APPENDIX H

Paleontological Resources Technical Report

Paleontological Resources Assessment for the Beacon Solar Energy Project, Kern County, California

Prepared for

ENSR Corporation

Prepared by

SWCA Environmental Consultants

Pasadena Office

February 2008

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE BEACON SOLAR ENERGY PROJECT KERN COUNTY, CALIFORNIA

SWCA PROJECT NUMBER 12842-113

SUBMITTED TO:
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PROJECT SUMMARY

PURPOSE AND SCOPE

SWCA Environmental Consultants was retained by ENSR Corporation to conduct paleontological resources management services for the Beacon Solar Energy Project (BSEP) located in Kern County, California. The scope of services included (1) a comprehensive museum records search and literature review, (2) a reconnaissance field survey, and (3) preparation of this technical report of findings that includes recommended mitigation measures.

DATES OF INVESTIGATION

The museum records searches were performed between November 2007 and January 2008. The paleontological reconnaissance survey of the BSEP proposed plant site and transmission line routes was performed between November 7 and November 19, 2007. The survey of the associated gas pipeline route was performed between December 13 and December 17, 2007. This technical report was completed in February 2008.

RESULTS OF THE INVESTIGATION

Geologic mapping by Jennings et al. (1962), Samsel (1962), Smith (1964), and Amoroso and Miller (2006) indicate that the BSEP area is underlain by Quaternary alluvium and lake bed deposits ranging from Pleistocene (1.8 million years old [Ma] to 10,000 years before present [BP]) to Holocene (10,000 years BP to Recent) in age. Museum collections records maintained by the Natural History Museum of Los Angeles County (LACM), the San Bernardino County Museum (SBCM), and the San Diego Natural History Museum (SDNHM) indicate that no previously recorded fossil localities exist within the plant site boundaries or along the associated linear routes nor have any fossil localities been previously recorded within one mile of these boundaries. However, numerous vertebrate fossil localities have been recorded throughout the region within the same or similar sedimentary deposits that occur within the BSEP boundaries.

The combined results of the museum records searches and literature review indicate that geologic units underlying the BSEP area have a paleontological sensitivity ranging from low to high. A single invertebrate fossil was observed on the surface during the paleontological field survey of the BSEP area but the bivalve is likely associated with a large trash pile nearby and it is not *in situ*. Surficial alluvial deposits within the BSEP area are generally considered too young to contain fossils; however, deeper layers of the lake bed deposits and subsurface alluvial sediments have the potential to contain significant paleontological resources. Therefore, ground disturbing activities within the BSEP area have the potential to impact sensitive nonrenewable paleontological resources.

RECOMMENDATIONS

The geologic units underlying the BSEP are determined to be paleontologically sensitive at depth. SWCA recommends that a qualified paleontologist be retained to design and implement a paleontological resources monitoring and mitigation plan during any ground disturbances related to the proposed BSEP.

DISPOSITION OF DATA

This report will be filed with ENSR Corporation. A copy will be retained at SWCA Environmental Consultants, along with maps, field notes, photographs, and all other records relating to the project.

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INTRODUCTION

This report presents the findings of a comprehensive literature review, museum records search, and reconnaissance field survey conducted for the Beacon Solar Energy Project (BSEP) located in Kern County, California. This study was performed in order to evaluate the paleontological sensitivity of the project area and vicinity, assess potential project-related impacts on paleontological resources, and provide recommendations for the management of paleontological resources. This study was conducted in accordance with the professional guidelines established by the Society of Vertebrate Paleontology (SVP) (1995) and requirements set forth by the California Energy Commission (2000).

DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist (Murphey and Daitch, 2007). Thus, once destroyed, a fossil can never be replaced. Fossils are an important scientific and educational resource because they are used to:

- Study the phylogenetic relationships between extinct organisms, as well as their relationships to modern groups.
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including biases in the fossil record.
- Reconstruct ancient environments, climate change, and paleoecological relationships.
- Provide a measure of relative geologic dating, which forms the basis for biochronology and biostratigraphy, and which is an independent and supporting line of evidence for isotopic dating.
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time.
- Study patterns and processes of evolution, extinction, and speciation.
- Identify past and potential future human-caused effects to global environments and climates (Murphey and Daitch, 2007).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Fossils are classified as nonrenewable scientific resources and are protected by various laws, ordinances, regulations, and standards (LORS) across the country. The SVP (1995) has established professional standards for the assessment and mitigation of adverse impacts to paleontological resources. This paleontological assessment was conducted in accordance with the LORS that are applicable to paleontological resources within the Beacon Solar Energy Project (BSEP) area. These LORS are summarized in Table 1 and the following paragraphs.

FEDERAL

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federally administered lands. Federal protection for significant paleontological resources would apply to the project if any construction or other related project impacts occurred on federally owned or managed lands. No federal protection of paleontological resources pertains to this project.

STATE

With regard to paleontological resources, the CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA, Public Resources Code Sections 15000 et seq.). Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "*Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*"

Other state requirements for paleontological resources management are included in the Public Resources Code (Chapter 1.7), Section 5097.5 and 30244. These statutes prohibit the removal of any paleontological site or feature on public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state) lands. These protections would apply to the proposed project only if the state or a state agency were to obtain ownership of project lands during the term of the project license.

LOCAL

The Land Use, Conservation, Open Plan Element of the Kern County General Plan addresses paleontological resources under "General Provision 1.10.3: Archaeological, Paleontological, Cultural, and Historical Preservation." This General Provision states as Policy 25, "the County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors." Implementation Measure L states that "the County shall address archaeological and historical resources for discretionary projects in accordance with CEQA." Implementation Measure M states that "in areas of known paleontological resources, the County should address the preservation of these resources where feasible."

Table 1. Summary of Paleontological Laws, Ordinances, Regulations, and Standards Applicable to the Project

Agency/Owner	Pertinent Paleontological LORS
Federal	None
State	CEQA
County	Kern County General Plan
City	None

PROFESSIONAL STANDARDS

The SVP has established standard guidelines (SVP, 1995) that outline professional protocols and practices for the conducting of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Typically, state regulatory agencies with paleontological LORS accept and utilize the professional standards set forth by the SVP.

As defined by the SVP (1995:26), significant nonrenewable paleontological resources are defined as:

> …Fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments.

As defined by the SVP (1995:26), significant fossiliferous deposits are defined as:

> A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years, BP [before present].

Based on the significance definitions of the SVP (1995), all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from that for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case. [SVP, 1995]

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

RESOURCE ASSESSMENT GUIDELINES

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under federal (National Environmental Policy Act, or NEPA), state (California Environmental Quality Act, or CEQA), and local (County of Kern) laws and regulations. This study satisfies project requirements in accordance with CEQA (13 PRC, 2100 et seq.) and Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the SVP (1995) and requirements set forth by the California Energy Commission (CEC) in Appendix B, Information Requirements for an Application of the CEC's Power Plant Site Certification Regulations (CEC, 2000).

PALEONTOLOGICAL SENSITIVITY

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources," the SVP (1995:23) defines three categories of paleontological sensitivity (potential) for sedimentary rock units: high, low, and undetermined:

- **High Potential.** Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontologic resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent, including deposits

associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.

- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.
- **Undetermined Potential.** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

It should be noted that metamorphic and granitic rock units do not yield fossils and therefore have no potential to yield significant nonrenewable fossiliferous resources.

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a qualified paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within the study area.

PROJECT LOCATION AND DESCRIPTION

The Beacon Solar Energy Project (BSEP) area is located along California State Route 14, northwest of the city of California City and south of the Red Rock Canyon State Recreation Area, in Kern County, California. The 2,012-acre proposed plant site is located on a 2,584-acre parcel (2317-acre survey area for the plant site, transmission line options, plus 200 ft buffer zone) within Sections 32, 33, and 34 in Township 30 South, Range 37 East on the U.S. Geological Survey (USGS) Cantil, California and Cinco, California 7.5-minute quadrangles and Sections 3, 4, 5, 7, 8, 9, 10, 15, 16, 17 and 18 in Township 31 South, Range 37 East on the Cinco, California and Mojave NE, California 7.5-minute USGS quadrangles

