Draft
Environmental Impact Report

Appendices - Volume 4

Appendices F through I

AVEP Solar Project

Kern County
Planning and Natural Resources Department
Bakersfield, California

January 2021

Appendix F

Cultural Resources Documentation

ESA

Appendix F-1

Phase I Cultural Resources Survey

ESA

NON-CONFIDENTIAL/REDACTED

PHASE I CULTURAL RESOURCES SURVEY
AVEP SOLAR PROJECT
KERN COUNTY, CALIFORNIA

Prepared for:

Tumbleweed Solar Facility
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October 2020
PN 26310.01

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MANAGEMENT SUMMARY

This report documents an intensive Phase I archaeological survey conducted for the AVEP Solar Project (Project), Kern County, California. The Project comprises three facilities: Chaparral Solar Facility, Rabbitbrush Solar Facility, and Tumbleweed Solar Facility.

The Project will be sited on approximately 2,117 acres (ac) of private land. The 125 MW Chaparral Solar Facility comprises approximately 764-ac of undeveloped open desert. The 125 MW Tumbleweed Solar Facility comprises approximately 721-ac of active agriculture and undeveloped open desert in two non-contiguous portions (eastern and western). The 125 MW Rabbitbrush Solar Facility comprises approximately 632-ac of undeveloped open desert and scattered low density rural land in two non-contiguous portions (eastern and western).

An original study area totaling 3,116-ac within which these three Facilities will be located was surveyed (Study Area). A total of 1,606-ac was surveyed for the Chaparral Solar Facility, 827-ac for the Rabbitbrush Solar Facility; and 683-ac for the Tumbleweed Solar Facility. The Chaparral and Rabbitbrush Solar Facilities Project areas were subsequently reduced in size due to the existence archaeological, cultural and other environmental constraints in order to avoid impacts to these resources. In addition, approximately 0.75 miles of previously unsurveyed segments of proposed electrical collection line routes were surveyed for the Project.

While the surveyed Study Area was 3,116-ac in total size, the proposed Project will be located on 1,985-ac, and only those cultural resources within the 1,985-ac Project footprint therefore have the potential to be adversely impacted. The additional 1,131-ac surveyed will not be included within the Project footprint and are not further considered in this report as this area will not be impacted by the Project. The survey results for this additional area can be found in Appendix E.

ASM Affiliates, Inc., conducted this study with David S. Whitley, Ph.D., RPA, serving as principal investigator. Background studies, including an archival records search and literature review, and fieldwork for the survey were completed from July to October 2017, in March 2018, and April 2019. The study was undertaken to provide background data to assist Kern County with environmental review pursuant to the California Environmental Quality Act (CEQA).

A records search of site files and maps was completed in May 2017 at the Southern San Joaquin Valley Information Center, California State University, Bakersfield. According to the records search, 11 previous cultural resource studies covered portions of the Project area, with numerous additional studies in the surrounding 0.5-mile buffer. Four archaeological sites had been previously recorded within the Chaparral Solar Facility Project area; no sites had been previously recorded in the Rabbitbrush and Tumbleweed Solar Facilities Project areas. [redacted]

An intensive Phase I Survey was conducted by ASM Affiliates with an archaeological field crew walking 15-meter wide transects across the Project areas. A total of 12 cultural resources were reidentified or newly identified and recorded during the survey of the Project Facilities footprint. Seven of these are prehistoric and five are historic archaeological sites. Eleven of the sites are within the Chaparral Solar Facility Project area. The twelfth site, AVEP-RA-31 [redacted] is within the Rabbitbrush Solar Facility Project area. No archaeological sites are present within the Tumbleweed Solar Facility Project area.

Due to the nature of the site, a Phase II test excavation and determination of significance was conducted at the location of site AVEP-RA-31, [redacted] An intensive Ground Penetrating Radar (GPR) examination of the AVEP-RA-31 site area was also conducted as part of this study. [redacted]

It is recommended that mitigation of potential adverse impacts to all sites with the Project area, with the exception of AVEP-RA-31 (located on the Rabbitbrush Facility), be incorporated by avoidance and preservation in place, or that Phase II test excavations and determinations of significance be conducted on them, to evaluate their integrity and significance/eligibility, in order to develop final recommendations for their treatment prior to Project approval. It is recommended that archaeological monitoring of groundsurface disturbance be conducted at site AVEP-RA-31, [redacted]

1. INTRODUCTION AND REGULATORY CONTEXT

ASM Affiliates was retained by Chaparral Solar Facility, LLC, Tumbleweed Solar Facility, LLC, and Rabbitbrush Solar Facility, LLC (the "Applicants"), to conduct an intensive Phase I Cultural Resources Survey for the AVEP Solar Project (Project), Kern County, California. The Project comprises three facilities: Chaparral Solar Facility, Rabbitbrush Solar Facility, and Tumbleweed Solar Facility, and three associated segments of electrical collection lines. The purpose of the Phase I survey is to identify and evaluate cultural and historical resources, if any, to provide data to support the County environmental review pursuant to the California Environmental Quality Act (CEQA, as amended January 1, 2015), Public Resources Code (PRC), Division 13 (Environmental Quality), Chapters 2.6 §21083.2 (Archaeological Resources) and 2.6 §21084.1 (Historical Resources); and the State CEQA Guidelines (as amended December 1, 2013), California Code of Regulations (CCR) Title 14, Chapter 3, Article 5 §15064.5 (Determining the Significance of Impacts on Historical and Unique Archaeological Resources). This assessment has also been prepared in accordance with the Kern County General Plan.

This investigation included:

- A background records search and literature review to determine if any known cultural resources were present in the Project area and/or whether the three Facility study areas had been previously and systematically studied by archaeologists;
- An on-foot, intensive inventory of the three Facility study areas to identify and record previously undiscovered cultural resources and to examine known sites; and
- A preliminary assessment of any such resources found within the three Facility study areas.

This investigation was conducted by ASM Affiliates, Inc., of Tehachapi, California, in April – September 2017, and March 2018. David S. Whitley, Ph.D., RPA, served as principal investigator, assisted by Peter Carey, M.A., RPA, field director, Robert Azpitarte, B.A., crew chief, Jeff Stevens, B.A., Amber Tedrow, B.A., Morgan Byrd, B.A., Amber Emberich, B.A., Stacey Escamilla, B.A, and Mercedes Bandimere, B.A., field technicians. James T. Daniels, Jr., M.A., RPA, conducted a ground- penetrating radar (GPR) survey for the project.

This manuscript constitutes a report on the Phase I survey and a Ground Penetrating Radar (GPR) study of site AVEP-RA-31. The following sections provide background to the investigation, including historic context studies; the findings of the archival records search; a summary of the field surveying techniques employed; and the results of the fieldwork. We conclude with management recommendations for the three Facility sites based on fact-specific cultural resource considerations at those sites.

1.1 PROJECT DESCRIPTION AND LOCATION

The Project would involve the construction, operation and eventual decommissioning of three solar photovoltaic power generating facilities proposed by the Applicants. These facilities, known as Tumbleweed Solar Facility, Rabbitbrush Solar Facility, and Chaparral Solar Facility (Figures 1 – 1 to 1 - 3), would collectively be capable of producing up to approximately 375 megawatts (MW) of renewable energy. The Project would be located on approximately 2,117-ac of private and in southeastern Kern County, California.

Major components of each Facility would include photovoltaic modules mounted on fixed-tilt or horizontal tracker systems, an onsite electrical collection system, an Energy Storage System (ESS), one or two microwave or other telecommunications towers, two meteorological stations, meteorological towers (if tracker technology is utilized), private access roads and an on-site and off-site collection system. Each facility would have a single O&M building of up to approximately 500 square feet, 1,500 square foot graveled area for employee parking, an aboveground water storage tank, permanent water lines, a septic system, and other associated facilities. Permanent chain-link security fencing would be installed around the individual facility site perimeters, substations, ESSs, and other areas requiring controlled access.

The 125 MW Chaparral Solar Facility comprises approximately 764-ac of undeveloped open desert. The Facility is generally bordered by Rosamond Boulevard to the south, 100th Street West to the east, Avenue of the Stars to the north and 114th Street West to the west (Figure 1-1 and 1-2). The Chaparral Solar Facility would have two microwave or other telecommunications towers and the Chaparral Solar ESS will be approximately 5-ac.

The 125 MW Tumbleweed Solar Facility comprises approximately 721-ac of active agriculture and undeveloped open desert in two non-contiguous portions (eastern and western). The Facility is generally bordered by West Avenue A to the south, 100th Street West to the east, Willow Avenue to the north and 117th Street West to the west (Figure 1-3). The Tumbleweed Solar Facility would have one microwave or other telecommunications tower and the Tumbleweed Solar ESS will be approximately 5-ac.

The 125 MW Rabbitbrush Solar Facility comprises approximately 632-ac of undeveloped open desert and scattered low density rural land in two non-contiguous portions (eastern and western). The Facility is generally bordered by Rosamond Boulevard to the south, 115th Street West to the east, Avenue of the Stars to the north and 130th Street West to the west (Figure 1-4). The Rabbitbrush Solar Facility would have one microwave or other telecommunications towers and the Rabbitbrush Solar ESS will be approximately 5 acres.

Each Facility would construct an off-site collection system (Figure 1-4) to interconnect into one of the two interconnection options. The nature (pole versus underground) and final locations of the Chaparral collector lines (Interconnect Options 2 and 3) through the Los Angeles Department of Water and Power corridor in the southeast corner of this facility have not yet been determined (Figures 1-1 and 1-4). Phase I survey of the final routes for these options will be required once these details have been finalized.

1.2 PROJECT SURVEY AREA

The Project will be sited on approximately 2,117-ac of private land, with the Chaparral Solar Facility on 764-ac; Rabbitbrush Solar Facility on 632-ac; and Tumbleweed Solar Facility on 721-ac.

An initial study area totaling 3,116-ac, within which these three Facilities will be located, was surveyed. A total of 1,606-ac was surveyed for the Chaparral Solar Facility, 827-ac for the Rabbitbrush Solar Facility; and 676-ac for the Tumbleweed Solar Facility. The Chaparral and Rabbitbrush Solar Facilities were reduced in size due to the existence archaeological, cultural and other environmental constraints in order to avoid impacts to these resources.

