The BLM has set forth guidelines for the management of paleontological resources in BLM Instruction Memorandum (IM) No. 2009-011 (2008), Handbook (H) 8270 (BLM 1998a), and H-8270-1 (BLM 1998b). This paleontological assessment complies with these guidelines as well as professional standards set forth by the SVP (SVP 2010).

2.2 STATE

Paleontological resources cannot be replaced once they are destroyed. Therefore, paleontological resources are considered nonrenewable scientific resources and are protected under the California Environmental Quality Act (CEQA). Specifically, in Section V(c) of Appendix G of the CEQA Guidelines, the "Environmental Checklist Form," the question is posed: "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" In order to determine the uniqueness of a given paleontological resource, it must first be identified or recovered (i.e., salvaged). Therefore, mitigation of adverse impacts to paleontological resources is mandated by CEQA.

2.3 LOCAL

The 2009 Kern County General Plan addresses paleontological resources in its Land Use, Open Space, and Conservation Element, Section 1.10.3. Policy 25 states, "The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors." In order to fulfill this goal, the County has set forth the following implementation strategies, pursuant to CEQA:

> **Implementation** Measure **M.** In areas of known paleontological resources, the County should address the preservation of these resources where feasible [Kern County 2009: 1.10.3].

3
PALEONTOLOGICAL SIGNIFICANCE AND RESOURCE CLASSIFICATION

3.1 SIGNIFICANCE CRITERIA

Paleontological resources are the evidence of once-living organisms as preserved in the rock record. They include both the fossilized remains of ancient plants and animals and the traces thereof (e.g., trackways, imprints, burrows, etc.). In general, fossils are considered to be greater than 5,000 years old (Middle Holocene) and are typically preserved in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks under certain conditions (SVP 2010).

Paleontological resources can provide important taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, or biochronological data. These data are important because they are used to examine evolutionary relationships, provide insight on the development of and interaction between biological communities, establish time scales for geologic studies, and for many other scientific purposes (Scott and Springer 2003; SVP 2010).

The BLM (2008) defines a significant paleontological resource as follows:

> Any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be scientifically important because it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has identified educational or recreational value. Paleontological resources that may be considered to not have paleontological significance include those that lack provenience or context, lack physical integrity because of decay or natural erosion, or that are overly redundant or are otherwise not useful for research [1-18].

3.2 POTENTIAL FOSSIL YIELD CLASSIFICATION (PFYC)

Geologic units are considered to be “sensitive” if they are known to contain scientifically significant paleontological resources anywhere in their extent. The area of sensitivity is typically defined as the entire rock unit (formation or member thereof) and not limited to areas where surface fossils may be exposed. Using baseline information gathered during a paleontological resource assessment, the sensitivity of the geologic unit(s) underlying a project area can be assigned to one of five classifications (Classes 1 through 5) defined by the BLM (2008). These categories include very high, high, moderate or unknown, low, and very low potential for fossilized remains. The criteria for each sensitivity classification, and the corresponding mitigation recommendations, are provided in Appendix A.

4
GEOLOGIC AND PALEONTOLOGY OF THE PROJECT AREA

4.1 GEOLOGIC SETTING

The Project area is situated within the Mojave Desert geomorphic province, southeast of the Sierra Nevada Mountains (Norris and Webb 1990). A geomorphic province is a region of unique topography and geology that is readily distinguished from other regions based on its landforms and diastrophic history. The Mojave Desert geomorphic province extends from the San Andreas and Garlock faults towards the Basin and Range Province and Colorado Desert in eastern California (Dibblee and Hewett 1966). The Mojave Desert was formed as a result of Proterozoic (2,500 million years ago [Ma] to 542 Ma) and Paleozoic (542 to 252 Ma) subsidence and sediment accumulation; Mesozoic (252 to 66 Ma) volcanism, plutonic intrusion, regional uplift, and metamorphism; and ongoing Cenozoic (66 Ma to present) uplift, depression, erosion, volcanism, and crustal deformation associated with movement along the Garlock and San Andreas faults (Dibblee 1967). The western Mojave Desert is situated on top of an uplifted basement block consisting of Proterozoic to Mesozoic crystalline rocks covered by a thin veneer of Cenozoic sedimentary rocks and Quaternary (2.6 Ma to present) alluvium (Garfunkel 1974). In general, the Mojave Desert is dominated by broad alluvial basins wherein sedimentary deposition has been controlled by the geography of uplifted and unroofed basement rock, Late Cenozoic basaltic and rhyolitic volcanic activity, and Quaternary hydrological processes. The Mojave Desert is entirely landlocked and averages 2,500 ft above mean sea level (amsl) in elevation (Norris and Webb 1990).

The Garlock Fault Zone and southernmost Sierra Nevada form the western boundary of the Mojave Desert (Ross 1989). The Garlock fault is a major northeast-trending, active strike-slip fault (Davis and Burchfiel 1973). The surface geomorphic expression of the Garlock Fault Zone forms a sharp transition between the relatively flat floor of the Mojave Desert and the rugged terrain of the Sierra Nevada to the north (Norris and Webb 1990). The Sierra Nevada bedrock consists of intrusive crystalline igneous rocks that were implaced approximately 77 Ma to 210 Ma during the Mesozoic as part of a batholith that formed in eastern California due to subduction of the Farallon Plate along the western margin of North America (Norris and Webb 1990). Subduction-related magma generation resulted in extensive volcanic activity in western North America during that time. However, not all magma erupted at the surface as volcanic lava. Some of the magma crystallized beneath the surface of the Earth's crust, forming the granitic plutons that compose the Sierra Nevada Batholith. Over time, during the Mesozoic and Early Cenozoic, the crustal sediments overlying the buried plutons were eroded, and the region was uplifted, although it is debated to what elevation they rose (Norris and Webb 1990). Later, during the Miocene (23 to 5.3 Ma), following erosion of the ancestral Sierra Nevada, crustal extension associated with Basin and Range normal faulting formed a series of approximately north-south trending valleys (basins) and mountains (ranges) (Glazner et al. 2002). This crustal deformation is associated with the early stages of uplift and unroofing of the Sierran Batholith. Subsequently, during the Pliocene (5.3 to 2.6 Ma) to Pleistocene (2.6 Ma to 11,700 years before present [B.P]),

the Sierra Nevada was further uplifted due to tectonic activity associated with down-dropping to the east (Henry 2009; USGS 2004).

4.2 SITE-SPECIFIC GEOLOGY AND PALEONTOLOGY

The Project area is mapped at a scale of 1:62,500 by Dibblee (1959) and Dibblee and Minch (2008). The lithology in the Project area consists of the quartz monzonite (qm), Quaternary older alluvium (Qoa), and Holocene (0.0117 Ma to the present) alluvial deposits (Qa) as depicted on Figure 5-1. The paleontological resource potential of each unit is discussed in the Chapter 7.