(see

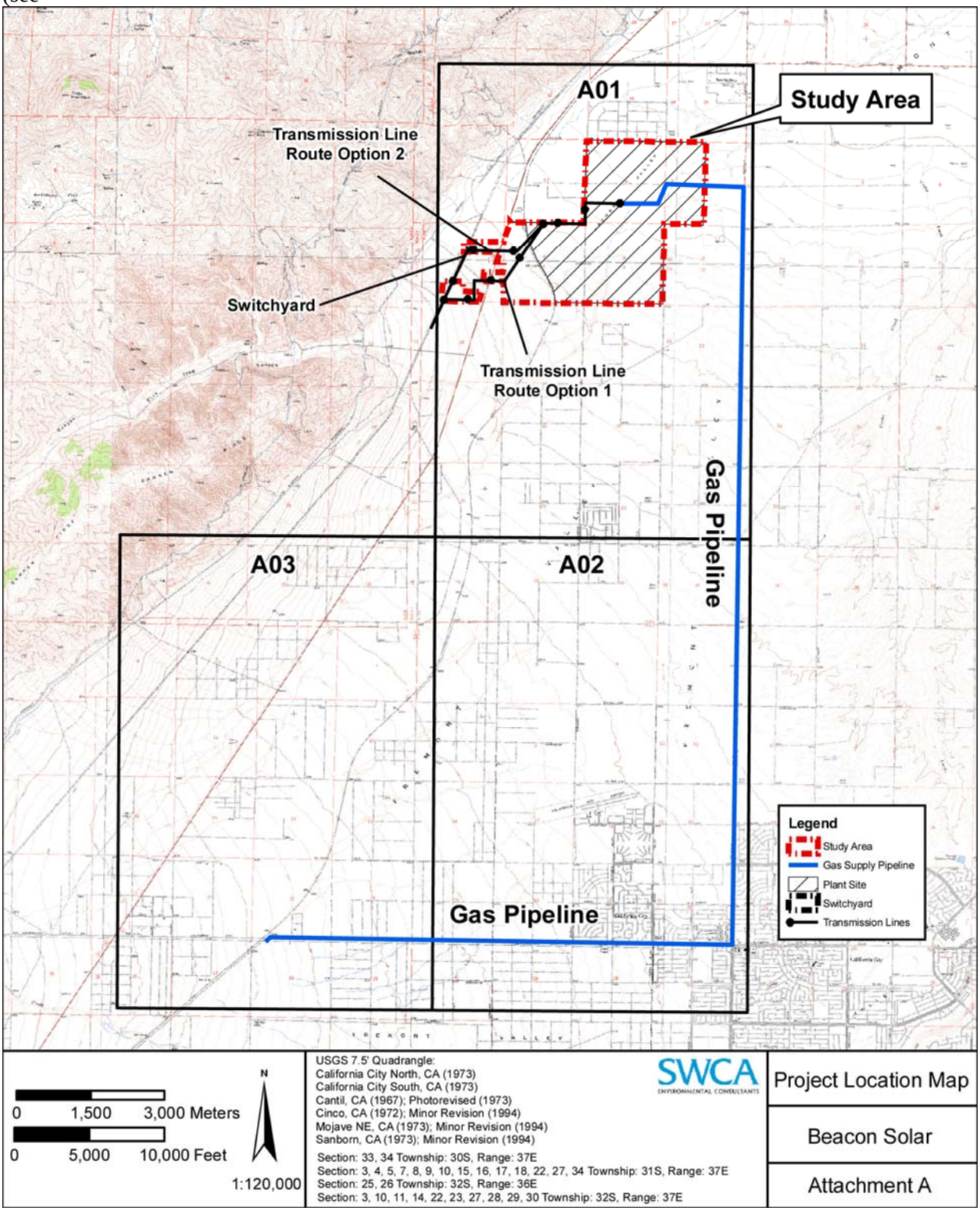

Figure **1** and Attachment A). The associated 17.17 mile gas pipeline route extends south of the plant site along Neuralia Road and then west along California City Boulevard to its intersection with the Southern Pacific Railroad. The pipeline route crosses portions of Sections 2, 3, 4, 10, 11, 14, 15, 22, 23, 26, 27, 34,

and 35 in Township 31 South, Range 37 East, Sections 2, 3, 10, 11, 14, 15, 19, 20, 21, 22, 23, 26, 27, 28, 29, and 30 in Township 32 South, Range 37 East, and Sections 23, 24, 25, and 26 in Township 32 South, Range 36 East on the Cantil, California, Cinco, California, and Mojave NE, California 7.5-minute USGS quadrangles (see Figure 1 and Attachment A). Two proposed transmission line route options are within the vicinity of the plant site and are depicted on Figure 1 and Attachment A.

The elevation of the BSEP proposed plant site ranges between 2,440 feet in the southwestern corner and 2,020 feet in the northeastern corner. The topography is generally flat with a gentle and continuous northeast-facing slope. There is also a small natural rise (approximately 20 feet high) trending northeast through the center of the plant site east of State Route 14. The topography along the proposed gas pipeline route is also generally flat, gently sloping to the northeast, with an elevation ranging from 2,690 feet at the southwestern end to 2,060 feet at the northeastern corner.

Much of the surface of the BSEP area has been disturbed. The majority of the proposed plant site has been previously used as an agricultural field and the entire proposed gas pipeline route has been previously disturbed by grading activities during the creation of Neuralia Road and California City Boulevard. These disturbed areas contain ruderal vegetation and, in places, are completely covered by aeolian sand deposits. The only areas which have not been disturbed and contain native creosote scrub vegetation are in Sections 7, 17, and 18, in Township 31 South, Range 37 East, in the southwestern corner of the BSEP proposed plant site.

PROJECT PERSONNEL

SWCA paleontologists Lauren Seckel and Jessica DeBusk and paleontological field technicians Taya Cummins and John Covert conducted fieldwork. Lauren Seckel and Jessica DeBusk authored this report. GIS Specialist David Cao produced graphics. Technical Editor Russ Gaitlin edited and formatted this report. Cara Corsetti, Qualified Paleontologist and SWCA Paleontology Program Director, managed this project and provided QA/QC review of this technical report.

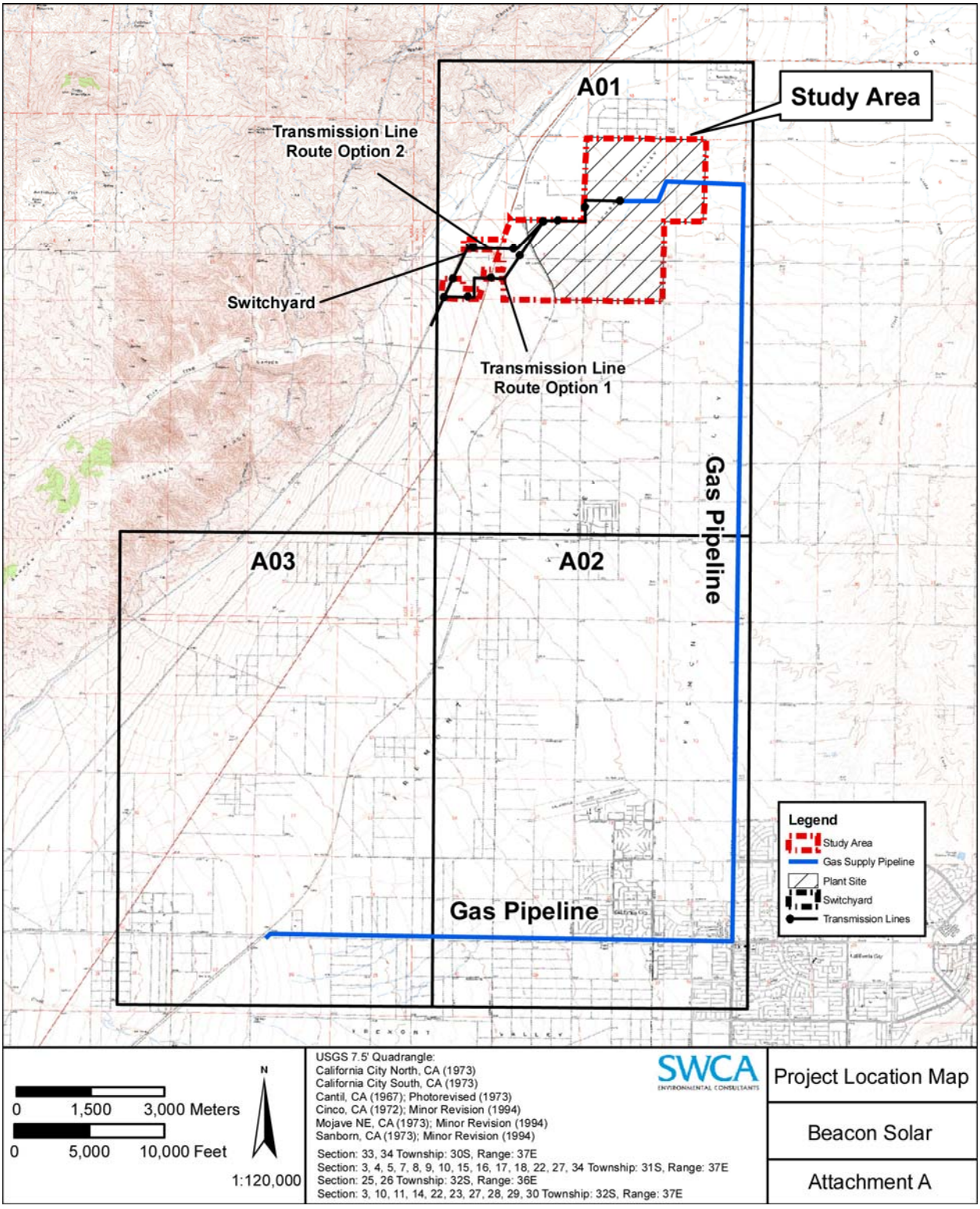

Figure 1. Project Location Map

METHODS

Due to the nature of the fossil record, paleontologists cannot know either the quality or the quantity of fossils present in a given geologic unit prior to natural erosion or human-caused exposure. Therefore, in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce scientifically significant fossils elsewhere within the same geologic unit (both within and outside of the study area) or a unit representative of the same depositional environment.