While the surveyed Project Study Area was 3,116-ac in total size, the proposed Project will be sited on approximately 2,117-ac, and only those cultural resources within the 1,985-ac Project footprint therefore have the potential to be adversely impacted. The additional 1,131-ac surveyed will not be included within the Project footprint and are not further considered in this report as this area will not be impacted by the Project. The survey results for this area can be found in Appendix E.

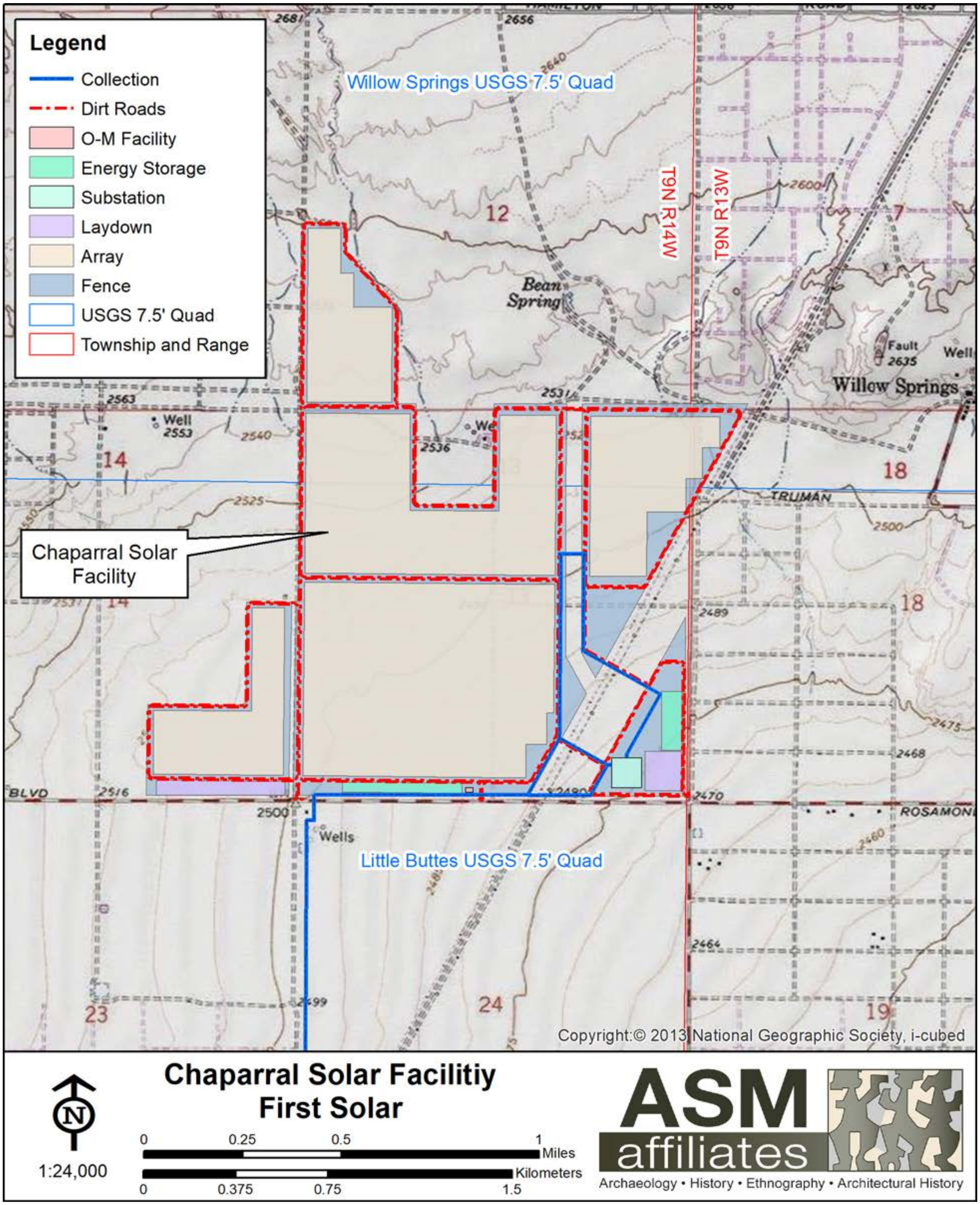


Figure 1-1. Location of the Chaparral Solar Facility Project area, Kern County, California.

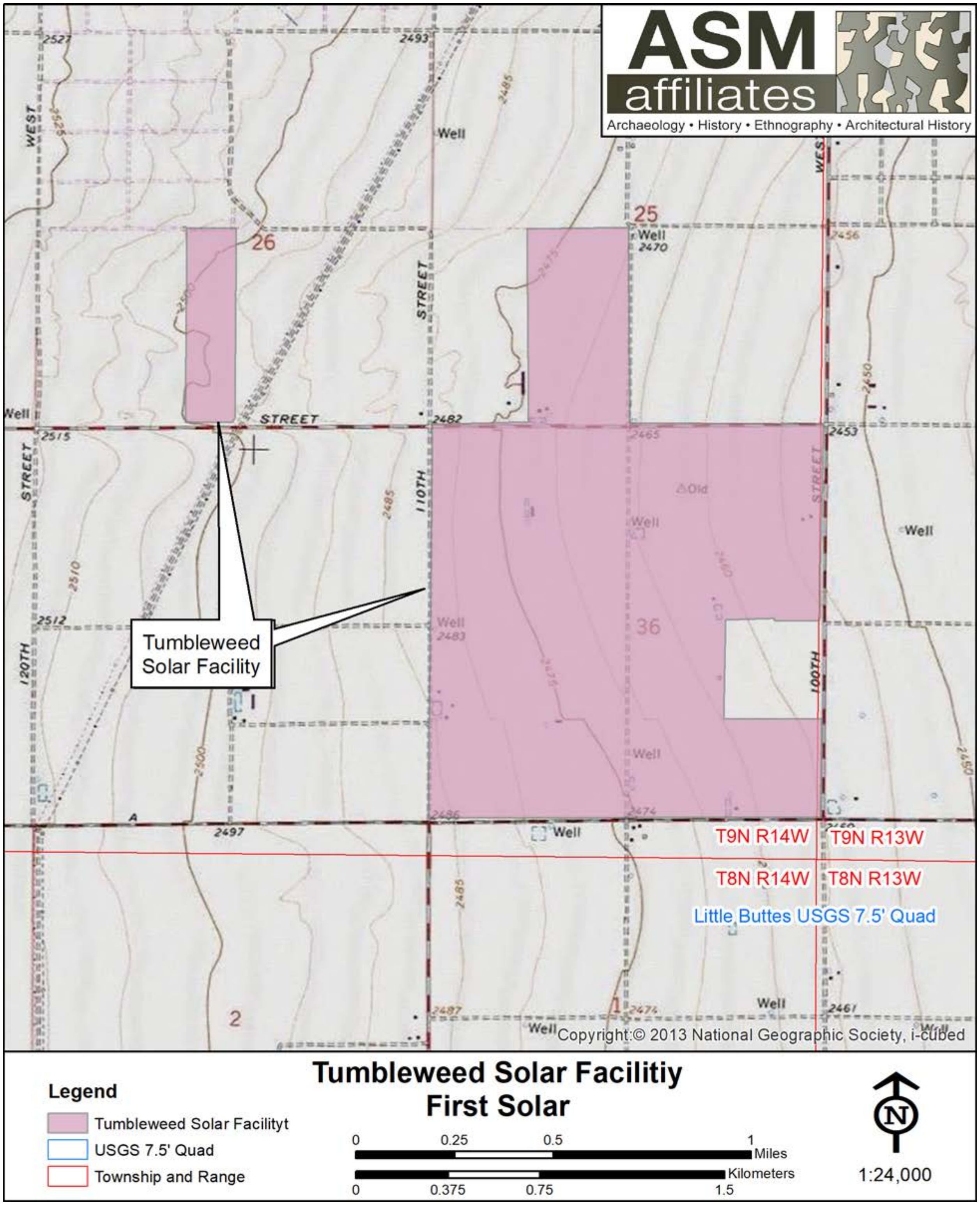


Figure 1-2. Location of the Tumbleweed Solar Facility Project area, Kern County, California.