4.2.1 Cretaceous Quartz Monzonite and Granodiorite

Cretaceous (145 to 66 Ma) age granitic bedrock is exposed within the Project area. Specifically, quartz monzonite and granodiorite (qm) plutonic igneous rocks are exposed along the Garlock Fault in the central portion of the Project area. This unit is part of the Sierra Nevada Batholith and is characterized by a granular texture and visible crystals of quartz, alkali feldspar (orthoclase and microcline), and plagioclase feldspar, with subordinate biotite, hornblende, and secondary minerals (Dibblee 1959; Ross 1989). Plutonic igneous rocks do not contain fossils due to their high heat of formation deep below the surface of the Earth.

4.2.2 Quaternary Older Alluvium

Quaternary older alluvial deposits are exposed in the Project area (Dibblee 1959). The sediments typically consist of coarse conglomerates and silty sandstone deposited in alluvial fan or fluvio-lacustrine environments. The poorly bedded, unconsolidated deposits display abundant dissection and localized reworking of coarse to fine sand, silt, and gravel (Dibblee and Minch 2008). The Quaternary older alluvium deposits in the western Mojave Desert typically grade from coarse gravel and boulders in the highlands to sand and silt in the valleys and playas. In the vicinity of the Project area, coarse alluvium was likely deposited as a result of bedrock erosion coincident with uplift of Barren Ridge and the Sierra Nevada batholith since the Pleistocene (McLeod 2014). The total thickness of the Quaternary older alluvium deposits varies locally, but in the Project area, the sediments are approximately 300 ft.

Quaternary alluvial, fluvial, and lacustrine deposits of Pleistocene age have proven to yield significant vertebrate fossil localities throughout California and near the Project area (Scott and Cox 2008; UCMP collections data). Numerous terrestrial vertebrate fossils have been recovered from within Quaternary alluvial deposits in the Mojave Desert within Kern County. Approximately 15 miles north of the Project area near Dove Spring Wash, a diverse assemblage of Late Pleistocene fossil resources have been recovered within Quaternary stream and pond deposits, including *Mammuthus* (mammoth), *Camelops* (camel), *Equus* (extinct horse), *Bison* (bison), and *Odocoileus* (deer). According to Whistler (1990), the Rancholabrean-age Dove Spring Wash fauna were recovered in fine-grained stream sediments within coarser-grained alluvial fan deposits (Whistler et al. 2009). Initially, the specimens were assigned a radiocarbon date of 10,730 ± 110 B.P.; however, subsequent radiometric (unspecified isotope) dating of fossil fragments yielded an age of 19,200 to 16,900 B.P. (Scott and Cox 2008; and Whistler 2009). Further north of the Project, a vertebrate locality in the China Lake basin near Ridgecrest, yielded over 100 fossil fragments of *Bison*, *Mammuthus*, *Camelops*, *Hemiauchenia* (lamine

camelid), *Odocoileus* and *Equus* (Scott and Cox 2008). South of the Project, two localities near Goler Gulch and Rodgers Dry Lake yielded Rancholabrean fauna from coarse alluvial deposits and fine-grained playa/lacustrine deposits, including a specimen of *Equus* (Scott and Cox 2008). The depth of fossil recovery is unreported.

4.2.3 Holocene Alluvial Deposits

Holocene (0.0117 Ma to present) alluvial deposits are widely exposed in the Project area (Dibblee and Minch 2008). The Quaternary deposits consist of alluvial gravel and sands that likely drained from the highlands in the east. Holocene deposits near the Project area generally consist of unconsolidated sediment and angular rock fragments found at the base of crystalline basement outcrops; unconsolidated, undissected, angular alluvial fan deposits; and unconsolidated, angular to subrounded arkosic sand and gravel deposits in the ephemeral stream channels, including Pine Tree Canyon Wash, near the Project area (Dibblee 1959). Holocene deposits are generally considered too young to contain fossilized remains.

5
METHODS

5.1 MUSEUM RECORDS SEARCH

Paleontological resources are not found in "soil" but are contained within the geologic deposits or bedrock that underlies the soil layer. Therefore, in order to ascertain whether or not a particular study area has the potential to contain significant fossil resources at the subsurface, it is necessary to review relevant scientific literature and geologic mapping to determine the geology and stratigraphy of the area. Further, to delineate the boundaries of an area of paleontological sensitivity it is necessary to determine the extent of the entire geologic unit, because paleontological sensitivity is not limited to surface exposures of fossil material.

To determine whether or not fossil localities have been previously discovered within the Project area or a particular rock unit, a search of pertinent local and regional museum repositories for paleontological localities was conducted at the Los Angeles County Museum of Natural History (LACM) and the San Bernardino County Museum (SBCM). The museum records search was supplemented by a review of the University of California Museum of Paleontology's (UCMP) online database, which contains paleontological records for Kern County.

5.2 FIELDWORK

A field survey of the Project area was conducted on May 14, 2014. The purpose of the field survey was to visually inspect the ground surface in areas of proposed disturbance for exposed fossils and to evaluate geologic exposures for their potential to contain preserved fossil material at the subsurface. Prior to fieldwork, a Project-specific curation agreement was obtained from the Raymond M. Alf Museum of Paleontology in Claremont, California (Appendix B). All work was conducted in accordance with the terms of Æ's statewide Paleontological Resources Use Permit, #CA-12-00-005P (Appendix C).