MUSEUM RECORDS SEARCH

For this project, museum records searches were performed by the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (LACM), the Department of Earth Sciences at the San Bernardino County Museum (SBCM), and the Department of PaleoServices at the San Diego Natural History Museum (SDNHM). Museum collections records were searched for the purposes of determining whether there are any known fossil localities in or near the BSEP project site, identifying the geologic units present in the project area, and determining the paleontological sensitivity ratings of those geologic units in order to assess potential impacts to nonrenewable paleontological resources. Published and unpublished literature and geologic maps were reviewed, and mitigation measures specific to this project were developed in accordance with the SVP's professional standards and guidelines (1995).

Geologic units were assigned a paleontological sensitivity rating (see Table 2) based on the museum records search and literature review. For the area underlying the BSEP, geologic maps (see Figure 2 and Attachment B) and paleontological sensitivity maps (see Figure 3 and Attachment C) were created.

FIELD SURVEY

A pedestrian reconnaissance survey of the 2,584-acre BSEP property, including the proposed plant site, 200 ft buffer area and transmission line route options, was performed between November 7 and November 19, 2007. A survey of the proposed gas pipeline route was performed between December 13 and December 17, 2007. The linear surveys included a 150-foot buffer (75 foot buffer on either side of the centerlines). The purpose of the fieldwork was to inspect the study area for surface fossils and exposures of potentially fossil-bearing geologic units and to determine areas in which fossil-bearing geologic units could be exposed during project-related ground disturbances.

GEOLOGY AND PALEONTOLOGY

GEOLOGIC SETTING

California is naturally divided into the following twelve geomorphic provinces, each distinguished from one another by having unique topographic features and geologic formations: (1) the Sierra Nevada, (2) the Klamath Mountains, (3) the Cascade Range, (4) the Modoc Plateau, (5) the Basin and Range, (6) the Mojave Desert, (7) the Colorado Desert, (8) the Peninsular Ranges, (9) the Transverse Ranges, (10) the Coast Ranges, (11) the Great Valley, and (12) the Offshore area. The Beacon Solar Energy Project (BSEP) area is located in the western region of the Mojave Desert geomorphic province. The Mojave Desert is bounded to the northwest by the Transverse Ranges and to the southwest by the Colorado Desert. The Sierra Nevada and the Basin and Ranges provinces establish the northern boundary and the Nevada state line and Colorado River establish the eastern boundary (Norris and Webb, 1976).

The Mojave Desert is an elevated alluvial plain located on a wedge-shaped fault block bounded by the San Andreas and Garlock fault zones to the southwest and north, respectively. The western Mojave Desert is characterized by three major rock groups. The first is the basement complex consisting of a pre-Tertiary granitoid batholith believed to be an extension of the Sierra Nevada batholith (Dibblee, 1967). The second is Tertiary-age sedimentary and volcanic rocks mostly of terrestrial origin and consisting of conglomerates, sandstones, shales, carbonates, tuffs and breccias, lava flows, and basaltic and rhyolitic plugs. The third major rock assemblage in the western Mojave Desert is composed of Quaternary alluvial, fluvial, and playa, or lake bed, deposits. Quaternary-age alluvial sediments, largely derived from the San Gabriel and Sierra Nevada Mountains, were deposited either conformably or, more commonly, unconformably on top of Tertiary- and pre-Tertiary–age rocks. The depth of alluvial deposition ranges from a few feet to possibly several thousand feet in thickness. These Quaternary-age deposits underlie the BSEP proposed plant site and gas pipeline route.

Table 2. Geologic Units Underlying the Beacon Solar Energy Project Area and their Paleontological Sensitivity Ratings

Geologic Unit	Age	Taxa	Paleontological Sensitivity Rating
Younger Alluvium	Holocene	None	Low to High
Older Alluvium	Pleistocene	Terrestrial Vertebrates	High
Lake Bed Deposits	Early Holocene to Pleistocene	Terrestrial Vertebrates	Low to High

SITE-SPECIFIC GEOLOGY AND PALEONTOLOGY

According to geologic mapping by Jennings et al. (1962), Samsel (1962), Smith (1964), and Amoroso and Miller (2006), the BSEP area and associated gas pipeline route are underlain by Quaternary deposits ranging from Pleistocene (1.8 million years old [Ma] to 10,000 years before present [BP]) to Holocene (10,000 years BP to Recent) in age (see Figure 2 and Attachment B).

Quaternary alluvium covers the majority of the BSEP area. Surficial deposits of Quaternary alluvium are dated to the Holocene and are known as younger alluvium. Quaternary older alluvium, which dates to the Pleistocene and has the potential to produce significant vertebrate fossils, is present only in the subsurface. Quaternary lake bed deposits are present only in the northeastern portion of the proposed BSEP plant site and gas pipeline route. It is likely that the uppermost layers of lake bed deposits date to the Holocene; however, at an undetermined but potentially shallow depth, these sediments date to the Late Pleistocene and could produce significant paleontological resources.

Quaternary Younger Alluvium

The youngest geologic unit found within the BSEP area is Quaternary alluvium of Holocene age (10,000 years ago to Recent) (Jennings et al., 1962; Samsel, 1962; Smith, 1964; Amoroso and Miller, 2006). This unit, making up the majority of the surficial deposits within the project area, is composed of unconsolidated valley and stream deposits of arkosic sands, gravel, and volcanic debris (Samsel, 1962; Smith, 1964). Although these Holocene-aged sediments often contain the remains of modern organisms, they are too young to contain significant paleontological resources. Therefore, younger alluvium is assigned a low paleontological sensitivity.

Quaternary Older Alluvium

Quaternary alluvium of Pleistocene age (1.8 Ma to 10,000 years BP) is found subsurface throughout the majority of the BSEP area. Pleistocene-aged alluvium has proven to yield scientifically significant vertebrate fossils both within the region and throughout southern California and is thus determined to have a high potential for paleontological resources (Whistler, 1990; McLeod, 2007; Scott, 2007).

Quaternary Lake Bed Deposits

Jennings et al. (1962) and Smith (1964) note surficial exposures of Quaternary lake bed deposits in the northeastern corner of the proposed BSEP plant site and along the northeastern portion of the associated gas pipeline route. Based on recent work by Amoroso and Miller (2006), these deposits are composed surficially of recent playas and mud flats, and of clay, silt, and fine sands at depth. Amoroso and Miller (2006) date these sediments to the Holocene and the latest Pleistocene. Although the lake bed exposures are unlikely to contain significant paleontological resources in their uppermost layers, similar deposits nearby and elsewhere in the Mojave Desert have produced numerous fossil vertebrate localities (McLeod, 2007; Scott, 2007; Jefferson, 1989; Reynolds, 1989; Jefferson, 1991). Therefore, these sediments are determined to have a high paleontological sensitivity at an unknown, but potentially shallow depth.