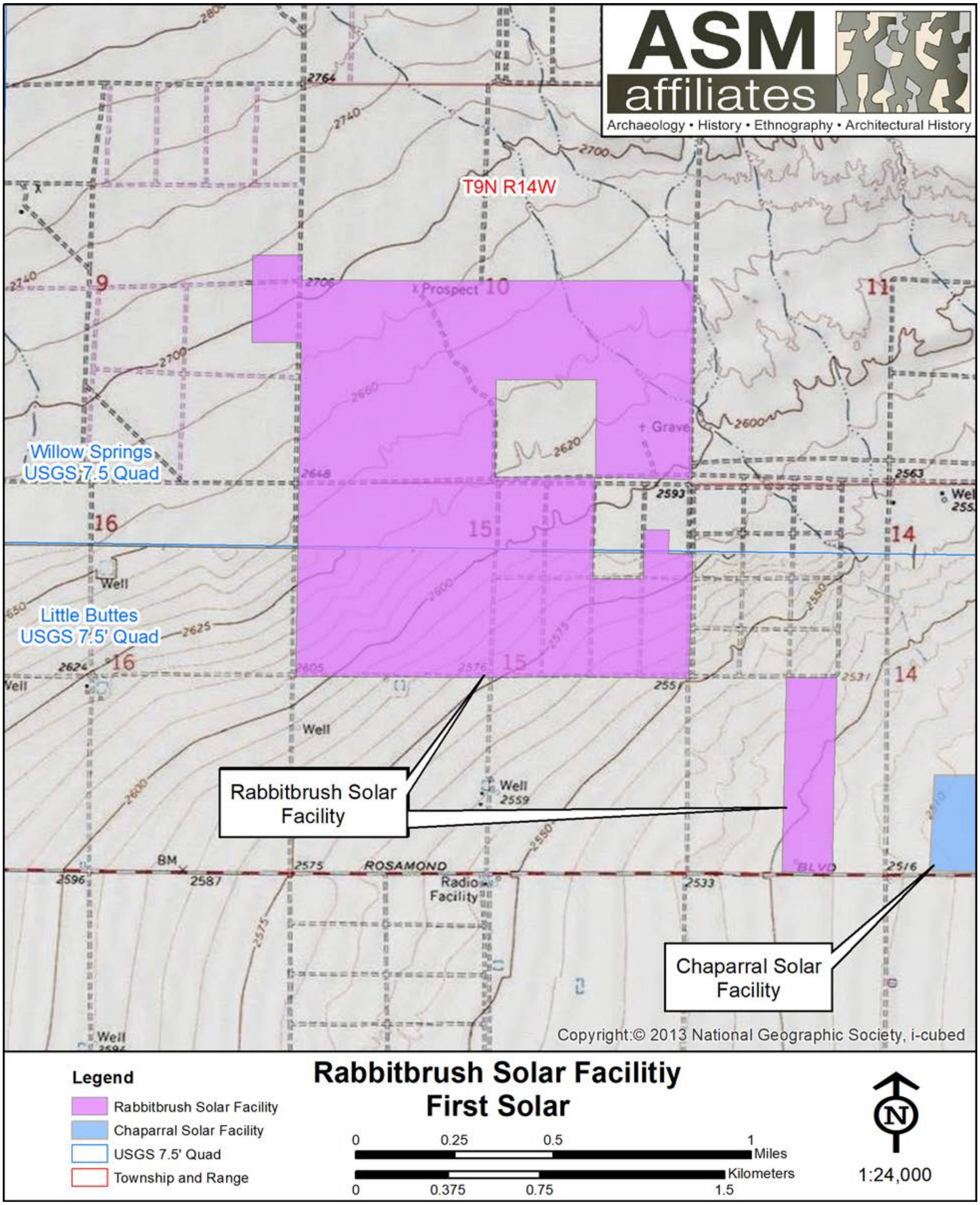


Figure 1-3. Location of the Rabbitbrush Solar Facility Project area, Kern County, California.

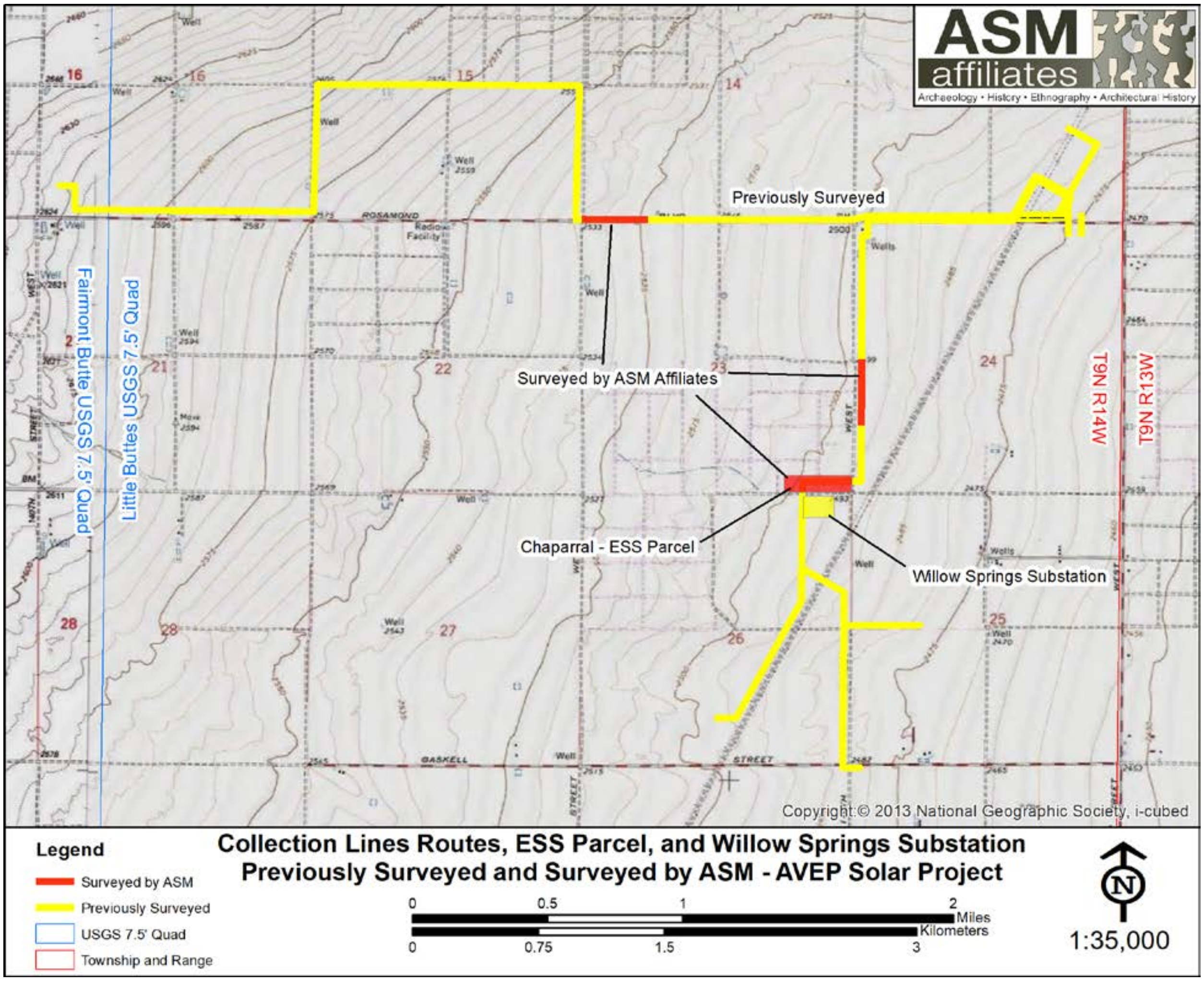


Figure 1-4. Collector line segments, Chaparral ESS Parcel, and Willow Springs Substation surveyed for the AVEP Project.

1.3 REGULATORY CONTEXT

1.3.1 State

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Public Resources Code [PRC], Section 21084.1). A *historical resource* is a resource listed in, or determined to be eligible for listing, in the California Register of Historical Resources (CRHR), a resource included in a local register of historical resources or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be *historically significant* (State CEQA Guidelines, Section 15064.5[a][1-3]). A resource shall be considered *historically significant* if it:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) Is associated with the lives of persons important in our past;
3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4) Has yielded, or may be likely to yield, information important in prehistory or history.

In addition, if it can be demonstrated that a project would cause damage to a *unique archaeological resource*, the lead agency may require reasonable efforts to permit any or all of these resources to be preserved in place or left in an undisturbed state. See PRC, Section 21083.2(b). To the extent that resources cannot be left undisturbed, mitigation measures are required (PRC, Section 21083.2[a], [b], and [c]).PRC, Section 21083.2(g) defines a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

CEQA further states that a significant adverse change to the significance of an historical resource is a significant effect on the environment. This occurs when a historical resource, including archaeological sites, are physically demolished, destroyed or altered (State CEQA Guidelines, Section 15064.5[b][c]).

1.3.2 Kern County General Plan

The policies, goals, and implementation measures in the Kern County General Plan that pertain to cultural resources are provided below.

1.10.3 Archaeological, Paleontological, Cultural, and Historical Preservation (General Provisions in the Land Use, Open Space, and Conservation Element)

Policy

Policy 25: The County will promote the preservation of cultural and historic resources that provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measures

- **Measure K:** Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.

- **Measure L:** The County shall address archaeological and historical resources for discretionary projects in accordance with CEQA.
- **Measure M:** In areas of known paleontological resources, the County should address the preservation of these resources where feasible.
- **Measure N:** The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
- **Measure O:** On a project-specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

2. ENVIRONMENTAL AND CULTUAL BACKGROUND

2.1 ENVIRONMENTAL SETTING

The Project would be located in southeastern Kern County, California, about 50 miles (mi) southeast of the City of Bakersfield and about 10-mi west of the unincorporated community of Rosamond, in the western portion of the Antelope Valley. The Antelope Valley is within the west Mojave Desert and is bounded by the Tehachapi Mountains to the northwest and the San Gabriel Mountains to the southwest. The Antelope Valley and Project area land uses include undeveloped desert (i.e., Mojave Basins; Griffith et al. 2016), fallow and active agriculture, low-density residences, and renewable energy (e.g., solar and wind).

The Project area elevation ranges between approximately 2,455 feet (ft) above mean sea level (amsl) in the Tumbleweed Solar Facility area and approximately 2,820-ft in the Rabbitbrush Solar Facility area. Annual average precipitation in the town of Mojave is approximately 6 inches (in), with January, February, and March receiving nearly half the annual rainfall (Western Regional Climate Center 2017). The average low temperature is 32 degrees Fahrenheit (°F) in December, and the average high temperature is 97°F in July.

The Antelope Valley is within the South Lahontan Basin, which is considered an isolated watershed (i.e., it is not hydrologically connected to other wetlands or water bodies). Soils in the Project area are generally well drained sandy loams and loamy sands with negligible to moderate runoff rates. The Project area comprises a mix of desert scrub communities, dominated by creosote, fallow fields, active agriculture, and developed lands that support a variety of wildlife species. The Project region has experienced considerable growth in renewable energy projects in recent years. Large-scale wind and solar projects have become interspersed with desert scrub and agricultural land uses (WEST 2018).

The major topographic feature within the region is the Willow Springs (also called Rosamond) fault scarp (cf. Dibblee 1963), located outside of the Project area. This trends southeast to northwest, north of the Chaparral and Rabbitbrush Solar Facilities Project areas. As a natural aquitard for groundwater moving downslope/south from the Tehachapi Mountains, it has created a series of springs and seeps. The largest and best known of these is the Willow Springs locality, a short distance northeast of the Chaparral Solar Facility. Willow Springs included seven flowing water sources when assessed in 1911, and was considered the most significant water resource along the scarp. Bean Spring, located in the approximate middle of Section 12 due north of the Chaparral Solar Facility, was considered the second most important at that time (Johnson 1911:49-51). Fossil spring-eyes are present along the face of the fault scarp, indicating that seeps and springs have migrated, over time, along this southwestward-facing front. [redacted]

2.2 ETHNOGRAPHIC BACKGROUND

Though the western Mojave Desert and environs were poorly reported in the early ethnographic summaries, Earle (e.g., 2003, 2005) has provided a synthesis for the region. A summary of his recent ethnohistorical conclusions provide an appropriate overview for the aboriginal history of the region.