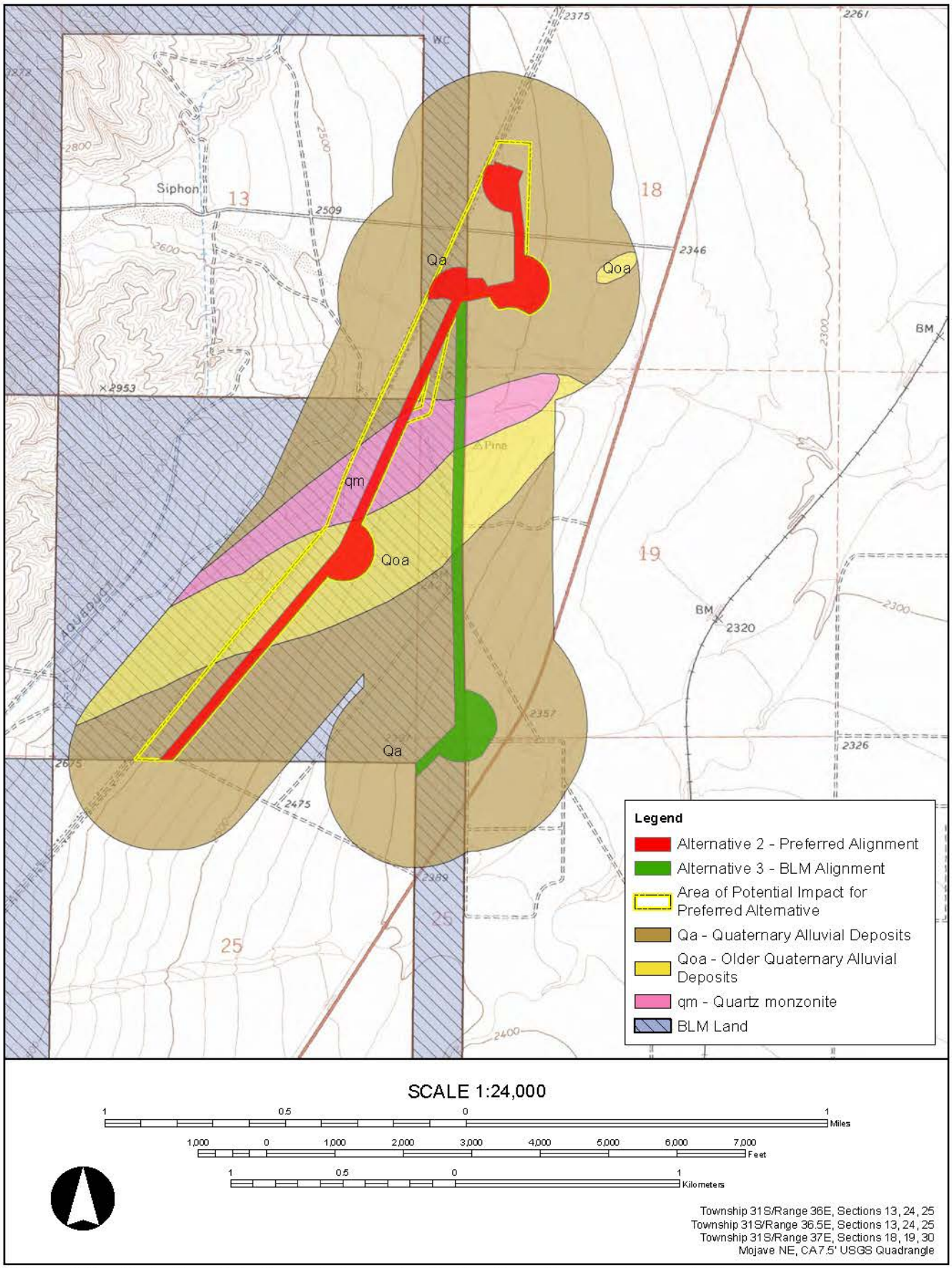

Figure 5-1 Geologic units in the project area showing locations of proposed ground disturbance.

6
RESULTS

6.1 MUSEUM RECORDS SEARCH RESULTS

The LACM collections records did not report any previously recorded vertebrate fossil localities directly within the Project boundaries; however, they do include two vertebrate localities that have been recovered relatively nearby from within the older Quaternary alluvium. These localities yielded fossil specimens of *Hemiauchenia* and *Equus* (McLeod 2014; Table 6-1).

According to the SBCM, Pleistocene deposits throughout the western Mojave have yielded numerous vertebrate fossils and have a high potential to contain significant nonrenewable paleontologic resources (Scott 2014). A search of the SBCM's Regional Paleontologic Locality Inventory (RPLI) indicates that although no vertebrate localities have been recorded within the Project area, several fossils have been recovered nearby from within Late Pleistocene nonmarine alluvium. The SBCM reports that one locality near Dove Spring Wash in Red Rock Canyon State Park yielded significant remains of extinct Pleistocene megafauna, including *Mammuthus, Equus, Camelops,* and *Bison* (Scott 2014; Table 6-1).

Finally, a review of online museum collections records maintained by the UCMP reveals that specimens from at least two vertebrate localities from Pleistocene age on have been previously documented from within Kern County. The UCMP localities yielded Irvingtonian and Rancholabrean age fossil specimens of *Equus* from a locality near Ridgecrest, as well as other unspecified vertebrate remains from sandstone near Dove Springs Wash (UCMP online collections). The results of the museum records search and literature review are presented in Table 6-1.

Table 6-1
Vertebrate Localities Reported from within the Quaternary Alluvium Deposits in the Vicinity of the Project Area in Kern County

Locality No.	Geologic Unit	Age	Taxa
LACM 7891, Near the California Aqueduct and Tehachapi Willow Springs Road	Quaternary Older Deposits	Pleistocene	*Hemiauchenia*
LACM 3722, City of Tehachapi	Quaternary Older Deposits	Pleistocene	*Equus*
UCMP RV6311, White Hills, western Mojave Desert	Quaternary Older Deposits	Pleistocene	*Equus*
UCMP V67225, Dove Springs	Quaternary Older Deposits	Pleistocene	Unspecified vertebrates
SBCM (no locality number), Dove Springs Wash, Red Rock Canyon State Park	(Non-marine Alluvium) Quaternary Older Deposits	Late Pleistocene	*Mammuthus, Equus, Camelops,* and *Bison*

Sources: McLeod (2014); Scott (2014); and UCMP collections online database: http://ucmpdb.berkeley.edu/loc.html, accessed 26 February 2014.

6.2 DETERMINATION OF PALEONTOLOGICAL RESOURCE POTENTIAL FOR GEOLOGIC UNITS WITHIN THE PROJECT AREA

In accordance with BLM guidelines (2008), this report utilizes the PFYC system (BLM 2007) to assess paleontological sensitivity and the level of effort required to manage potential impacts to significant fossil resources. Using this system, the sensitivity of geologic units was determined on the basis of the relative abundance and risk of adverse impacts to vertebrate fossils and significant invertebrates and plants.

As a result of the paleontologic resource assessment, PFYC rankings were recommended for the geologic units within the Project area, and corroborated by the BLM (Clifford and DeBusk 2014; Email comm. with T. Thomas 2014). The quartz monzonite, which is exposed in the central portion of the Project area, has been designated as having a very low potential (PFYC Class 1) due to its high heat of formation. The Quaternary older alluvial deposits, which underlie a portion of the western Project area, are known to yield intermittent vertebrate fossils, and as a result, a moderate potential (PFYC Class 3a) is assigned. Holocene age alluvial deposits are typically too young to contain fossilized remains. Therefore, the younger Quaternary deposits within the Project area have been designated as having low potential (PFYC Class 2). The PFYC rankings of the geologic units underlying the Project area are listed in Table 6-2 and depicted on Figure 6-1.

Table 6-2
Geologic Units in the Project Area and Their PFYC Ranking

Geologic Unit	*Map Abbreviation	Age	Typical Fossils	Potential Fossil Yield Classification
Quartz monzonite	Qm	Cretaceous	None	Very Low (Class 1)
Older Quaternary Alluvial Deposits	Qoa	Pleistocene	Vertebrates; Mammals	Moderate (Class 3a)
Quaternary Alluvial Deposits	Qa	Holocene	None	Low (Class 2)

*Geology taken from Dibblee (1959) and Dibblee and Minch (2008)

6.3 PALEONTOLOGICAL FIELD RECONNAISSANCE

A field survey of the Project area was conducted by Staff Paleontologist, Stephanie Lukowski and Field Technician, Elizabeth Cisneros on May 14, 2014. During the course of fieldwork, a pedestrian survey of the proposed disturbance area located on BLM managed public lands was accomplished, and the published geologic maps were verified. Project areas obscured by brush were not comprehensively examined due to lack of ground visibility. However, the majority of the proposed disturbance areas within the Project, including exposures of older Quaternary alluvial deposits, were subject to an intensive pedestrian walkover (Figure 6-2).