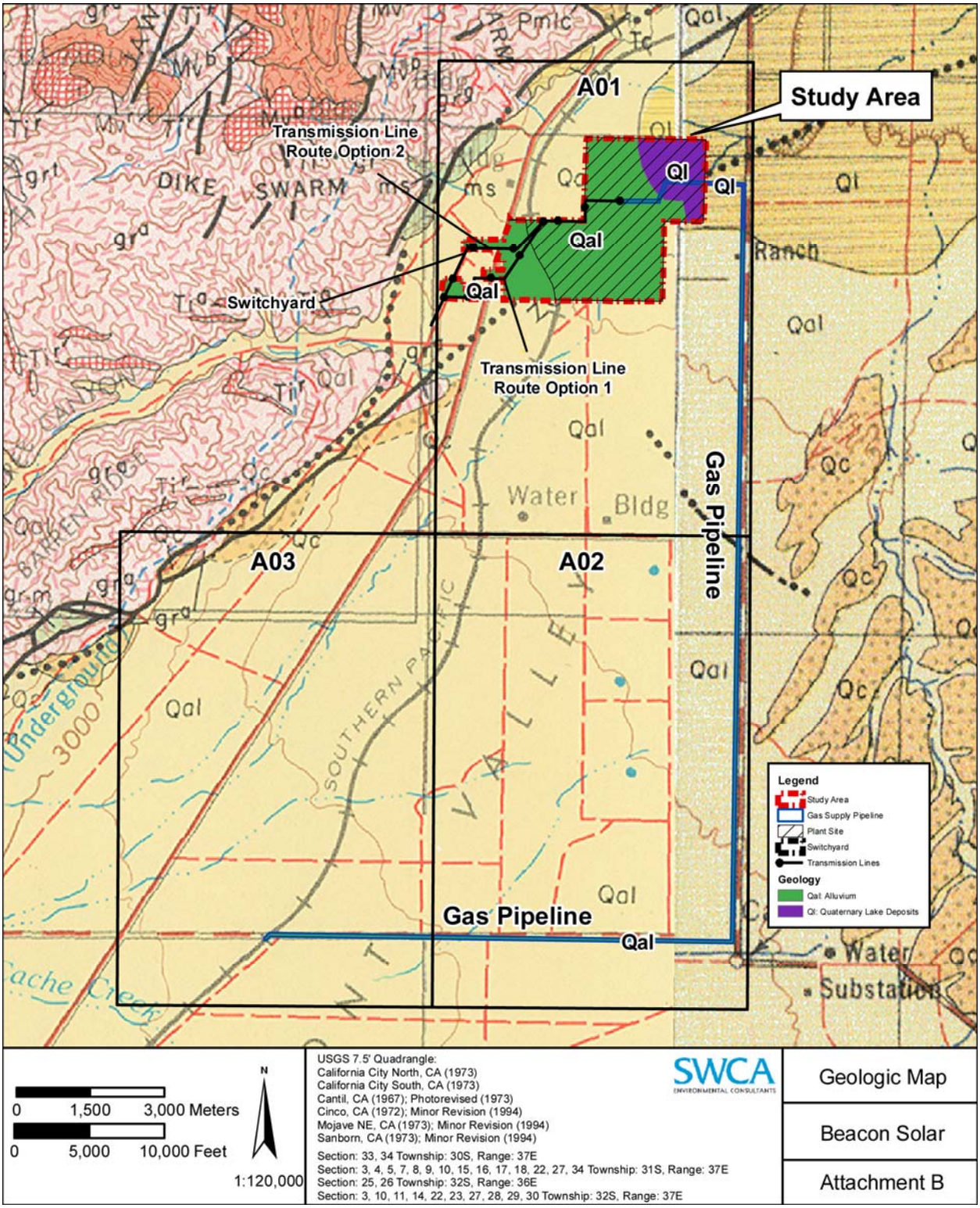

Figure 2. Geologic Map of Project Area*

*Geology taken from Jennings, et al. (1962), Samsel (1962), and Smith (1964) The project area (outlined in red) is underlain by the geologic units Qal (Quaternary alluvium) and Ql (Quaternary lake bed deposits).

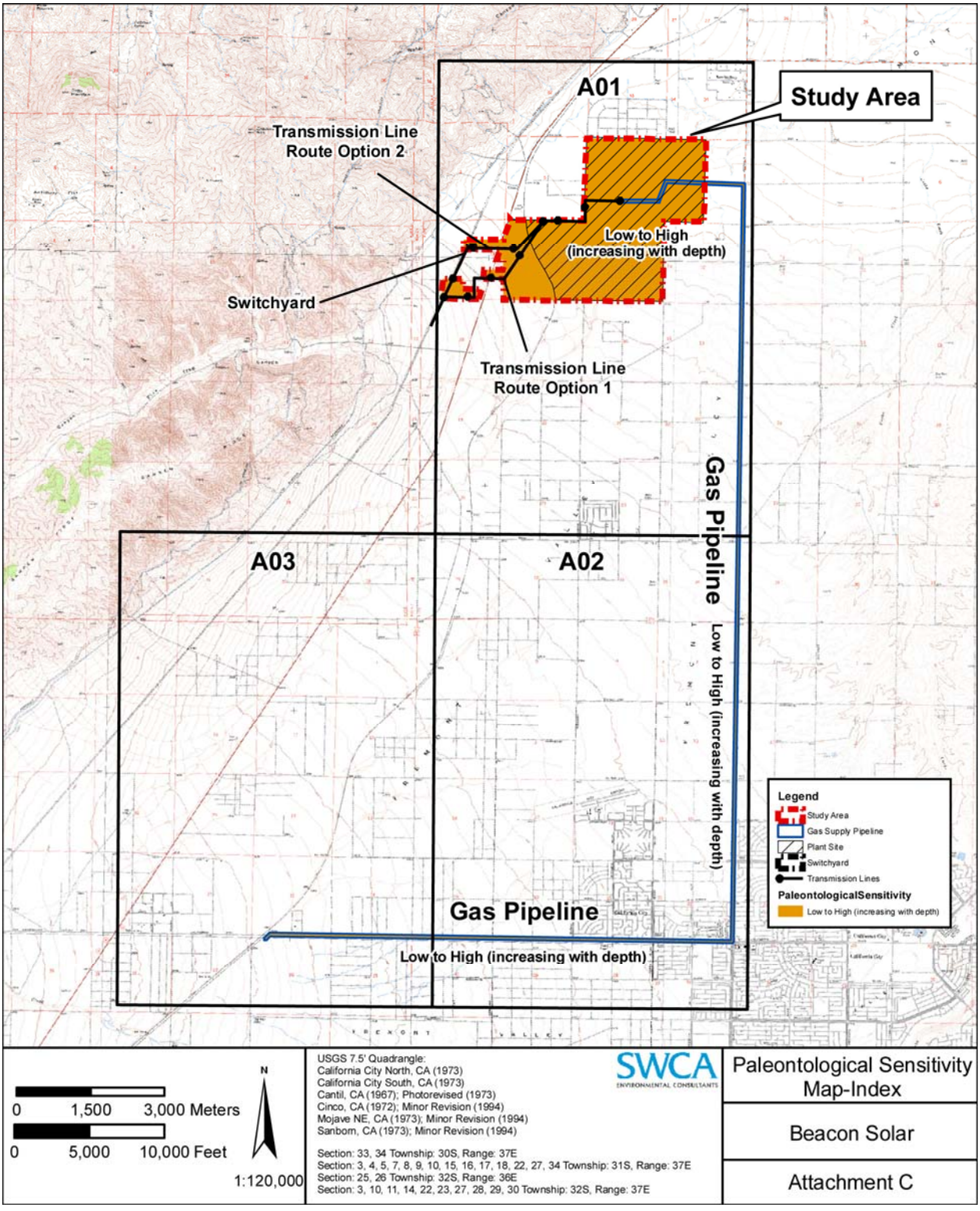

Figure 3. Paleontological Sensitivity of the Geologic Units exposed within the Project Area

ANALYSIS AND RESULTS

MUSEUM RECORDS SEARCH

A comprehensive review of museum collections records at the SBCM, LACM, and SDNHM confirmed that no fossil localities have been previously recorded within the BSEP project plant site, transmission line route options, or gas pipeline route, or within 1 mile of the project boundaries. There are, however, 15 vertebrate fossil localities known from similar geologic units beyond 1 mile of the project boundaries. There is one vertebrate locality from mountain wash deposits between Jawbone Canyon and Kelso Valley, northwest of the project area; 14 vertebrate localities producing 28 different taxa are known from Pleistocene-age fan, fluvial, and lacustrine deposits in the Red Rock Canyon area, directly north of the project area (see Table 3) (McLeod, 2007).

Table 3. Vertebrate Fossils Previously Recovered Greater Than 1 mile Outside of the Project Area

Geological Formation	Museum Locality Number	Taxon	Common Name
Mountain wash deposits	LACM 5943	Leporidae	rabbit
Quaternary fan, fluvial, and lacustrine deposits	*LACM 4708-4709, 5771-5775, 5836, 5922-5926, 5932	*Sorex palustris*	shrew
		Gerrhonotus sp.	alligator lizard
		Phrynosoma sp.	horned lizard
		Sceloporus occidentalis	fence lizard
		Pituophis sp.	gopher snake
		Lampropeltis getulus	king snake
		Passeriformes	perching birds
		Pipistrellus hesperus	bat
		Lepus californicus	rabbit
		Sylvilagus audubonii	rabbit
		Ammospermophilus leucurus	squirrel
		Tamias minimus	squirrel
		Thomomys monticola	pocket gopher
		Thomomys townsendii	pocket gopher
		Dipodomys merriami	kangaroo rat
		Dipodomys panamintinus	kangaroo rat
		Perognathus longimembris	pocket mouse
		Chaetodipus penicillatus	pocket mouse
		Neotoma fucipes	wood rat
		Microtus californicus	deer mouse
		Peromyscus maniculatus	deer mouse
		Reithrodontomys megalotis	deer mouse
		Mammuthus columbi	mammoth
		Canis sp.	dog
		Equus sp.	horse
		Antilocapridae	pronghorn antelope
		Camelops sp.	camel
		Bison antiquus	bison

LACM = Natural History Museum of Los Angeles County
*Museum records indicate that many of the smaller animals were collected from a local lignitic layer. An analysis of these fossils was published by D. W. Whistler (1990).