According to Earle's reconstruction, the western Mojave was inhabited during the Historic/Protohistoric period by three distinct language-speakers, one group of whom could be further subdivided into two (and perhaps three) fairly distinctive dialects. The most significant linguistic division existed between the Kawaiisu speakers, who lived in Tehachapi Valley through the southern Sierra Nevada and eastward across Fremont Valley towards Red Mountain and into southern Panamint Valley, and the groups to the south and west in Antelope Valley, per se. The Kawaiisu language is a member of the Numic branch of the Uto-Aztecan language family, and is thereby most closely related to the Shoshone and Paiute languages of the Great Basin.

South and westward of the Kawaiisu were two other members of the Uto-Aztecan language family, but in this instance, both were distinct languages belonging to the Takic (as opposed to Numic) branch, specifically to the Serran Takic branch. Along the south westernmost side of the Antelope Valley, including the northern foothills of the Liebre Mountains and the southern side of the Sierra Pelona, were the Tataviam. Related to them linguistically, but speaking a distinct language, were the Kitanemuk, who occupied the westernmost Antelope Valley and the Tehachapi Mountains west of Tehachapi Pass. Living to the east of the Kitanemuk, who extended to approximately the current location of Highway 14 where it heads north across the Antelope Valley, were a Serrano clan. According to Earle's analysis, there was a linguistic continuum along the northern side of the San Gabriel Mountains in the Western Mojave Desert, from the Serrano on the east to the Kitanemuk, at the western end.

The study area thus falls in a slightly ambiguous zone near the Kawaiisu, Kitanemuk and Serrano boundaries. Despite this uncertainty, these groups were culturally similar. All three, for example, were foragers, with food sources derived principally from gathering. The exact plant species exploited was dependent on seasonal availability as well as precise geographical/environmental location. In the higher montane portions of the region (e.g., towards the Tehachapis), acorn-bearing oak and pinyon nuts were staples. In the lower lying more desertic zones, including the study area, mesquite, yucca and a variety of other edible plants were emphasized. Hunting also contributed meat protein, and principally emphasized small game, such as hares, rabbits and rodents.

Following general California patterns, there were also a number of similarities in social and political organization across the Antelope Valley. The Haminat may have been organized into exogamous clans and moieties, whereas the western groups might have lacked these, and in this sense the Haminat could have been more like the southern California Desert groups like the Serrano and Cahuilla, with the other groups more similar to the south-central California culture of the Chumash and related peoples. Although there is debate about their prehistoric origins (e.g., Sutton 2017), it appears that the region as a whole lacked any political organization beyond that of the tribelet, or what Earle has identified in the Spanish records as *naciones*. These were autonomous land-owning groups, focused on a principal village and led by a headman or chief, and probably comprising a lineage system or clan. In this sense, the Antelope Valley can be said to follow the political organizational pattern found throughout most of Native California. This, of course, further links it with Californian, as opposed to Great Basin, cultural patterns.

In general terms, major historical villages were located at well-watered spots, such as springs. Most of these, for this reason, are located in the San Andreas Rift Zone, along the south side of the Antelope Valley, which is unusually well-watered. [redacted]

2.3 PRE-CONTACT ARCHAEOLOGICAL BACKGROUND

The following summary of regional archaeology is derived from Gardner (2009), Glennan (1971), Scharlotta (2014), Sutton (1996, 2017), Way and Jackson (2009), Whitley (1994, 1998, 2000), and Whitley et al. (2006).

Pre-Clovis (earlier than 12,000 YBP)

The initial occupation of North America is still a topic of research and debate, with the date of initial human entry onto the continent not yet known, and little understood about the lifeways of the earliest occupants. This Late Pleistocene occupation is generally referred to as the Pre-Clovis (cultural) Period, dated at earlier than 12,000 years before present (YBP). During this period, many of the valley floors of the Mojave Desert and the Great Basin where filled with a large lake system, including Lake Thompson in the Antelope Valley. Although a number of claims have been made for Pre-Clovis sites in the Mojave Desert generally, these have either been disproven or remain controversial and uncertain. Possible Pre-Clovis petroglyph dates for the Coso Range have been proposed by Whitley (2013), but still require verification by additional tests.

Paleoindian (12,000 - 9000 YBP)

Although the initial occupation of the continent is controversial, there is widespread agreement on the subsequent Paleoindian period, which is typically viewed as pertaining to mobile big-game hunters who exploited Pleistocene megafauna. The hallmarks of the Paleoindian period are the fluted, collaterally-flaked and basally-thinned and -ground Clovis and Folsom spear points, during the earlier portions of the period, followed by a series of large, well-flaked but unfluted lanceolate points towards the end of the period, some of which are stemmed. Some scenarios suggest that the big-game hunting practiced by these Paleoindian peoples may be responsible for the extinction of the Pleistocene megafauna, such as Imperial Mammoth, *Bison antiquus*, and the North American horse. Aside from this so-called Pleistocene overkill problem, the image of Paleoindians as specialized big-game hunters has become pervasive for North America though it is far from proven in all parts of the continent. Recent evidence, however, indicates that the earlier portions of the Paleoindian period comprised a lengthy and severe drought, thus demonstrating that the large mammal herds were already under extreme environmental stress, regardless of the effects of human predation. Paleoclimatic reconstruction in the vicinity of the study area indicates that a drought also occurred in this specific region, further supporting the notion that all Mojave Desert populations – human and animal – existed in stressed conditions at that time.

Very substantial although sometimes overlooked evidence of Paleoindian use of eastern California has been found in a number of areas, including Pilot Knob Valley, northeast of the study area; on the shores of Pleistocene Lake China and within the Coso Range, again to the northeast; in Fort Irwin, northeast of Barstow; at Boron, to the west; in the El Paso Mountains, northeast of the study area; on Edwards Air Force Base, to the east; and in the Tehachapi Mountains, to the north. Typically, the Paleoindian evidence consists of isolated (in some cases reused) Paleoindian projectile points, although there is also evidence for Paleoindian petroglyph manufacture in the Cosos. Although it is likely that Paleoindian habitation sites are somewhere preserved in the region, they have yet to be found and a better understanding of the Paleoindian period in this portion of eastern California will only be obtained when such sites are discovered and investigated

Early Archaic (9000 - 6000 YBP)

The Early Archaic period, or so-called Western Pluvial Lakes Tradition, represents the early Holocene in paleoenvironmental terms. Its hallmark is generally considered to be the widely dispersed but ambiguously-dated Western Stemmed Tradition projectile points. These include the local variants known as Lake Mohave and Silver Lake points, which may in fact actually date between 10,500 and 7,500 YBP and thus be partly coeval with fluted points. Combined with studies of the lithic technologies of Early Archaic and Paleoindian sites, this chronological overlap suggests that the Western Stemmed Tradition may have been an in-situ development out of the earlier Paleoindian tradition.

Early Archaic sites are most commonly found on the lowest terraces above latest Pleistocene and early Holocene lake basins and stream deltas. (Notably, fluted points are also sometimes found at these same sites and geomorphological locations, contributing to the chronological ambiguity of both point types). Early Archaic sites are, accordingly, widely regarded as part of a lacustrine-focused adaptive strategy. Although a number of authors have cautioned against too simplistic an interpretation of these associations, pointing to the fact that Early Archaic sites are also found in other environments (e.g., Way and Jackson 2009), it nonetheless is apparent that, in eastern California at least, this environmental association and its inferred subsistence implications maintain some verity. Indeed, it can be noted that recent research in the Great Basin has emphasized the general importance of lacustrine adaptations in general terms. Although lakeshore exploitation may have been practiced during the Early Archaic in this portion of eastern California, this period apparently also included mobile hunting in other environments as well.

Middle Archaic (6000 to 4000 YBP)

Be this early evidence as it may, what is incontrovertible is that, regardless of date of *initial* occupation, *substantial* inhabitation did not occur until much later, with the start of the Middle Archaic or Pinto Period, at about 6000 YBP. This lasted until approximately 4000 YBP. A number of sites from this time period are known from the Rosamond area, specifically associated with the prehistoric shoreline of Rosamond Lake.

The Middle Archaic, however, corresponds essentially to the Altithermal paleoenvironmental period, a hot and dry climatic regime. In the Coso area to the north, but not necessarily elsewhere in eastern California, there is little if any evidence for Middle Archaic occupation. Existing evidence could be interpreted to signal a diminution in occupation, if not an outright abandonment, in this region, apparently corresponding to the hot and dry climatological conditions of the Altithermal. It is also possible, however, that local inhabitants may have adopted a subsistence strategy and settlement pattern with little archaeological visibility on the landscape during this period; e.g., a highly mobile pattern. Although this alternative interpretation of the apparent dearth of Middle Archaic sites must be acknowledged, it seems implausible in light of the fact that extremely dry conditions would be more commonly predicted to result in a stronger form of “tethered nomadism”, and thus greater archaeological visibility, around water sources. Moreover, there is very clear evidence for Middle Archaic settlements in the Fort Irwin area, to the east of Barstow, suggesting that not all portions of eastern California were abandoned at this time; emphasizing the possibility of more regional variability than heretofore acknowledged.

Late Archaic (4000 to 1500 YBP)

Much less controversy surrounds the subsequent Late Archaic period, or Elko Period, lasting from about 4000 to 1500 years B.P., which correlates with improved and wetter environmental conditions across the far west, including within the study area. Although sites from this time period are sometimes considered rare in the Mojave Desert, it is notable that many of the subsequent Rose Spring Period villages (see below) were first occupied during this earlier phase. That is, as has been noted by a number of authors, there seems to be a strong continuity between the Elko Period and subsequent times, with the latter period materials masking or burying the Elko remains. In the Antelope Valley region, this begins with a major increase in population by at least about 3000 YBP.

Similar patterns have been noted in surrounding regions. For example, the start of the Late Archaic in the Coso Range region, to the north, is posited to represent the initial establishment of the primary settlement and subsistence systems that are currently archaeologically visible, while this same period has been recognized as experiencing a major, far western North American-wide expansion of settlements into new environments and increases in population, stretching from the Great Basin of eastern California, through the southern Sierra Nevada, across the Transverse Ranges, and down to the coast. The primary temporal diagnostics for the Late Archaic are Elko and Gypsum series projectile points.