For both the preferred and alternative alignment, the 150 foot ROW plus a 200 foot buffer per BLM (2008) regulations were intensively surveyed for paleontological resources utilizing evenly spaced, 20-meter zigzagged transects covering Project areas underlain by Quaternary older alluvial deposits. In the field, Lukowski and Cisneros utilized a Trimble GeoXT Global

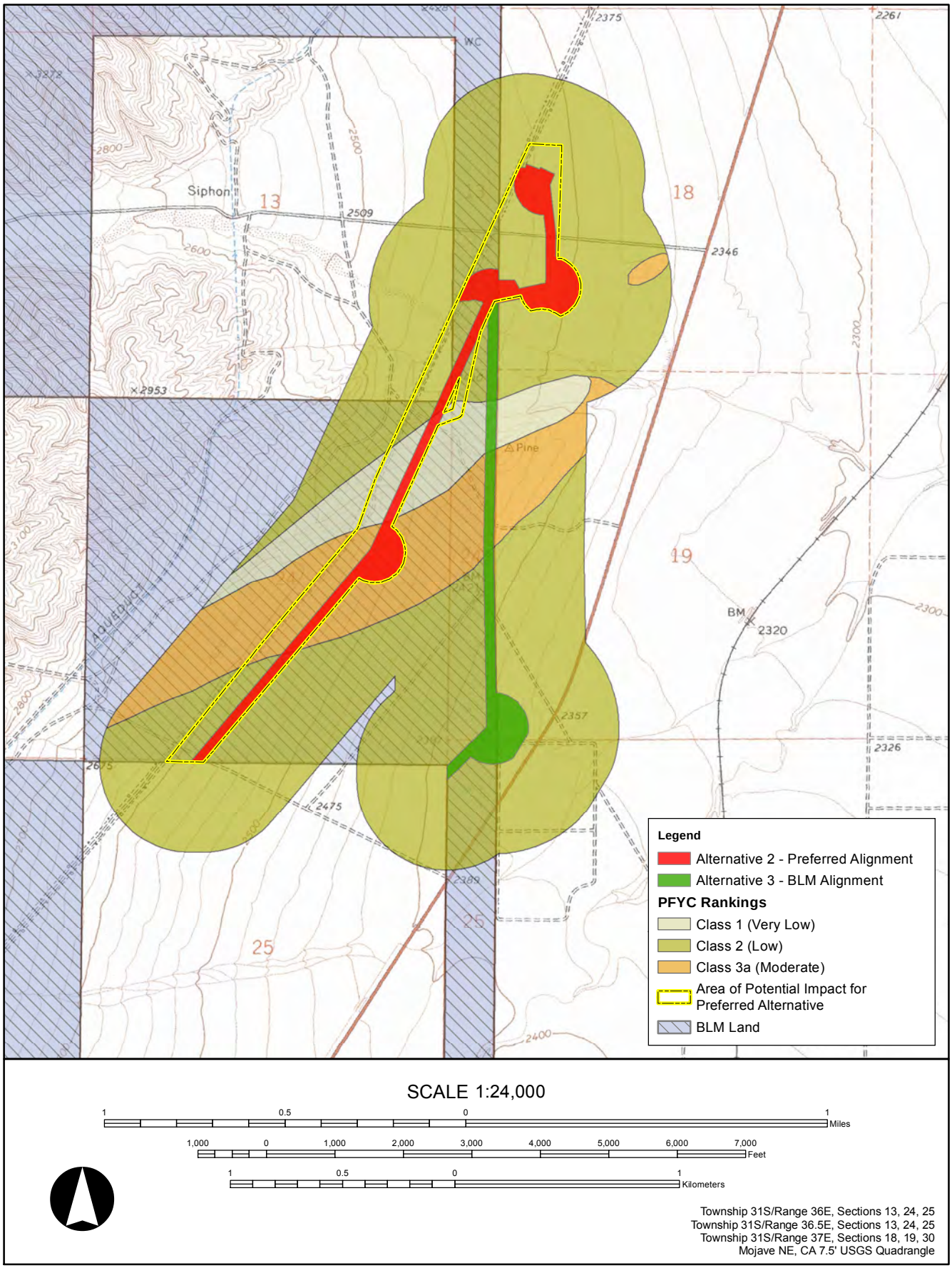

Figure 6-1 Paleontological sensitivity map showing the potential fossil yield classification.