FIELD SURVEY

A pedestrian reconnaissance survey of the proposed BSEP plant site and transmission area was performed between November 7 and November 19, 2007 by SWCA paleontologists Lauren Seckel and Jessica DeBusk and paleontological field technicians John Covert and Taya Cummins. A survey of the proposed gas pipeline route was completed between December 13 and December 17, 2007 by Lauren Seckel and Taya Cummins. Surveyors walked parallel transects in order to cover the entire 2,584-acre plant site and transmission area and 17.6-mile pipeline route. Particular attention was focused in the southwestern portion of the BSEP proposed plant site, which has not been disturbed by previous agricultural clearing or grading.

A single invertebrate fossil (SWCA Field Locality TKC110907-01) was found on November 9, 2007 in the southwestern portion of the proposed plant site, east of California State Route 14, in undisturbed native creosote scrub. The bivalve, field identified as a pectin (scallop), is large, almost 13 cm across, and complete, retaining both halves as well as the hinge (see Photograph 6). The large pectin was found in a burned trash pile of broken glass bottles and metal debris (see Photograph 7) and appears as if it may have been cleaned as there is no matrix remaining on the shell. The pectin fossil is not *in situ* and was determined to be associated with the trash pile.

Photograph 1. View from the northwest corner of the proposed BSEP area, looking southeast over a sandy abandoned agricultural field.

Photograph 2. View from the northeast corner of the proposed BSEP area, looking southwest over an abandoned agricultural field.

Photograph 3. View from the southeast corner of the proposed BSEP area, looking northwest over a very sandy abandoned agricultural field.

Photograph 4. View from the center of the proposed BSEP area, looking west over a cleared field.

Photograph 5. View from the center of the western edge of the BSEP area, looking east over undisturbed native creosote scrub.

Photograph 6. View of fossilized pectin (SWCA Field Locality TKC110907-01).

Photograph 7. Overview of SWCA Field Locality TKC110907-01 and large trash pile, looking west.

Photograph 8. View facing south along Neuralia Rd and the proposed gas pipeline route.

Photograph 9. View facing east along California City Blvd and the proposed gas pipeline route.

CONCLUSIONS

The destruction of fossils as a result of human-caused ground disturbance has a significant cumulative impact, as it makes biological records of ancient life permanently unavailable for study by scientists. Implementation of proper mitigation measures can, however, reduce the impacts to the paleontological resources to below the level of significance. Shallow excavations (less than 6 ft) related to the BSEP project are unlikely to result in adverse impacts to significant paleontological resources; however, deeper excavations (greater than 6 feet) will most likely impact Late Pleistocene sediments and may have an adverse impact to paleontological resources unless proper mitigation measures are implemented.

Various activities on the plant site and along the linear facilities routes may require excavations deeper than 6 feet, e.g., foundations/footings and other equipment in the power block and new transmission pole structures. Monitoring is recommended where project construction activities require excavations greater than 6 feet.

Using information from geologic maps and the results of the paleontology study of the BSEP area, the locations of the paleontologically sensitive geologic units underlying the BSEP area were identified and are depicted in Figure 3 and in Attachment C.

RECOMMENDED MITIGATION MEASURES

Ground-disturbing activities in the Beacon Solar Energy Project (BSEP) area may result in adverse impacts to significant paleontological resources unless proper mitigation measures are implemented. Implementation of proper mitigation measures can, however, reduce the impacts to the paleontological resources to below the level of significance.

The following mitigation measures have been developed to ensure that the potential adverse impacts of BSEP ground disturbance on paleontological resources are at a less than significant level. The measures are based on the SVP standard guidelines (1995) and meet the requirements of CEQA. These mitigation measures have been used throughout California and have been demonstrated to be successful in protecting paleontological resources while allowing timely completion of construction projects in paleontologically sensitive areas.

PRE-CONSTRUCTION PHASE

Measure A. Prior to the start of any project related construction (defined as construction related vegetation clearing, ground disturbance and preparation, and site excavation activities), the project owner shall ensure that the designed paleontological resource specialist approved by the CEC Compliance Project Manager (CPM) is available for field activities and prepared to implement the conditions of certification. The designated paleontological resource specialist shall be responsible for implementing all the paleontological conditions of certification and for using qualified personnel to assist in this work.

Measure B. Prior to the start of construction, a Paleontological Resource Monitoring and Mitigation Plan drafted by the designated paleontological resource specialist shall be submitted to the CPM for approval. The plan shall identify general and specific measures to minimize potential impacts to sensitive paleontological resources. The project paleontological resource specialist shall implement the Paleontological Resource Monitoring and Mitigation Plan (PRMMP) as needed.

The PRMMP shall include, but not be limited to, the following elements and measures.

- A discussion of the sequence of project-related tasks, such as preconstruction surveys (if any), fieldwork, flagging or staking; construction monitoring; and if fossils are discovered, mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation;

- Identification of the person(s) expected to assist with the tasks the PRMMP, and a discussion of the mitigation team leadership and organizational structure;

- Where monitoring of project construction activities is deemed necessary, the extent of the areas where monitoring is to occur;

- An explanation that the designated Paleontological Resource Specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined;

- A discussion of the equipment and supplies necessary for the recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

- Inventory, preparation and delivery for curation info a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources; and

- Identification of the institution that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any

requirements of specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution.

Measure C. Prior to the start of construction, the Paleontological Resource Specialist shall prepare a staff training program for review and approval by the CPM. The paleontological training program shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources. The training program shall also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities.

CONSTRUCTION PHASE

Measure D. The designated paleontological resource specialist or paleontological monitor shall be present at times he or she deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in areas with a significant potential for fossil-bearing sediments to occur. All ground-disturbing activities at depths greater than 6 feet shall be monitored on a full-time basis because of their high paleontological sensitivity (see Figure 3 and Attachment C). All ground disturbances at depths less than 6 feet will be "spot-checked" by paleontological monitors. The frequency of the spot checks shall be determined by the Paleontological Specialist and will be based on factors such as the extent of ground disturbance and the location of those disturbances in relation to paleontologically sensitive sediments. Paleontological monitoring will include inspection of exposed rock units and collection of matrix to be testing for the presence of microscopic fossils. Paleontological monitors will have authority to temporarily divert excavations or drilling away from exposed fossils in order to efficiently and professionally recover the fossil specimens and collect associated data.

POST-CONSTRUCTION PHASE

Measure E. If any significant paleontological resource materials are recovered**,** the project owner, through the designated Paleontological Resource Specialist, shall ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all such materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Measure F. The project owner shall ensure preparation of a Paleontological Resources Report by the designated paleontological resource specialist. The Paleontological Resources Report shall be completed following the analysis of the recovered fossil materials and related information. The project owner shall submit the Paleontological Resources Report to the CPM for approval. If applicable, the Paleontological Resources Report shall include, but not be limited to, a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources found in the field; determinations of sensitivity and significance; and a statement by the paleontological resource specialist that project impacts to paleontological resources have been mitigated. If fossil materials were recovered, the Paleontological Resources Report shall be submitted with a request for confidentiality.