In the Coso Range, the Late Archaic is signaled by the establishment of major winter villages, typically at springs, in valley bottoms on the western and wetter side of the range. Analyses of paleoethnobotanical and faunal remains suggest a generalized foraging strategy, emphasizing all available resources, including buckwheat stands around small mud-playas. This evidence is complemented by an extensive but seemingly non-logistically organized use of all upland environments. Included here is a significant quantity of isolated projectile points in the uplands, suggesting mobile hunting patterns. Furthermore, the Late Archaic witnessed the beginning of the intensive exploitation of the Coso Sugarloaf obsidian quarry, an event that apparently correlates with the beginning of the inland-to-coastal obsidian trade in south-central California.

Rose Spring (1500 - 800 YBP)

The Rose Spring Period is differentiated from the earlier Late Archaic/Elko Period by the introduction of the bow and arrow and a change from spear points to arrow points at circa AD 500. This transition is, in technical terms, dramatic. In fact, the introduction of this new weaponry technology probably did not have any immediate major impacts on social or cultural systems. At least initially, the settlement and subsistence systems were stable, and lithic technology and production did not noticeably change.

Moreover, and as implied above, in all other respects Rose Spring times appear to have been a continuum from the earlier patterns, so that the change in hunting technology was probably less important than we might otherwise presume. Within the Antelope Valley area, Desert Village Complexes, representing a major change in magnitude of settlements, were founded at least by Rose Spring times, and perhaps towards the end of the earlier Elko phase. Two of these have been identified in the foothills of the Antelope Valley, with a third between Rosamond and Rogers Dry Lake, a fourth at Koehn Lake. It is possible, if not likely, that these represent the founding of the tribelet system of political organization in the region. It is also likely that a fifth Desert Village Complex is present at Willow Springs.

At approximately AD 1000 - 1200, however, a shift in settlement and subsistence practices began that, ultimately, culminated in the protohistoric/ethnographic patterns referred to as the Later Prehistoric or Numic Period (discussed below). This involved the abandonment of some winter villages (or at least a reduction in the intensity of their use); the establishment of logistical base camps around springs in the upland environments; an increasing emphasis on a relatively specialized diet focused on seeds and the pinyon nut; and a great increase in the production of petroglyphs. That is, settlement patterns became more organized and focused, while subsistence was increasingly specialized, and ritual became more common. The causes for this transition are still debated and not yet fully understood.

Late Prehistoric (800 - 140 YBP)

The Late Prehistoric (or, in some areas, Numic) Period, from 800 YBP to the Historic Period, represents a continued growth in local population, with numbers of people apparently quite high. It is distinguished from previous Rose Spring times by the introduction of brownware ceramics and a change in projectile point types: from Rose Springs types to Desert Side-Notched and Cottonwood Triangular. A boundary of some sort may have developed during this period, with Desert Side-Notched points, brownware ceramics and obsidian common from the Fremont Valley northward. South of this area, in the Antelope Valley proper, ceramics and obsidian are rare, and Cottonwood Triangular points are the predominant projectile point type. This apparently correlates with similar patterns further towards the coast: at about 800-1000 years ago the desert-to-coast obsidian trade dried up, and Rose Spring-like projectile points were replaced by Cottonwood-like points, with Desert Side-Notched points rare.

The Protohistoric/Historic phase of the Late Prehistoric, representing the last 300 years, is apparently marked by a major disruption in indigenous settlement, and a corresponding paucity of sites. Missionization pulled many of the region's inhabitants away. Note, however, that ~300 YBP also represents a brief period of extreme drought. Hence deteriorating environmental conditions may have contributed to social disruptions combined with the introduction of new diseases, all of which would have had detrimental effects on the local population. Subsequently, the Antelope Valley area was used as a staging ground for rustlers and other miscreants, who were raiding the missions' livestock. The result was that the area became somewhat of a no-man's land which, no doubt, has also contributed to the paucity of ethnographic information on it.

2.4 HISTORICAL BACKGROUND

Perhaps because of the use of the Antelope Valley as a staging area for Indian raids on the *estancias* and missions closer to the coast, Euro-American settlement and development of the area was a little later dating than in other parts of southern California. As a result, the history of the Antelope Valley to about the 1860s principally involved various explorers who traversed it: for example, Pedro Fages crossed the southern valley in 1772; Fr. Garcés crossed the west end and went through Willow Springs in 1776; Jedediah Smith, similarly, went across the western valley in 1827 and also visited Willow Springs, as did John C. Fremónt and his guide Kit Carson in 1844. The Rogers and Manly party - the Jayhawkers or Death Valley '49ers - camped at Willow Springs towards the end of their dramatic 1849 expedition across the Mojave Desert, as well. And Lt. Edward Beale, at the lead of a caravan of camels, came across the southern side of the valley in his 1857 trip to Fort Tejon (Starr 1988; Settle 1963).

It was not until the 1860s that the first settlers moved into this region, settling mostly in the Elizabeth Lake region and the southern foothills of the Tehachapi Mountains, and involved principally in ranching. With the development in 1868 of the Cerro Gordo silver mine in Inyo County, however, the Antelope Valley became a major thoroughfare for the movement of bullion and goods between Los Angeles and the Owens Valley; indeed, efforts to wrestle control over the Inyo silver trade away from Los Angeles became a major theme of California economic history in the 1870s. Los Angeles managed to maintain its monopolization of this trade, nonetheless, with Remi Nadeau's freight-line playing a major part in the transshipment of goods and ore across the valley. Willow Springs and its adobe tavern served as a major stop on this route, with the stage line then essentially heading south (on the route that would eventually be adopted by the railroad), for a 28-mile stretch through Cow Hole to Barrel Springs, at the mouth of Soledad Canyon, and subsequently through the canyon for the uphill climb through the San Gabriel Mountains. Old Nadeau Road, which parallels Pearblossom Highway near the Vincent Hills, is apparently a remnant of this original freight-line route, which proved so instrumental in the growth of Los Angeles as the economic center of southern California. It is a few miles east of the study area (Starr 1988).

Shortly after the establishment of the first permanent school in the region, in 1869 at Elizabeth Lake, a number of settlers' colonies sprang-up within the valley, including Wicks, Manzana, Chicago, Kingsbury, John Brown, Old Palmdale and Almondale (Settle 1963). However, the major impetus to settlement resulted with the completion of the Southern Pacific railway through the valley in 1876, fostering the establishment of Rosamond, Lancaster and Palmdale by 1882.

The Southern Pacific Railroad arrived in Mojave on August 8, 1876. The location of the current depot, on the west side of Highway 14, was the location of the original depot site, although the existing depot building is a later construction. A freight depot was added on August 20 of the same year and, before long, the town turned into a division point for the rail line. With the railhead at Mojave, the San Bernardino Borax Company began hauling its borax to the town on mule teams; the Baldheaded Eagle Borax Company began using the town as its railhead a few years later, in 1881. The Santa Fe Railroad arrived in 1884, as did the famous “20 Mule Teams” of the Pacific Borax Company, truly making the town a transportation hub for the region. The Pacific Borax Company continued with its mule team loads to the railhead until 1889, when a spur line reached their mining operations (Deaver 1967).

The original town site of Mojave was laid-out by the Southern Pacific at the time that the rail went through. Initially it was simply a residential camp for railroad employees consisting of a few wooden shacks, but it was of sufficient importance that a post office was opened in October 1876. Because of its position as a transportation hub, Mojave quickly attracted additional residents but was not filed as a subdivision until 1905 (ibid). Growth at and after that point was spurred by two early twentieth century developments. The first was the increasingly important mining activities at Standard Hill and Soledad Mountain, south of town. The second was the construction of the Los Angeles Aqueduct, built between 1907 and 1913, which brought literally thousands of workers into the region. In addition to its function as a transport hub, Mojave served as the “watering hole” for the mine and aqueduct crews, and was widely renowned for its saloons and brothels, which were said to outnumber the churches in town by 10 to one.

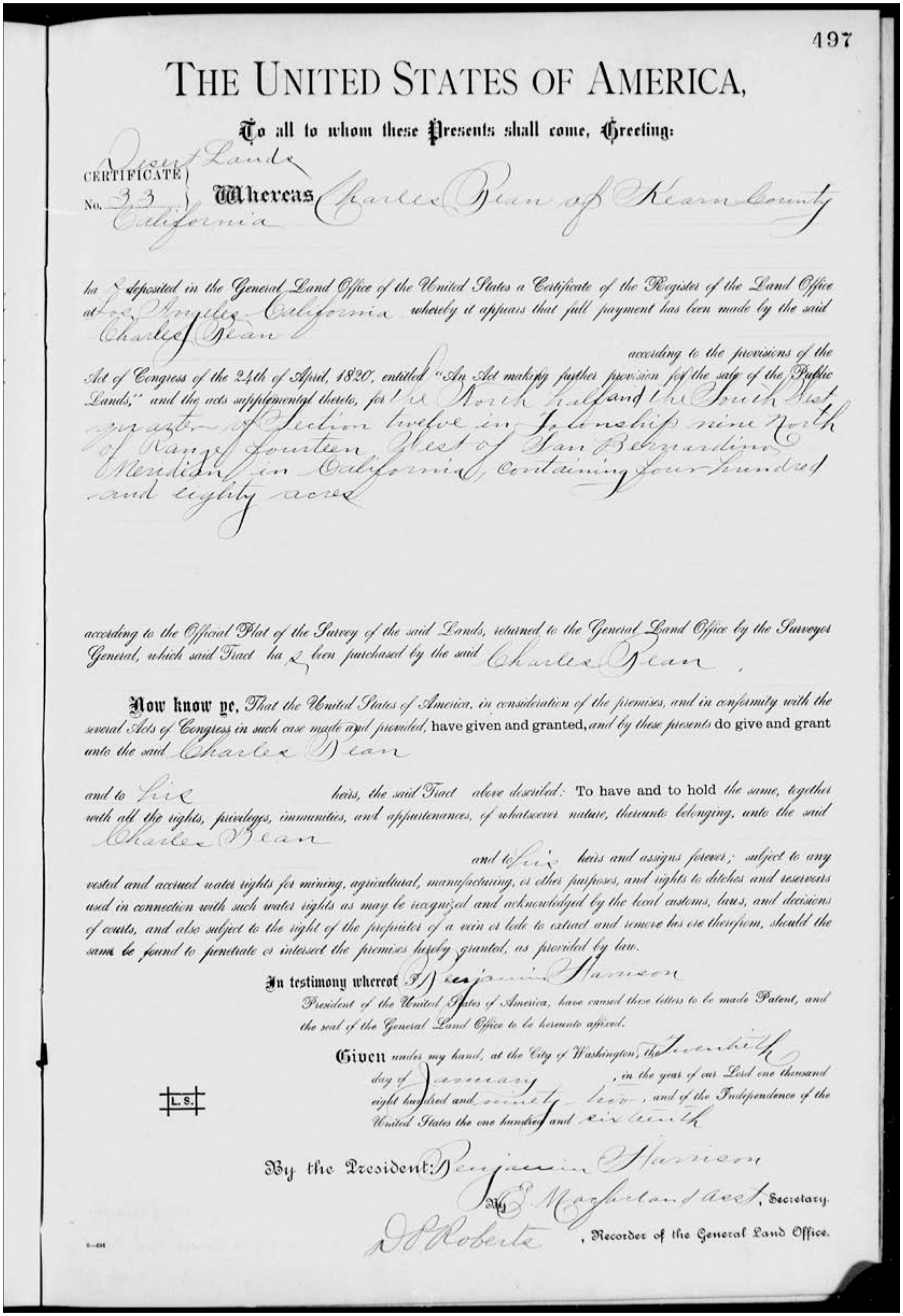
Rosamond was also a Southern Pacific depot originally named Sand Creek but was given its current name in honor of a daughter of a rail official. A post office opened here in 1885 and the Butterworth Ranch was homesteaded, for cattle, in 1888, six miles west of Rosamond. The origin of the town proper is somewhat later. The town site was purchased by C.C. Calkins in 1907 who sold the mortgage to Charles M. Stinson. Stinson in turn donated the mortgage to the Union Rescue Mission of Los Angeles, who foreclosed on the property in 1916. In 1935 the Mission began selling lots in the town site, initiating its residential development (Settle 1967; DeWitt 1989).