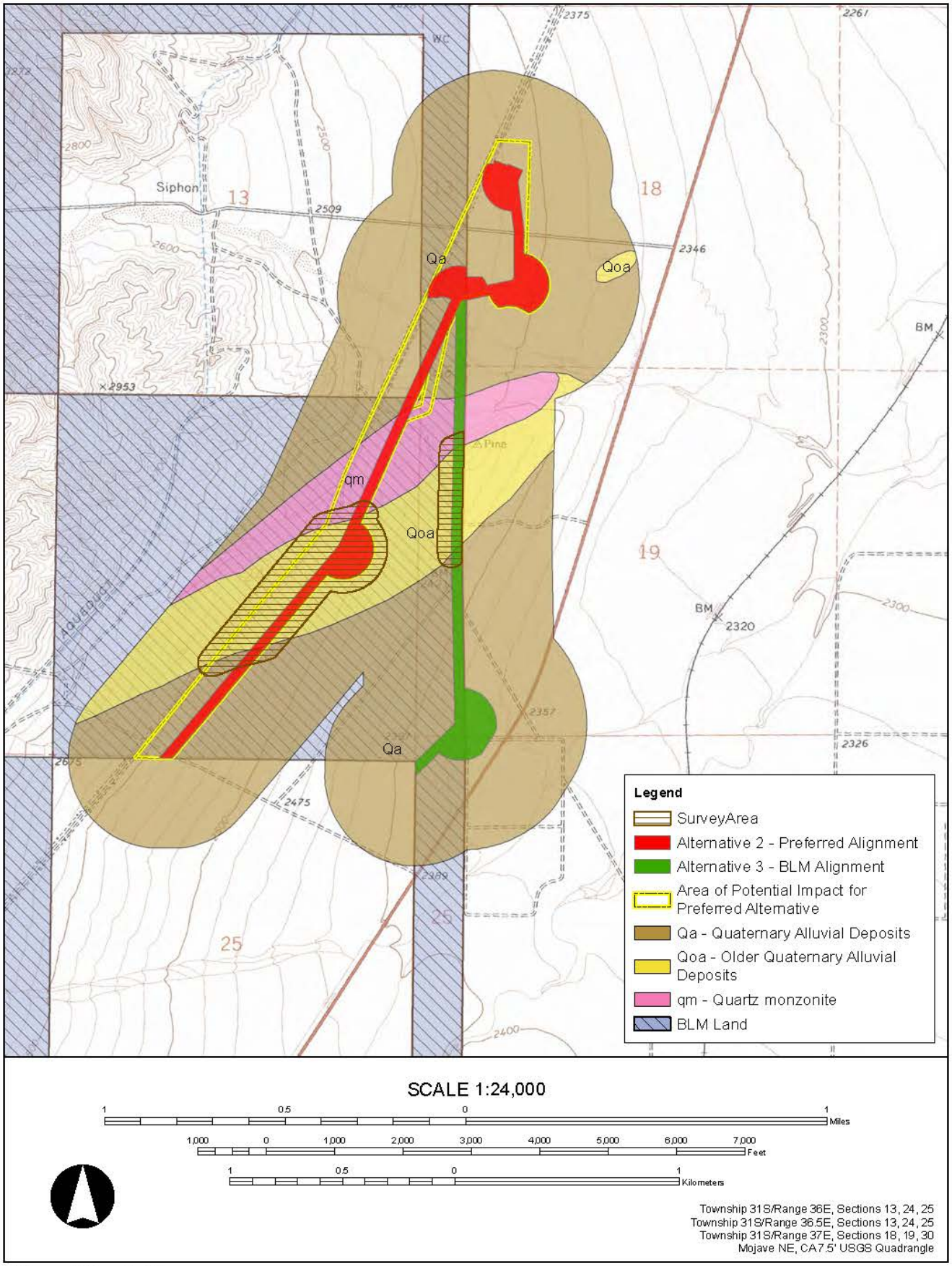

Figure 6-2 Field survey coverage map.

Positioning System (GPS) receiver and topographic maps to locate geologic formation boundaries. The surfaces of the exposed units were visually examined for the evidence of paleontological resources. Notes were taken on the geology and lithology of geologic units encountered and photographs were taken to document the survey.

The older Quaternary alluvial deposits were well exposed in the Project area and ground visibility was 80 percent (Figures 6-3–6-6). The older Quaternary alluvial deposits were grey to tan colored, unconsolidated, coarse sands and silts with angular to sub-rounded, pebble to cobble sized clasts of chert and quartz monzonite on the surface. This is consistent with the published descriptions of the older Quaternary alluvial deposits of this region.

No paleontological resources were discovered on the ground surface of the Project area during the course of fieldwork. Only those areas that are included in the proposed disturbance areas within the Project area were surveyed. However, sensitive older Quaternary alluvium may be present beneath the Holocene alluvial deposits at an unknown depth.

Figure 6-3 View due north along the ROW from the northern extent of the older Quaternary alluvial exposures in the alternative alignment.

Figure 6-4 View to the northeast of older Quaternary alluvial deposits along the ROW of the preferred alternative.

Figure 6-5 View of the older Quaternary alluvial deposits southwest along the ROW of the preferred alternative.

Figure 6-6 View of the surface of the older Quaternary alluvial deposits.

7
FINDINGS AND RECOMMENDATIONS

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. Since this Project entails installation of a gen-tie line, new ground disturbances are anticipated. Ground disturbance is planned for portions of the Project area that are underlain by Cretaceous granitic rock and Quaternary alluvium, which will likely impact previously undisturbed lithology in those deposits; however, significant fossils have not been reported within these units in the vicinity of the Project area. Ground disturbances are also proposed within portions of the Project area underlain by previously undisturbed older Quaternary alluvium, which has proven to yield vertebrate remains throughout the western Mojave Desert and Kern County. Consequently, the likelihood of impacting scientifically significant fossils because of Project development is very low to moderate, dependent upon the unit within which the ground disturbance will occur.

It is recommended that all construction workers and other on-site personnel shall receive a detailed environmental awareness training on paleontological resources prior to the start of the Project. The training will be conducted by a qualified and BLM-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. No on-site monitoring by paleontological monitors is recommended due to the low to moderate potential of the underlying geologic units and small Project footprint in sensitive units; however, the Project Paleontologist must be available throughout the Project on an on-call basis in the event that a paleontological resource is encountered by on-site personnel during the course of Project development.

8
CONCLUSIONS

This assessment is based on the results of a museum records search, review of available geologic and paleontologic literature, and a pedestrian survey of exposures within the Project area. No fossils were observed during the course of the survey; therefore, only fossils that have already been inventoried or collected are available for this analysis. Based on this analysis, the geologic units underlying the area of proposed ground disturbance within the Project area have a low to moderate paleontological sensitivity and there is low to moderate potential for buried fossils within the deposits. These nonrenewable scientific resources may be at risk of being adversely impacted by earth-disturbing activities during the development of the Project. Should any future site work occur that would impact previously undisturbed older Quaternary alluvium, then a qualified paleontologist should be retained on an on-call basis to mitigate adverse impacts to fossilized remains.

9
REFERENCES

Bureau of Land Management (BLM)

1998a *General Procedural Guidance for Paleontological Resource Management Manual H-8270.* Department of the Interior, Washington, D.C.

1998b *Paleontological Resources Management Manual H-8270-1.* Department of the Interior, Washington, D.C.

2007 *Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands.* Instruction Memorandum No. 2008-009. Department of the Interior, Washington, D.C.

2008 *Assessment and Mitigation of Potential Impacts to Paleontological Resources. Instruction Memorandum No. 2009-011.* Department of the Interior, Washington, D.C.

Clifford, Heather L., and Jessica L. DeBusk

2014 *Paleontological Resources Assessment for the RE Cinco Gen-tie Project, Inyo County, California.* Prepared for the BLM Ridgecrest Field Office, Moreno Valley, California.

Davis, Gregory A., and B. C. Burchfiel

1973 Garlock Fault: An Intracontinental Transform Structure, Southern California. *Geological Society of America Bulletin* 84(4):1407–1422.

Dibblee, T. W. Jr.

1959 *Preliminary geologic map of the Mojave quadrangle, California.* U.S. Geological Survey Mineral Investigations Field Study Map, MF 219, scale 1:62,500.

1967 *Areal geology of the western Mojave Desert, California.* U.S. Geological Survey and the California Division of Mines and Geology, Professional Paper 522, Washington D. C.

Dibblee, T. W. Jr., and D. F. Hewett

1966 Geology of the Mojave Desert Region. *Mineral Resources of California.* U.S. Geological Survey and the California Division of Mines and Geology, Bulletin 191. Menlo Park, CA and Washington D. C.

Dibblee, T. W. Jr., and J. A. Minch

2008 *Geologic map of the Mojave & Castle Butte 15 minute quadrangles, Kern County, California.* Electronic document, http://ngmdb.usgs.gov/Prodesc/proddesc_86636.htm, accessed February 20, 2014. Dibblee Foundation Map #DF-401, Dibblee Geological Foundation.