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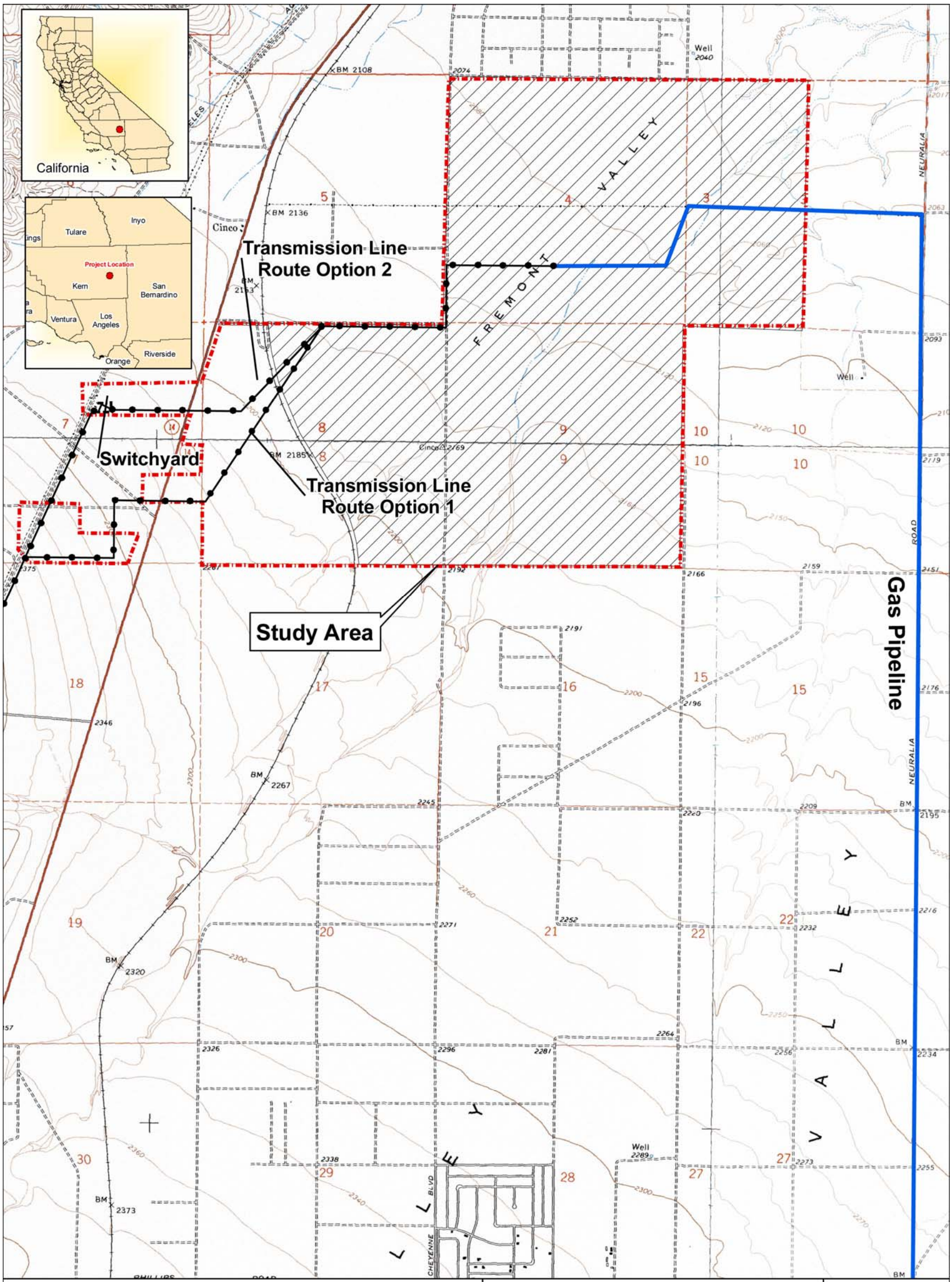
Attachment A:
Project Location Maps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Riverside
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Study Area
Gas Pipeline
FREMONT VALLEY
NEURALIA ROAD
CHEYENNE BLVD
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Plant Site
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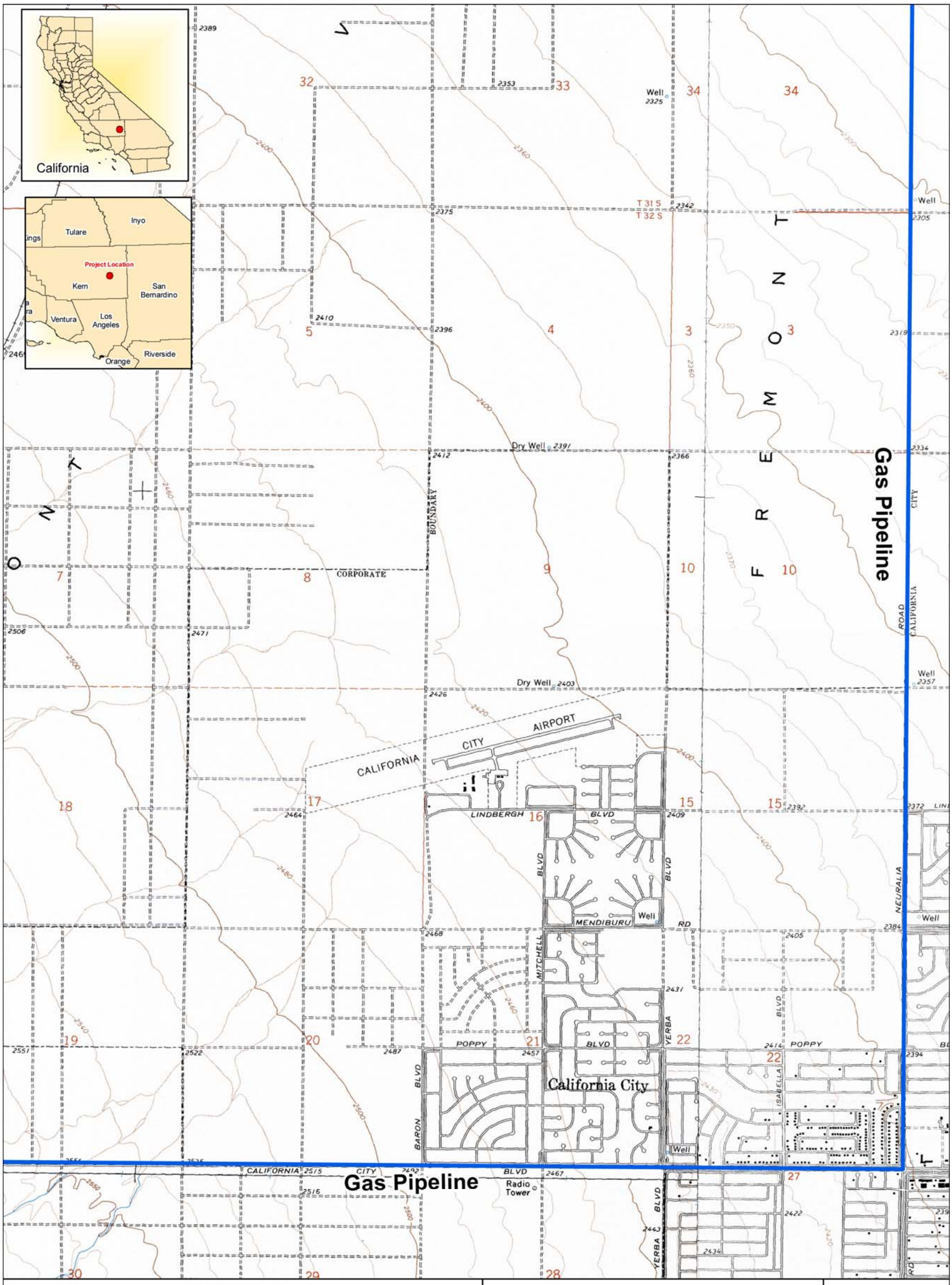
Beacon Solar
Attachment A
SWCA
ENVIRONMENTAL CONSULTANTS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Transmission Lines
Project Location
Map- A02
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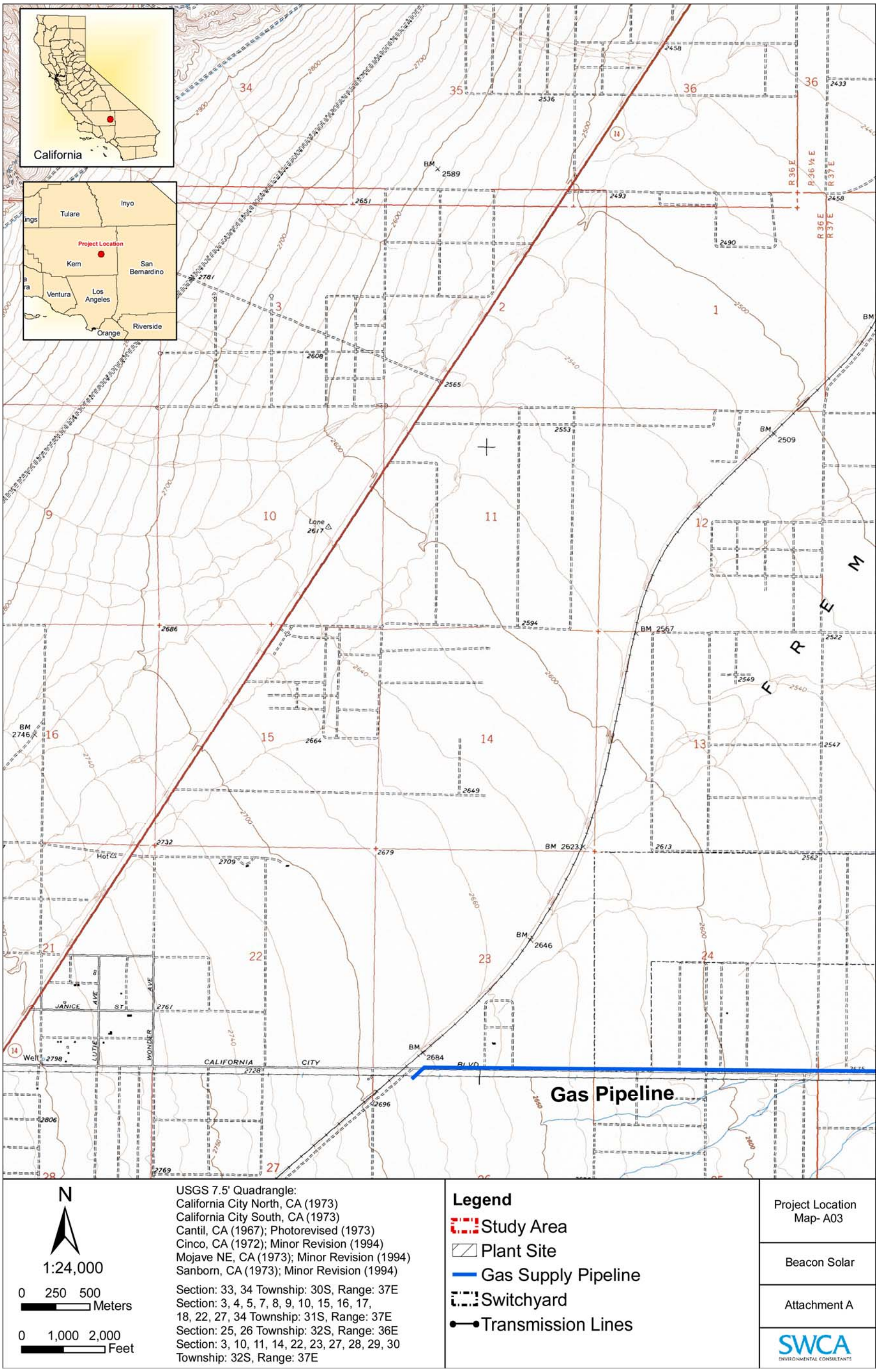
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Study Area
Plant Site
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Switchyard
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Map- A03
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Attachment A
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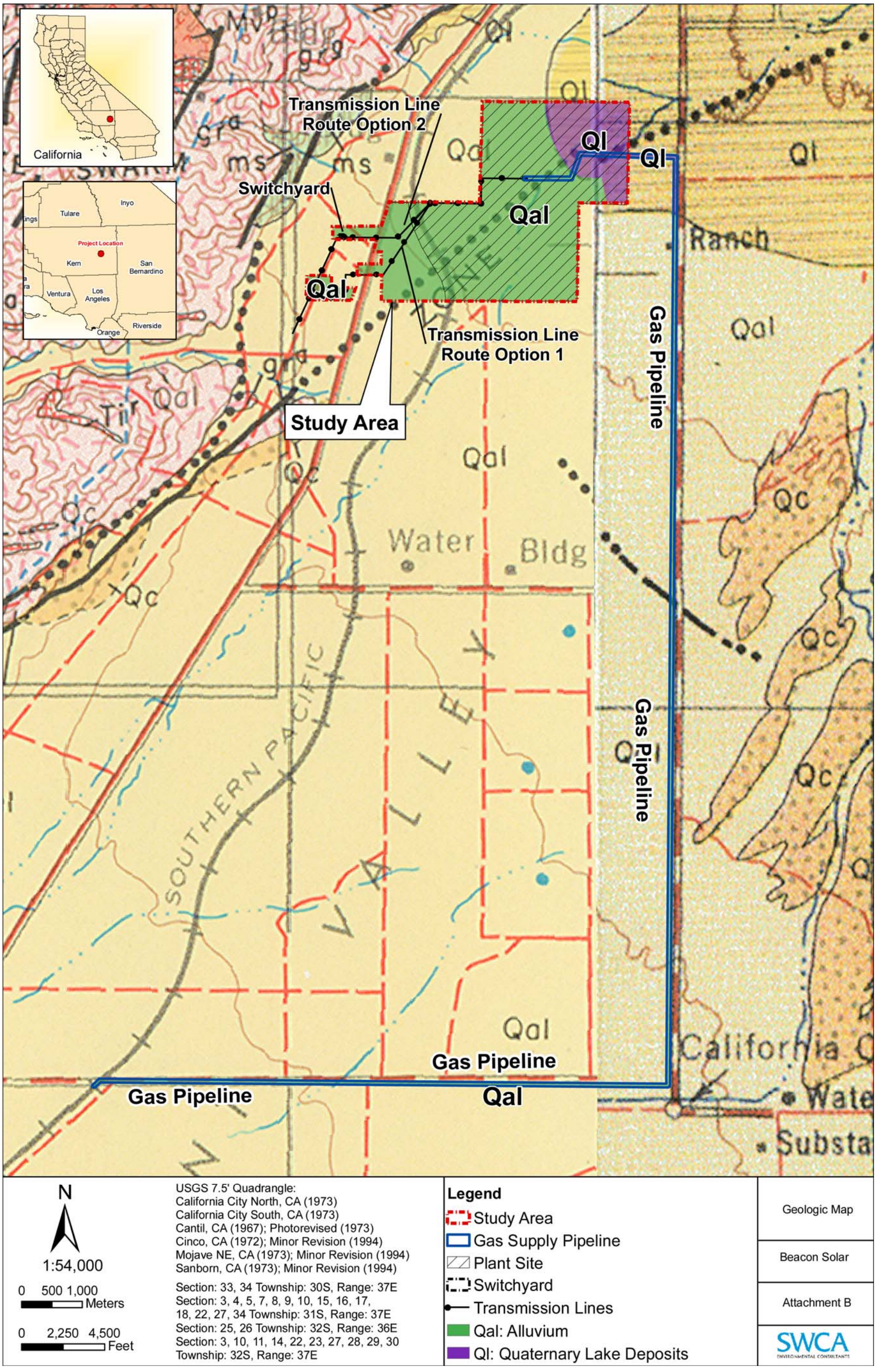
ENVIRONMENTAL CONSULTANTS