Rosamond's history is also tied to early mining in the region; specifically, the development of Tropico Mine which began in the 1870s and, for over two decades, solely involved clay mining, for Ezra Hamilton's brickworks and pottery in Los Angeles. Hamilton purchased the mining property in the 1890s. Recognizing the presence of gold dust in the clay, he prospected the area, finally discovering a profitable load in 1896. By 1907 his Lida mines had yielded more than 8000 tons of ore averaging 1.2 ounces of gold and 7.5 ounces of silver per ton. Hamilton sold his mines in 1908, with the property eventually becoming the Tropico Mining and Milling Company (Settle 1967). Mining and custom milling continued until 1956 when the operation was shut down.

Willow Springs (California Historical Landmark 130), a short distance west of Rosamond, figured in much of the early history of the region (as noted above), serving as a watering stop on the main trail through the area. Fages, in 1772, Garces, in 1776, and Fremont, in 1844, are all thought to have stopped at the spring. Stage routes from Los Angeles to both Havilah and Inyo ran through the spring, starting in the 1860s, with Remi Nadeau (responsible for the Los Angeles to Inyo freight route) building a corral at the spring. Because they were running livestock in the Antelope Valley, the Tejon Ranch purchased the spring at about this same time. The spring was subsequently purchased around 1900 by Ezra Hamilton, after his discovery of gold in the area, who was responsible for constructing most of the existing stone buildings at this location (Starr 1988; Settle 1967).

According to an account by Hamilton himself, written in 1913, he made about $200,000 from the Lida Mine (Settle 1963). He paid $3500 to the Beale estate for Willow Springs and 160 acres of surrounding land, and created a farm and health resort. Hamilton claimed that, in 1913, there were 27 stone houses, a hotel, bath-house, public hall, dance hall, school, and auto and blacksmith shops. The school was the first in the area (ibid.). Willow Springs was connected to Los Angeles by a paved Highway in 1921, when the Mint Canyon Highway (later renamed Sierra Highway) was completed, greatly facilitating the location as a tourist resort (Way and Jackson 2009). Despite this fact, Willow Springs is only mentioned in passing in *Thompson's Routes to Watering Places in the Mohave Desert Region*, published in 1921, indicating that it was not a major destination.

The Chaparral Solar Facility is located approximately one-half mile southwest of Willow Springs. Bean Spring is located north of the facility, within Section 12 about one-mile west of Willow Springs. Bean Spring is named after early settler Charles F. Bean who acquired 480-ac (the north half and southwest quarter) of Section 12 in 1892 under the Desert Land Act of 1877 (Figure 1.5); this includes the northwesternmost portion of the Chaparral facility extending into Section 12. This patent required a recipient to settle and irrigate the land. In 1896 Bean augmented his holding with an additional 160-ac (the southeast quarter of Section 12; outside of the Chaparral facility), obtained under the Timber Culture Act of 1873. The Timber Culture Act required planting 40-ac of trees (Way and Jackson 2009). Bean Canyon, located northeast of the spring in the Tehachapi Mountains, also appears to have been named after him.



497

THE UNITED STATES OF AMERICA,

To all to whom these Presents shall come, Greeting:

Desert Lands
CERTIFICATE No. 33
California

Whereas Charles Bean of Kearn County California

has deposited in the General Land Office of the United States a Certificate of the Register of the Land Office at Los Angeles California whereby it appears that full payment has been made by the said Charles Bean according to the provisions of the Act of Congress of the 24th of April, 1820, entitled "An Act making further provision for the sale of the Public Lands," and the acts supplemental thereto, for the North half and the South West quarter of Section twelve in Township nine North of Range fourteen West of San Bernardino Meridian in California, containing four hundred and eighty acres

according to the Official Plat of the Survey of the said Lands, returned to the General Land Office by the Surveyor General, which said Tract has been purchased by the said Charles Bean,

Now know ye, That the United States of America, in consideration of the premises, and in conformity with the several Acts of Congress in such case made and provided, have given and granted, and by these presents do give and grant unto the said Charles Bean and to his heirs, the said Tract above described: To have and to hold the same, together with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said Charles Bean and to his heirs and assigns forever; subject to any vested and accrued water rights for mining, agricultural, manufacturing, or other purposes, and rights to ditches and reservoirs used in connection with such water rights as may be recognized and acknowledged by the local customs, laws, and decisions of courts, and also subject to the right of the proprietor of a vein or lode to extract and remove his ore therefrom, should the same be found to penetrate or intersect the premises hereby granted, as provided by law.

In testimony whereof I, Benjamin Harrison President of the United States of America, have caused these letters to be made Patent, and the seal of the General Land Office to be hereunto affixed.

Given under my hand, at the City of Washington, the twentieth day of January, in the year of our Lord one thousand eight hundred and ninety two, and of the Independence of the United States the one hundred and sixteenth.

L.S.

By the President: Benjamin Harrison

By E. Macfarland asst, Secretary.

D. P. Roberts, Recorder of the General Land Office.

Figure 1.5 1892 Bean land patent for 480-ac of Section 12.

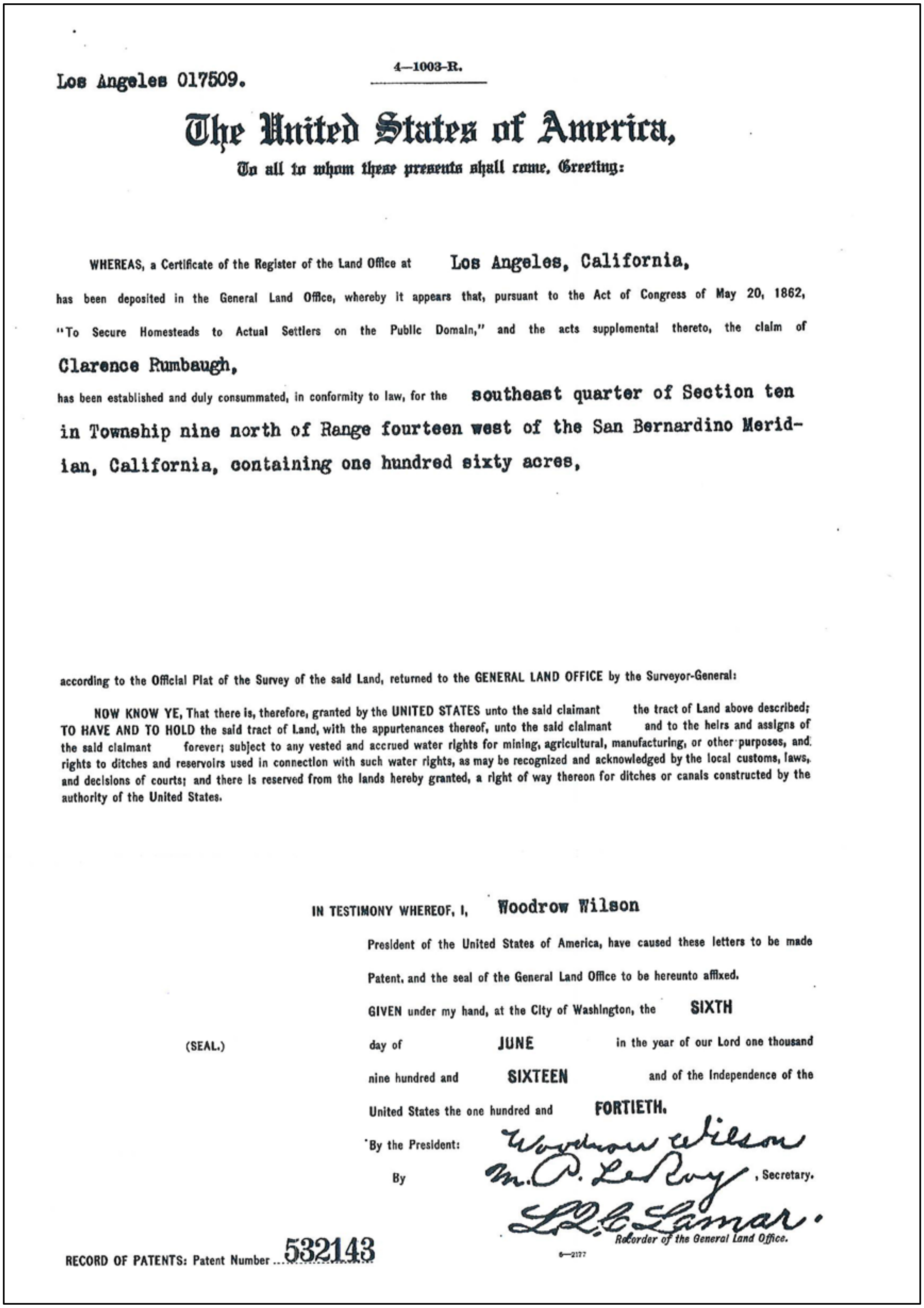
Bean's timing was unfortunately poor: a severe draught from 1897 – 1899 caused many Antelope Valley homesteads to fail (Thompson 1921:292). As noted by Johnson (1911:49), the seven separate springs and seeps at Willow Springs were only capable of watering about 33-ac in non-drought conditions, and this was the best water source along the fault scarp, making Bean's requirement to cultivate 40-ac of timber untenable. By the 1910 census Bean was living in Los Angeles and was listed as a miner working at his "own mine," apparently having abandoned his desert homestead (Way and Jackson 2009). With the exception of two ponds, a burn pit (likely not historical) and some barbed wire fencing, there is little evidence of historical development at the spring, and no evidence for historical development or use within the Chaparral Solar Facility footprint related to this patent.