Garfunkel, Z
1974 Model for the Late Cenozoic Tectonic History of the Mojave Desert, California, and for Its Relation to Adjacent Regions. *Geological Society of America Bulletin*, 85(12):1931–1944.

Glazner, Allen F., J. Douglas Walker, John M. Bartley, and John M. Fletcher
2002 Cenozoic Evolution of the Mojave block of Southern California. In *Geologic Evolution of the Mojave Desert and Southwestern Basin and Range*, Geological Society of America Memoir 195, edited by Allen F. Glazner, J. Douglas Walker, and John M. Bartley, pp. 19–41. Boulder, Colorado.

Henry, Christopher D.
2009 Uplift of the Sierra Nevada, California. *Geology,* 37:575–576.

Kern County
2009 Kern County General Plan, September 22, 2009. Electronic document, http://pcd.kerndsa.com/planning/planning-documents/general-plans, accessed October 2, 2013. Kern County, California Planning and Community Development.

McLeod, S. A.
2014 Unpublished museum records. The Natural History Museum of Los Angeles County. Los Angeles.

Norris, R. M. and R. W. Webb
1990 *Geology of California.* John Wiley and Sons, New York.

Recurrent Energy
2014 *RE Cinco Project Gen-Tie Plan of Development*. Recurrent Energy. Submitted to the Bureau of Land Management.

Ross, D. C.
1989 *The Metamorphic and Plutonic Rocks of the Southernmost Sierra Nevada, California, and their Tectonic Framework.* U.S. Geological Survey Professional Paper 1381. U.S. Geological Survey, Denver.

Scott, Eric
2014 Unpublished museum records. San Bernardino County Museum.

Scott, Eric, and Kathleen Springer
2003 CEQA and Fossil Preservation in California. *The Environmental Monitor,* Fall 2003. Association of Environmental Professionals. Sacramento, California.

Scott, Eric, and Shelley M. Cox
2008 Late Pleistocene Distribution of Bison (Mammalia; Artiodactyla) in the Mojave Desert of Southern California and Nevada. In *Geology and Vertebrate Paleontology of Western and Southern North America*, edited by Xiaoming Wang and Lawrence G. Barnes, pp.359–382. Natural History Museum of Los Angeles County, Science Series.

Society of Vertebrate Paleontology (SVP)
2010 *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.* Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee.

U.S. Geological Survey
2004 Pacific Province. Electronic document http://geomaps.wr.usgs.gov/parks/province/pacifmt.html, accessed February 20, 2014. Geologic Provinces of the United States: Records of an active Earth, U.S. Geological Survey, Denver.

Whistler, D. P.
1990 A late Pleistocene (Rancholabrean) fossil assemblage from the northwestern Mojave Desert, California. Abstracts of Proceedings, San Bernardino County Museum Association Quarterly XXXVII, v. 2, p. 3-17.

Whistler, David P., Richard H. Tedford, Gary T. Takeuchi, Xiaoming Wang, , Zhijie J. Tseng, and Michael E. Perkins
2009 Revised Miocene Biostratigraphy and Biochronology of the Dove Spring Formation, Mojave Desert, California. In *Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne,* edited by L. B. Albright III, pp. 331–362. Museum of Northern Arizona Bulletin 65, Flagstaff, Arizona.

APPENDIX A

Potential Fossil Yield Classification

Class 1 – Very Low. Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable.

(2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

Class 2 – Low. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low.

(2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 – Moderate or Unknown. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low, or
- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3a – Moderate Potential. Units are known to contain vertebrate fossils or scientifically significant non-vertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b – Unknown Potential. Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data.

(2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 – High. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface-disturbing activities may adversely affect paleontological resources in many cases.

Class 4a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface-disturbing actions. Illegal collecting activities may impact some areas.

Class 4b – These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.

- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action.

(2) A field survey by a qualified paleontologist is often needed to assess local conditions.

(3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.

(4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available.

Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface-disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 5 – Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human caused adverse impacts or natural degradation.

Class 5a – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface-disturbing actions. Unit is frequently the focus of illegal collecting activities.

Class 5b – These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high.

(2) A field survey by a qualified paleontologist is usually necessary prior to surface-disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions.

(3) Official designation of areas of avoidance, special interest, and concern may be appropriate. The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface-disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities.

APPENDIX B

Curation Agreement

RAYMOND M. ALF MUSEUM OF PALEONTOLOGY

Stephanie Lukowski
Applied Earthworks
133 North San Gabriel Boulevard, Suite 201
Pasadena, CA 91107

7 May 2014

Dear Ms. Lukowski:

I am writing to confirm the willingness of the Raymond M. Alf Museum of Paleontology to act as a repository for any paleontological specimens resulting from your company's survey of BLM land related to the Recurrent Energy Cinco Generator Intertie Project. Our institution will accept and professionally curate paleontological collections and accompanying samples, records, data, maps, photographs, field notes, and other documents derived from paleontologic work conducted by the staff of Applied Earthworks. If paleontological resources are recovered on the project, we will then proceed with any additional steps necessary, including a curation agreement and development of cost estimates for curation.

The Raymond M. Alf Museum of Paleontology is nationally accredited by the American Alliance of Museums (AAM) and serves as a permanent repository for fossil specimens from private and federal lands. As such, we uphold professional museum standards for collections care in compliance with guidelines for federal collections.

Please do not hesitate to contact me by telephone (909-482-5244) or email (afarke@webb.org) if you have any questions or concerns.

Sincerely,

Andrew A. Farke, Ph.D.
Curator

discover

1175 West Baseline Road, Claremont, CA 91711-2199
ph 909.624.2798 fx 909.621.4582
www.alfmuseum.org
Accredited by The American Association of Museums

APPENDIX C

Bureau of Land Management Paleontological Resources Use Permit

DI Form 1991 (Rev Sept 2004)
OMB No. 1024-0037
Exp. Date (01/31/2008)

United States Department of the Interior

PERMIT FOR PALEONTOLOGICAL INVESTIGATIONS

To conduct archeological work on Department of the Interior lands and Indian lands under the authority of:

☒ The Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm) and its regulations (43 CFR 7).
☐ The Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225, 16 U.S.C. 431-433) and its regulations (43 CFR 3).
☐ Supplemental regulations (25 CFR 262) pertaining to Indian lands.
☒ Bureau-specific statutory and/or regulatory authority: Federal Land Policy and Management Act of 1976 (Public Law 94-570), and Section 302 of Public Law 94-4579