Attachment B:
Geologic Map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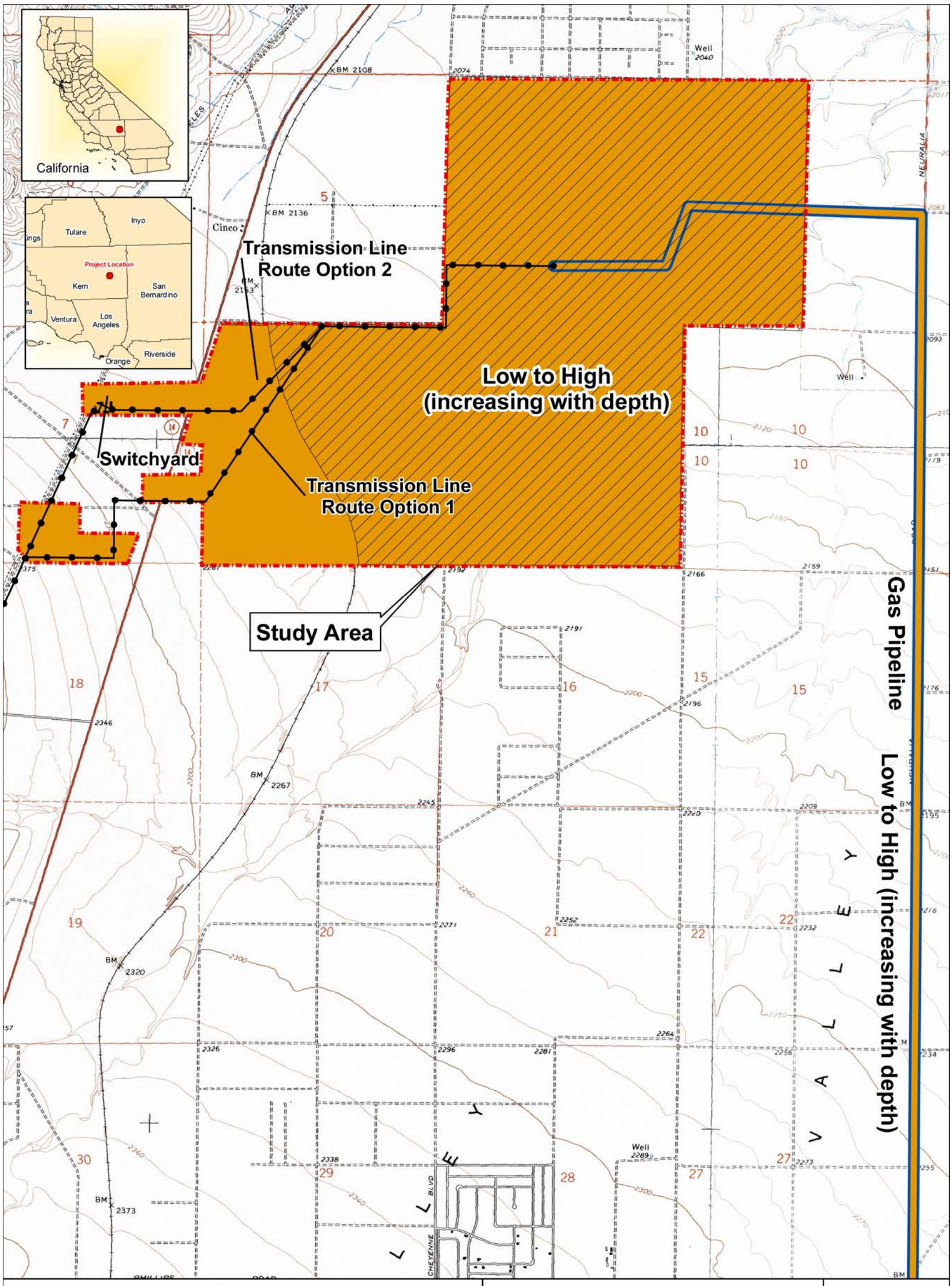
Plant Site
Switchyard
Transmission Lines
Qal: Alluvium
Ql: Quaternary Lake Deposits
Geologic Map
Beacon Solar
Attachment B
SWCA
ENVIRONMENTAL CONSULTANTS