According to General Land Office records, a second 160-ac homestead was filed within the Rabbitbrush Solar Facility. This was located in the southeast quarter of Section 10 and was patented through the Homestead Act by Clarence Rumbaugh on 6 June 1916 (Figure 1.6). U.S. Census records indicate that no one by that name lived in California in 1910 or earlier. The 1920 census lists a Clarence E. Rumbaugh, a grocer born in 1877 in Indiana, as living in Stockton. The 1930 census lists a Clarence L. Rumbaugh, a farmer living in Pasadena who was born in Michigan in 1892. Either of these individuals may have been the recipient of the patent. No additional historical information could be found about either person. [redacted]

Historical use of the Project area, as a result, primarily has resulted from mid-twentieth century farming in the region.

2.5 GEOARCHAEOLOGICAL BACKGROUND

The Project area consists of the open flats of the Antelope Valley. A Caltrans geoarchaeological study that included the Project area classified this location as having Very Low to Moderately Low sensitivity for subsurface sites (Meyer et al. 2010). This study involved first determining the location and ages of late Pleistocene (>25,000 years old) landforms in Kern County and the southern San Joaquin Valley. These were identified by combining a synthesis of 2,400 published paleontological, soils and archaeological chronometric dates with geoarchaeological field testing. The ages of surface landforms were then mapped to provide an assessment for the potential for buried archaeological deposits. These ages were derived primarily from the Soil Survey Geographic Database (SSURGO) and the State Soils Geographic (STATSGO) database. A series of maps were created from this information that ranked locations in 7 ordinal classes for sensitivity for buried soils, from Very Low to Very High. Given its low sensitivity for buried deposits according to this analysis, it is therefore unlikely that the Project area would contain subsurface archaeological deposits.



Los Angeles 017509.

4—1003-R.

The United States of America,

To all to whom these presents shall come, Greeting:

WHEREAS, a Certificate of the Register of the Land Office at Los Angeles, California, has been deposited in the General Land Office, whereby it appears that, pursuant to the Act of Congress of May 20, 1862, "To Secure Homesteads to Actual Settlers on the Public Domain," and the acts supplemental thereto, the claim of Clarence Rumbaugh, has been established and duly consummated, in conformity to law, for the southeast quarter of Section ten in Township nine north of Range fourteen west of the San Bernardino Meridian, California, containing one hundred sixty acres,

according to the Official Plat of the Survey of the said Land, returned to the GENERAL LAND OFFICE by the Surveyor-General:

NOW KNOW YE, That there is, therefore, granted by the UNITED STATES unto the said claimant the tract of Land above described; TO HAVE AND TO HOLD the said tract of Land, with the appurtenances thereof, unto the said claimant and to the heirs and assigns of the said claimant forever; subject to any vested and accrued water rights for mining, agricultural, manufacturing, or other purposes, and rights to ditches and reservoirs used in connection with such water rights, as may be recognized and acknowledged by the local customs, laws, and decisions of courts; and there is reserved from the lands hereby granted, a right of way thereon for ditches or canals constructed by the authority of the United States.

IN TESTIMONY WHEREOF, I, Woodrow Wilson President of the United States of America, have caused these letters to be made Patent, and the seal of the General Land Office to be hereunto affixed.

GIVEN under my hand, at the City of Washington, the SIXTH day of JUNE in the year of our Lord one thousand nine hundred and SIXTEEN and of the Independence of the United States the one hundred and FORTIETH.

(SEAL.)

By the President: Woodrow Wilson

By M. P. LeRoy, Secretary.

L. Q. C. Lamar. Recorder of the General Land Office.

RECORD OF PATENTS: Patent Number 532143

6—2177

Figure 1.6 1916 Rumbaugh land patent for 160-ac of Section 10.

3. ARCHIVAL RECORDS SEARCH

In order to determine whether the Project survey area had been previously inventoried for cultural resources, including historical and prehistoric archaeological sites and built-environment resources, and/or whether any such resources were known to exist on it, an archival records search was conducted by the staff of the Southern San Joaquin Valley Information Center (IC). This study is included in Confidential Appendix A of this report, and is summarized below.

The records search was completed using a 0.5-mi radius around the Project area to determine: (i) if prehistoric or historical archaeological sites had previously been recorded within that area; (ii) if the Project area had been systematically surveyed by archaeologists prior to the initiation of this field study; and/or (iii) whether the Project region was known to contain archaeological sites and to thereby be archaeologically sensitive. Records examined included archaeological site files and maps, the NRHP, Historic Property Data File, California Inventory of Historic Resources, and the California Points of Historic Interest.

In addition to the cultural resources records search, a search of the Native American Heritage Commission (NAHC) Sacred Lands Files was completed. According to their records, no sacred sites or tribal cultural resources are known in the Project areas.

According to the IC records search and provided GIS data, 11 previous studies had covered the entirety of the Chaparral Solar Facility and small portions (less than 25%) of the Rabbitbrush Solar Facility and Tumbleweed Solar Facility Project footprints (Tables 3-1, 3-2 and 3-3), and numerous previous studies had been undertaken within 0.5-mi radius of these Project areas (Table 3-4; Note that three block study outlines (i.e.) provided by the IC had shapefiles boundaries but no report data). The Chaparral Solar Facility, surveyed in its entirety twice previously, is the only Project area in which previously recorded cultural resources were known to exist (Table 3-5), with four prehistoric archaeological sites and four isolated artifacts identified, yielding a site density of less than one site per 100-ac. A total of 48 previously recorded resources are present within 0.5-mi of the Chaparral Solar Facility, Rabbitbrush Solar Facility, and Tumbleweed Solar Facility Project areas (Appendix A). [redacted]

Table 3-1. Survey Reports within the Rabbitbrush Solar Facility Project Area

Report No.	Year	Author (s)/Affiliation	Title
KE-01010	1991	R.W. Robinson/Individual Consultant	Environmental Impact Report Draft, Willow Springs Specific Plan Update
KE-01286	1987	R.A. Schiffman / Bakersfield College	Archaeological Investigation for Parcel Map #8208, Kern County, California

Table 3-2. Survey Reports within the Tumbleweed Solar Facility Project Area

Report No.	Year	Author (s)/Affiliation	Title
KE-00801	1989	R.E. Parr/Cultural Resource Facility, California State University, Bakersfield	An Archaeological Assessment of Parcel 2 of Parcel Map 7387, West of Rosamond, Kern County, California
KE-02911	2004	J. Schmidt/ Compass Rose Archaeological	Four Deteriorated Replacement Poles Located on the Antelope-Cal Cement Circuit, Cal Cement-Goldtown-Monolith-Windparks Circuit, and the Corum-Rosamond Circuit, Kern County, CA
KE-03209	2005	J. Schmidt/ Compass Rose Archaeological	Re: DWO 6036-4800; A.I. No. 5-4867: Fairmont 12 kV Distribution Line Deteriorated Pole Replacement Project, Antelope Valley District, Kern Co.
KE-03546	2006	K Ahmet et al. /ECORP Consulting, Inc.	Cultural Resources Survey Report for Antelope Transmission Project: Segments 2 & 3 Los Angeles and Kern Counties
KE-04057	2011	S.M Hudlow / Hudlow Cultural Resource Associates, Bakersfield, CA	Phase I Cultural Resources Survey for PV3, Willow Springs, Kern County, California
KE-04062	2011	June A. Schmidt/ Compass Rose Archaeological, Inc.	Re: Archaeological Letter Report: Antelope-Cal Cement 66 kV; WO #900418843: Wind Storm Emergency Pole Replacement Project, Antelope Valley Area, Kern County.

Table 3-3. Survey Reports within the Chaparral Solar Facility Project Area

Report No.	Year	Author (s)/Affiliation	Title
KE-01010	1991	R.W. Robinson/Individual Consultant	Environmental Impact Report Draft, Willow Springs Specific Plan Update
KE-01181	1990	R.A. Schiffman / Bakersfield College	Archaeological Investigation of 112 Acre Parcel West of Willow Springs Section 18, Township 9N, 13W. Kern County, California
KE-01355	1989	R.A. Schiffman / Bakersfield College	Archaeological Investigation for a 1900 Acres West of Rosamond, Kern County, California
KE-03546	2006	K Ahmet et al. /ECORP Consulting, Inc.	Cultural Resources Survey Report for Antelope Transmission Project: Segments 2 & 3 Los Angeles and Kern Counties
KE-03874	2009	A Glover and S Gust / Cogstone Resource Management, Inc	Supplemental Cultural and Paleontological Resources Assessment, Segment 3A, Section1, Tehachapi Renewable Transmission Project

Table 3-4. Previous Surveys within 0.5-mi of the Project Area

Report Identifier	Date	Author(s)/Affiliation	Title
Chaparral Solar Facility			
KE-00802	1989	Robert E. Parr/ CRF CSUB	An Archaeological Assessment of 480 Acres of Land West of Rosamond, Kern County, California
KE-00869	1990	Robert E. Parr and Scott Jackson/ CRF CSUB	An Archaeological Assessment of 840 Acres of Land Near Willow Spring, Kern County, California
KE-01338	1989	Robert A. Schiffman/ Bakersfield College	Archaeological Investigation for Parcel map #8208, Kern County, California
KE-01605	1989	Mark Q. Sutton/ CRF CSUB	An Archaeological Survey of PM 8386, 20 Acres at 90th W. and Rosamond Blvd.