Please use this number when referring to this permit
No.: **CA-12-00-005P**

1. Permit issued to **Applied Earthworks**	2. Under application dated **May 2012**
3. Address **133 N. San Gabriel Blvd. Suite 201 Pasadena, CA 91107-3414**	4. Telephone number(s) **626.578.0119** 5. E-mail address(es) **jdebusk@appliedearthworks.com**
6. Name of Permit Administrator **Jessica DeBusk** Telephone number(s): **626.578.0119** Email address(es): **jdebusk@appliedearthworks.com**	7. Name of Principal Investigator(s) **Jessica DeBusk, Joshua Bonde** Telephone number(s): **626.578.0119, 702.468.2500** Email address(es): **jdebusk@appliedearthworks.com, bondej@unlv.nevada.edu**
8. Name of Field Director(s) authorized to carry out field projects **Stephanie Lukopwski, Niranjala Kottachchi**	Telephone number(s): **626.578.0119, 708.476.6915, 559.871.2988,** Email address(es): **stephlukowski@gmail.com, nkottachchi@gmail.com**
9. Activity authorized **Survey, Recordation and, Excavation**	
10. On lands described as follows **All lands in California administered by the Bureau of Land Management**	
11. During the duration of the project **From July 18, 2012** **To July 17, 2015**	
12. Name and address of the curatorial facility in which collections, records, data, photographs, and other documents resulting from work under this permit shall be deposited for permanent preservation on behalf of the United States Government. **Natural History Museum of LA Co., 900 Exposition Blvd., LA, CA 90007, 213-763-3325**	
13. Permittee is required to observe the listed standard permit conditions and the special permit conditions attached to this permit.	
14. Signature and title of approving official Charlotte Hunter, Phd Deputy Preservation Officer	15. Date 07/18/2012

15. Standard Permit Conditions

a. This permit is subject to all applicable provisions of 43 CFR Part 3, 43 CFR 7, and 25 CFR 262, and applicable departmental and bureau policies and procedures, which are made a part hereof.

b. The permittee and this permit are subject to all other Federal, State, and local laws and regulations applicable to the public lands and resources.

c. This permit shall not be exclusive in character, and shall not affect the ability of the land managing bureau to use, lease or permit the use of lands subject to this permit for any purpose.

d. This permit may not be assigned.

e. This permit may be suspended or terminated for breach of any condition or for management purposes at the discretion of the approving official, upon written notice.

f. This permit is issued for the term specified in 11 above.

g. Permits issued for a duration of more than one year must be reviewed annually by the agency official and the permittee.

h. The permittee shall obtain all other required permit(s) to conduct the specified project.

i. Archeological project design, literature review, development of the regional historic context framework, site evaluation, and recommendations for subsequent investigations must be developed with direct involvement of an archeologist who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation; fieldwork must be generally overseen by an individual who meets the Secretary of the Interior's Standards for Archeology and Historic Preservation.

j. Permittee shall immediately request that the approving official (14. above) make a modification to accommodate any change in an essential condition of the permit, including individuals named and the nature, location, purpose, and time of authorized work, and shall without delay notify the approving official of any other changes affecting the permit or regarding information submitted as part of the application for the permit. Failure to do so may result in permit suspension or revocation.

k. Permittee may request permit extension, in writing, at any time prior to expiration of the term of the permit, specifying a limited, definite amount of time required to complete permitted work.

l. Any correspondence about this permit or work conducted under its authority must cite the permit number. Any publication of results of work conducted under the authority of this permit must cite the approving bureau and the permit number.

m. Permittee shall submit a copy of any published journal article and any published or unpublished report, paper, and manuscript resulting from the permitted work (apart from those required in items q. and s., below), to the approving official and the appropriate official of the approved curatorial facility (item 12 above).

n. Prior to beginning any fieldwork under the authority of this permit, the permittee, following the affected bureau's policies and procedures, shall contact the field office manager responsible for administering the lands involved to obtain further instructions.

o. Permittee may request a review, in writing to the official concerned, of any disputed decision regarding inclusion of specific terms and conditions or the modification, suspension, or revocation of this permit, setting out reasons for believing that the decision should be reconsidered.

p. Permittee shall not be released from requirements of this permit until all outstanding obligations have been satisfied, whether or not the term of the permit has expired. Permittee may be subject to civil penalties for violation of any term or condition of this permit.

15. Standard Permit Conditions (continued)

q. Permittee shall submit a preliminary report to the approving official within a timeframe established by the approving official, which shall be no later than 6 weeks after the completion of any episode of fieldwork, setting out what was done, how it was done, by whom, specifically where, and with what results, including maps, GPS data, an approved site form for each newly recorded archeological site, and the permittee's professional recommendations, as results require. If other than 6 weeks, the timeframe shall be specified in Special Permit Condition p. Depending on the scope, duration, and nature of the work, the approving official may require progress reports, during or after the fieldwork period or both, and as specified in Special Permit Condition r.

r. Permittee shall submit a clean, edited draft final report to the agency official for review to insure conformance with standards, guidelines, regulations, and all stipulations of the permit. The schedule for submitting the draft shall be determined by the agency official.

s. Permittee shall submit a final report to the approving official not later than 180 days after completion of fieldwork. Where a fieldwork episode involved only minor work and/or minor findings, a final report may be submitted in place of the preliminary report. If the size or nature of fieldwork merits, the approving official may authorize a longer timeframe for the submission of the final report as specified in Special Permit Condition q.

t. Two copies of the final report, a completed NTIS Report Documentation Page (SF-298), available at http://www.ntis.gov/pdf/rdpform.pdf, and a completed NADB-Reports Citation Form, available at http://www.cr.nps.gov/aad/tools/nadbform_update.doc, will be submitted to the office issuing the permit.

u. The permittee agrees to keep the specific location of sensitive resources confidential. Sensitive resources include threatened species, endangered species, and rare species, archeological sites, caves, fossil sites, minerals, commercially valuable resources, and sacred ceremonial sites.

v. Permittee shall deposit all artifacts, samples and collections, as applicable, and original or clear copies of all records, data, photographs, and other documents, resulting from work conducted under this permit, with the curatorial facility named in item 12, above, not later than 90 days after the date the final report is submitted to the approving official. Not later than 180 days after the final report is submitted, permittee shall provide the approving official with a catalog and evaluation of all materials deposited with the curatorial facility, including the facility's accession and/or catalog numbers.

w. Permittee shall provide the approving official with a confirmation that museum collections described in v. above were deposited with the approved curatorial facility, signed by an authorized curatorial facility official, stating the date materials were deposited, and the type, number and condition of the collected museum objects deposited at the facility.

x. Permittee shall not publish, without the approving official's prior permission, any locational or other identifying archeological site information that could compromise the Government's protection and management of archeological sites.

y. For excavations, permittee shall consult the OSHA excavation standards which are contained in 29 CFR §1926.650, §1926.651 and §1926.652. For questions regarding these standards contact the local area OSHA office, OSHA at 1-800-321-OSHA, or the OSHA website at http://www.osha.gov.

z. Special permit conditions attached to this permit are made a part hereof.