Attachment C:
Paleontologic Sensitivity Maps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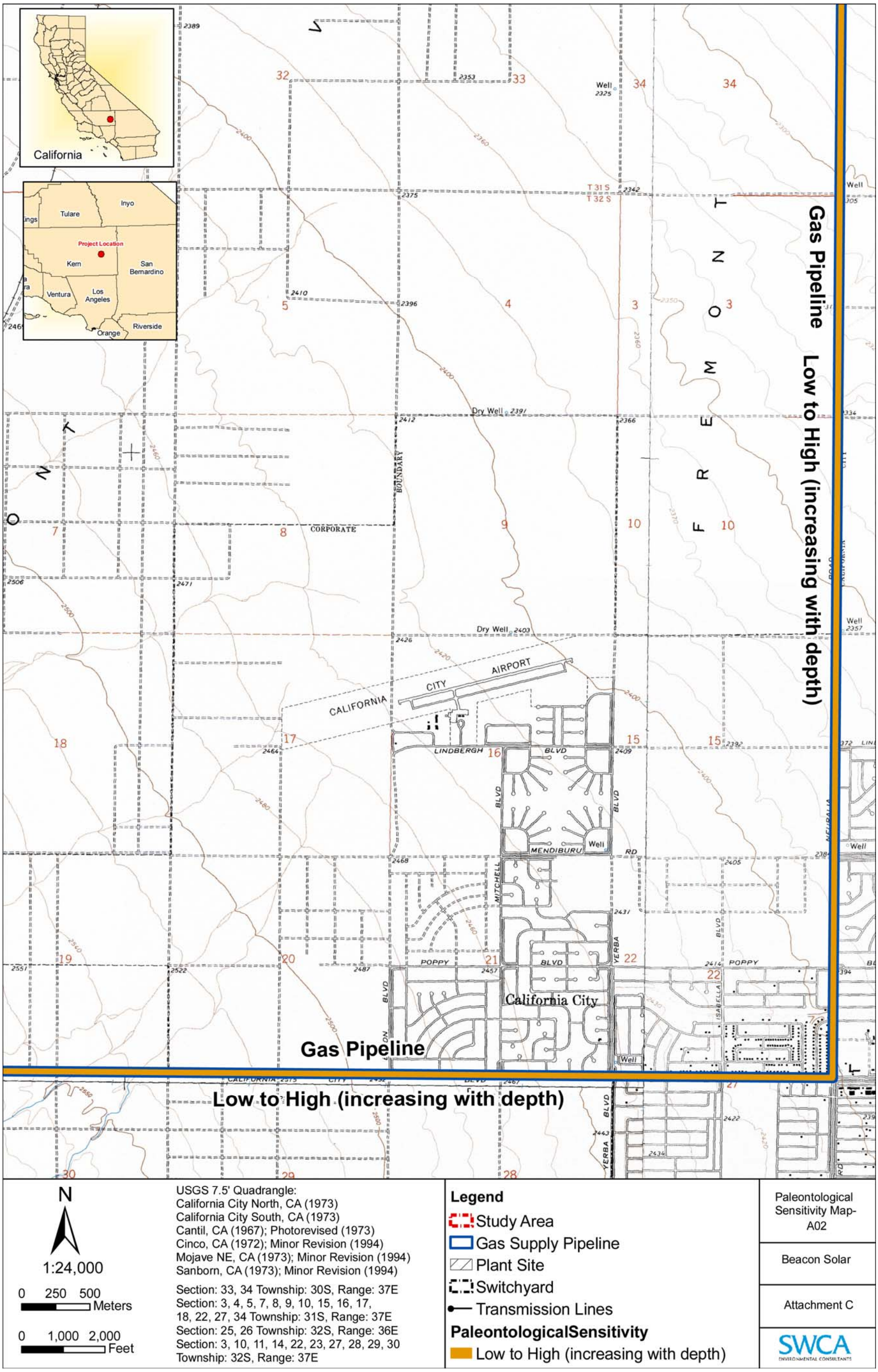
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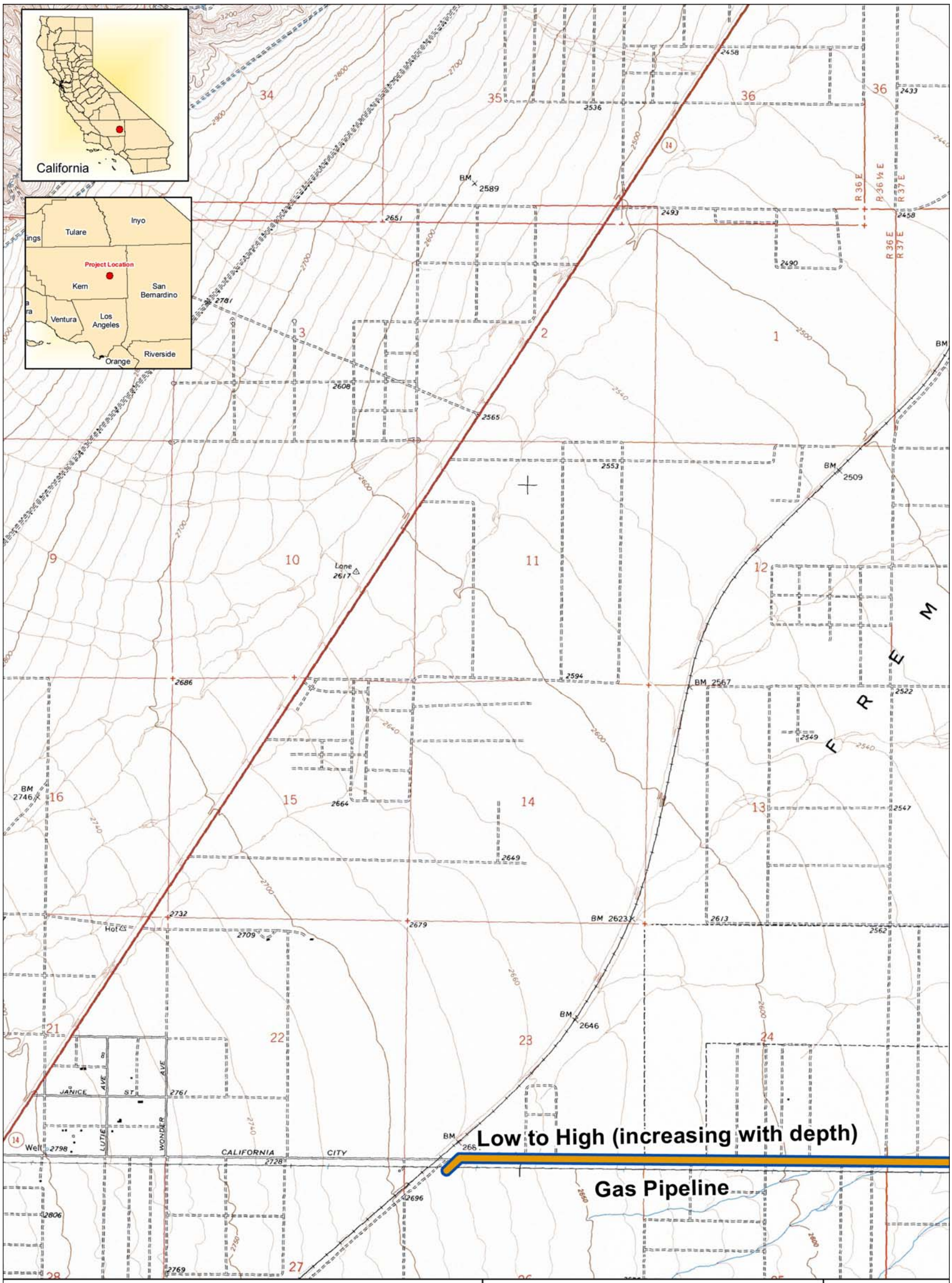
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Low to High (increasing with depth)
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