16. Special Permit Conditions

☒ a. Permittee shall allow the approving official and bureau field officials, or their representatives, full access to the work area specified in this permit at any time the permittee is in the field, for purposes of examining the work area and any recovered materials and related records.

☒ b. Permittee shall cease work upon discovering any human remains and shall immediately notify the approving official or bureau field official. Work in the vicinity of the discovery may not resume until the authorized official has given permission.

☒ c. Permittee shall backfill all subsurface test exposures and excavation units as soon as possible after recording the results, and shall restore them as closely as reasonable to the original contour.

☒ d. Permittee shall not use mechanized equipment in designated, proposed, or potential wilderness areas unless authorized by the agency official or a designee in additional specific conditions associated with this permit.

☒ e. Permittee shall take precautions to protect livestock, wildlife, the public, or other users of the public lands from accidental injury in any excavation unit.

☒ f. Permittee shall not conduct any flint knapping or lithic replication experiments at any archeological site, aboriginal quarry source, or non-site location that might be mistaken for an archeological site as a result of such experiments.

☒ g. Permittee shall perform the fieldwork authorized in this permit in a way that does not impede or interfere with other legitimate uses of the public lands, except when the authorized officer specifically provides otherwise.

☒ h. Permittee shall restrict vehicular activity to existing roads and trails unless the authorized officer provides otherwise.

☒ i. Permittee shall keep disturbance to the minimum area consistent with the nature and purpose of the fieldwork.

☒ j. Permittee shall not cut or otherwise damage living trees unless the authorized officer gives permission.

☒ k. Permittee shall take precautions at all times to prevent wildfire. Permittee shall be held responsible for suppression costs for any fires on public lands caused by the permittee's negligence. Permittee may not burn debris without the authorized officer's specific permission.

☒ l. Permittee shall conduct all operations in such a manner as to prevent or minimize scarring and erosion of the land, pollution of the water resources, and damage to the watershed.

☒ m. Permittee shall not disturb resource management facilities within the permit area, such as fences, reservoirs, and other improvements, without the authorized officer's approval. Where disturbance is necessary, permittee shall return the facility to its prior condition, as determined by the authorized officer.

☒ n. Permittee shall remove temporary stakes and/or flagging, which the permittee has installed, upon completion of fieldwork.

☒ o. Permittee shall clean all camp and work areas before leaving the permit area. Permittee shall take precautions to prevent littering or pollution on public lands, waterways, and adjoining properties. Refuse shall be carried out and deposited in approved disposal areas.

☐ p. Permittee shall submit the preliminary report within _____ days/weeks of completion of any episode of fieldwork..

☐ q. Permittee shall submit the final report within _____ days/weeks/months after completion of fieldwork..

☐ r. Permittee shall submit progress reports every _____ months over the duration of the project.

☒ s. California special permit conditions are attached.

Special Permit Conditions Continuation Sheet: California Conditions

- a. Work under this permit is limited to specific service approved for each permit. This may consist of non-collection survey, limited testing to determine site content and limits or extensive testing emergency excavation and/or salvage projects. Testing/ excavation projects may be conducted under the authority of this permit only upon completion of ARPA consultation with Native American Groups and written approval from the Bureau for such work. (CARIDAPs for the purpose of the identification of archaeological resources are authorized under a FLPMA/ARPA Permit).
- b. Permittees shall verbally and subsequently in writing contact the appropriate BLM Field Manager prior to the beginning of each of his field operations (with follow-up written notification) to inform the BLM of specific work to be conducted. At this time, the BLM Field Manager may impose additional stipulation as deemed necessary to provide for the protection and management of resource values in the general site or project area.
- c. All cultural artifacts and other related materials such as notes, photographs, etc., acquired under the provisions of this permit **remain the property of the United States Government and may be recalled at any time for the use of the Department of the interior or other agencies of the Federal Government.** Cultural materials collected under the provisions of this permit must be curated at a repository approved by the BLM. Curation shall be at a local qualified repository, if feasible, and an approved curation facility shall be designated prior to all field projects. An itemized list of all materials with accession numbers, curated at the repository will be submitted to the State Office and to the appropriate Field Office within 180 days of the completion of individual field projects. A copy of a receipt from the curation facility must be submitted with the list or catalogue.
- d. Permittees shall acquire a primary number from the appropriate Information Center for each cultural resource documented while undertaking work authorized by this permit.
- e. The BLM Field Manager or authorized representative may require a monthly letter progress report outlining what was accomplished. This report, if required, is due by the fifth day of the following month, unless different arrangements are approved.
- f. The individual(s) in direct charge must be academically qualified and possess adequate field experience. At least two weeks prior to initiation field work, the permittees must provide the BLM Field Manager with the vitae of individuals proposed to be in direct charge if not approved at the time of permit issuance. A list of field crew members should be submitted at the same time. Only the individual(s) listed in Item No. 8 of the permit is/are authorized to be in direct charge of field work conducted under this permit.
- g. The person(s) in direct charge of field work, shall be on site at all times when work is in progress. Failure to comply with permit stipulations will result in removal of subject's name(s) from the approved list of person-in-direct-charge.
- h. Care should be exercised to avoid directly or indirectly increasing access or potential vandalism to sensitive sites.
- i. All National Permit Stipulations are binding. The authority for issuing permits in the Bureau of Land Management rests solely with the State Director as Delegated by the Secretary of the Interior and all further delegation is prohibited by Secretarial Order. No Modification of National Permit Conditions 8 or 9 or of the California Special Permit Conditions may occur except by written decision of the State Director.
- j. The Bureau of Land Management shall be cited in any report of work done under this permit, including publications such as books, news articles and scientific publications, as well as oral reports, films, television programs, and presentations in other media.

By signing below, I, the Principal Investigator, acknowledge that I have read and understand the Permit for Archeological Investigations and agree to its terms and conditions as evidenced by my signature below and initiation of work or other activities under the authority of this permit.

Signature and title:	Date:

Paperwork Reduction Act and Estimated Burden Statement: This information is being collected pursuant to 16 U.S.C. 470cc and 470mm, to provide the necessary facts to enable the Federal land manager (1) to evaluate the applicant's professional qualifications and organizational capability to conduct the proposed archeological work; (2) to determine whether the proposed work would be in the public interest; (3) to verify the adequacy of arrangements for permanent curatorial preservation, as United States property, of specimens and records resulting from the proposed work; (4) to ensure that the proposed activities would not be inconsistent with any management plan applicable to the public lands involved; (5) to provide the necessary information needed to complete the Secretary's Report to Congress on Federal Archeology Programs; and (6) to allow the National Park Service to evaluate Federal archeological protection programs and assess compliance with the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470). Submission of the information is required before the applicant may enjoy the benefit of using publicly owned archeological resources. To conduct such activities without a permit is punishable by felony-level criminal penalties, civil penalties, and forfeiture of property. A federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average one hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Departmental Consulting Archeologist; NPS; 1849 C Street, NW (2275); Washington, DC 20240-0001.