Report Identifier	Date	Author(s)/Affiliation	Title
KE-02059	1997	Bruce Love/ CRM TECH	Cultural Resources Survey Report: Bakersfield-Rialto Fiberoptic Line Project, Kern, Los Angeles, and San Bernardino Counties, California
KE-03236	2005	Katherine H. Pollock and Michael K. Lerch/ Statistical Research, Inc.	Deteriorated Pole Replacement Project – Archaeological Survey of Ten Pole Locations on the Kinsley 12 kV, Whirlwind 12 kV, Rayburn 12 kV, Pick 12 kV, Lake Hughes 12 kV, and Big Pines 12 kV Transmission lines, Los Angeles County, California, and the Willow Springs 12 kV Transmission Line
KE-03781	2010	Rebecca S. Orfila/ RSO Consulting Cultural and Historical Resource Management	RE: Archaeological Survey of the Southern California Edison Company Power Poles #1200431E, 1200439E, 549527E, 1433929E, and 549520E on the Oak Creek 21kV Circuit Near Willow Springs/ Rosamond, Kern County, California (IO# 312201; SAP# TD435806)
KE-03793	2008	John F. Romani and Alan P. Garfinkel/ Compass Rose Archaeological	Archaeological Survey Report Tehachapi Willow Springs Road from Rosamond Boulevard to 10 Miles North, Willow Springs Area, Kern County, California
KE-03889	2009	Matthew DeCarlo and Rebecca Orfila/ CAR CSUB	A Cultural Resources Assessment of Three Proposed Deteriorated Pole Replacement Projects (WO 4703-0455) Near Rosamond, Kern County, California
KE-04057	2011	Scott M. Hudlow/ Hudlow Cultural Resource Associates	Phase I Cultural Resources Survey for PV3, Willow Springs, Kern County, California
KE-04058	2011	Scott M. Hudlow/ Hudlow Cultural Resource Associates	Phase I Cultural Resources Survey for PV-11, (Rosamond Solar Array) Rosamond, Kern County, California
KE-04225	2010	Thomas Jackson, Matthew Armstrong, and Nancy Sikes/ Pacific Legacy, Inc.; Cogstone Resource Management, Inc.	Cultural Resources Inventory of the Southern California Edison Company Whirlwind to Rosamond and Rosamond to Windhub Telecommunication line, Kern County, California
Rabbitbrush Solar Facility (west portion)			
KE-00869	1990	Robert E. Parr and Scott Jackson/ CRF CSUB	An Archaeological Assessment of 840 Acres of Land Near Willow Spring, Kern County, California
KE-01355	1989	Robert A. Schiffman/ Bakersfield College	Archaeological Investigation for 1900 Acres West of Rosamond, Kern County, California
KE-04058	2011	Scott M. Hudlow/ Hudlow Cultural Resource Associates	Phase I Cultural Resources Survey for PV-11, (Rosamond Solar Array) Rosamond, Kern County, California
Rabbitbrush Solar Facility (east portion)			
KE-00802	1989	Robert E. Parr/ CRF CSUB	An Archaeological Assessment of 480 Acres of Land West of Rosamond, Kern County, California
KE-00869	1990	Robert E. Parr and Scott Jackson/ CRF CSUB	An Archaeological Assessment of 840 Acres of Land Near Willow Spring, Kern County, California
KE-01010	1991	R.W. Robinson/ Individual Consultant	Regional Overview of the Cultural Resources Inventory and Significance Evaluation Final Report Volume II
KE-01010	1991	Robert Bein/William Frost & Associates	Environmental Impact Report Draft, Willow Springs Specific Plan Update
KE-04057	2011	Scott M. Hudlow/ Hudlow Cultural Resource Associates	Phase I Cultural Resources Survey for PV3, Willow Springs, Kern County, California
KE-04058	2011	Scott M. Hudlow/ Hudlow Cultural Resource Associates	Phase I Cultural Resources Survey for PV-11, (Rosamond Solar Array) Rosamond, Kern County, California
KE-04080	2010	Stacie Wilson and Stacey C. Jordan/ AECOM	Cultural Resources Report for the Proposed RRG Antelope Valley Solar Project Kern and Los Angeles Counties, California

Report Identifier	Date	Author(s)/Affiliation	Title
KE-04225	2010	Thomas Jackson, Matthew Armstrong, and Nancy Sikes/ Pacific Legacy, Inc.; Cogstone Resource Management, Inc.	Cultural Resources Inventory of the Southern California Edison Company Whirlwind to Rosamond and Rosamond to Windhub Telecommunication line, Kern County, California
Tumbleweed Solar Facility (east portion)			
KE-00634	1985	Michael E. Macko and Jill Wiesbord/ Applied Conservation Technology, Inc.	Sylmar Expansion Project: Cultural Resources Inventory and Significant Evaluation Addendum to Final Report
KE-01010	1991	R.W. Robinson/ Individual Consultant	Regional Overview of the Cultural Resources Inventory and Significance Evaluation Final Report Volume II
KE-01010	1991	Robert Bein/William Frost & Associates	Environmental Impact Report Draft, Willow Springs Specific Plan Update
KE-01350	1989	Robert A. Schiffman/ Bakersfield College	Archaeological Investigation for 300 Acre Avenue “A” Project, Kern County, California
KE-01529	1994	Clay A. Singer, John E. Atwood, and Cheryl Sinopoli/ C.A. Singer & Associates, Inc.	Cultural Resources Survey and Impact Assessment for Wilmar Farms, a 630 Acre Parcel Located at 1747 100th Street West, Kern County, CA
KE-01787	1989	Robert S. White/ Archaeological Associates Ltd.	An Archaeological Assessment of a 320+ Acre Parcel in the Willow Springs Area of Kern County
KE-04135	2011	James J. Schmidt/ Compass Rose Archaeological, Inc.	Cultural Resources Report for the Proposed RRG Antelope Valley Solar Project Kern and Los Angeles Counties, California
KE-04138	2011	Robert E. Parr/ Cal Heritage	Cultural Resource Assessment for the Replacement of Twenty Southern California Edison Company Deteriorated Power Poles in Los Angeles and Kern Counties, California
Tumbleweed Solar Facility (west portion)			
KE-00095	1997	Carolyn Rice/ Ananian Associates	Environmental Consultation for CUP 17, Map 232 – Muslim Cemetery Project
KE-00634	1985	Michael E. Macko and Jill Wiesbord/ Applied Conservation Technology, Inc.	Sylmar Expansion Project: Cultural Resources Inventory and Significant Evaluation Addendum to Final Report
KE-01010	1991	R.W. Robinson/ Individual Consultant	Regional Overview of the Cultural Resources Inventory and Significance Evaluation Final Report Volume II
KE-01010	1991	Robert Bein/William Frost & Associates	Environmental Impact Report Draft, Willow Springs Specific Plan Update
KE-01427	1992	Robert A. Schiffman/ Bakersfield College	Archaeological Investigation of Parcel Map No. 359-031-02 in Portions of Sections 25 & 26, T.9N; R. 13W. Kern County, California
KE-01529	1994	Clay A. Singer, John E. Atwood, and Cheryl Sinopoli/ C.A. Singer & Associates, Inc.	Cultural Resources Survey and Impact Assessment for Wilmar Farms, a 630 Acre Parcel Located at 1747 100th Street West, Kern County, CA
KE-01787	1989	Robert S. White/ Archaeological Associates Ltd.	An Archaeological Assessment of a 320+ Acre Parcel in the Willow Springs Area of Kern County
KE-01938	1993	David Van Horn/Archaeological Associates	Surface Collection & Test Excavation Program at KER-2714, a Milling Station in the West-Central Antelope Valley, Kern County, CA
KE-03686	2009	Amy Glover and Sherri Gust/ Cogstone Resource Management, Inc.	Supplemental Cultural and Paleontological Resources Assessment, Segment 3A, Section 1, Tehachapi Renewable Transmission Project, Variance for the Use of Gaskell Yard, Rosamond, Kern County, California
KE-04062	2011	June A. Schmidt/ Compass Rose Archaeological, Inc.	Re: Archaeological Letter Report: Antelope-Cal Cement 66 kV; WO #900418843: Wind Storm Emergency Pole Replacement Project, Antelope Valley Area, Kern County.

Report Identifier	Date	Author(s)/Affiliation	Title
KE-04080	2010	Stacie Wilson and Stacey C. Jordan/ AECOM	Cultural Resources Report for the Proposed RRG Antelope Valley Solar Project Kern and Los Angeles Counties, California

Table 3-5. Resources within the Chaparral Solar Facility Project Area.

Primary #	Type	Description
P-15-007340	Isolate	Prehistoric flake
P-15-007341	Isolate	Prehistoric flake
P-15-007342	Isolate	Prehistoric flake
P-15-012475	Isolate	Prehistoric flake
P-15-013844	Site	Prehistoric fire affected rocks
P-15-013846	Site	Prehistoric lithic scatter
P-15-013847	Site	Prehistoric lithic scatter
P-15-013848	Site	Prehistoric lithic scatter

The IC records search also indicated that segments of three collector lines, totaling approximately 0.75-mi (Figure 1-4), had not been previously surveyed. All other collector lines and collector line segments had been previously surveyed, with no resources identified within them.

In addition to the IC records search, a variety of additional historical files and records were consulted. These included the GLO land patent files; on-line death/burial and cemetery records at the Kern County Recorder's Office and Department of Public Health, respectively; historical air photos and topographical maps of the Project location (at historicaerials.com); the 1910, 1920 and 1930 U.S. Census records; and the files at the History Room, Beale Memorial Library.

4. METHODS AND RESULTS

The Project survey area was 2,117-ac in size. The Chaparral Solar Facility Project area is two adjacent blocks, separated by the LADWP Owens Gorge 230kV transmission corridor, that cover 764-ac. The Tumbleweed Solar Facility Project area consists of two non-contiguous blocks that total 721-ac. The Rabbitbrush Solar Facility Project area also consists of two blocks that are 632-ac total in size. The surveyed collector line routes, based on a 100-ft wide survey corridor for each, total an additional 12.5-ac. An intensive Phase I Survey was conducted on these solar facility areas and the unsurveyed collector line routes in May and June 2017, and in March 2018.

The field methods employed included intensive pedestrian examination of the ground surface for evidence of archaeological sites and cultural resources, in the form of artifacts, surface features and buildings (such as bedrock mortars, historical mining equipment, built-structures), and archaeological indicators (e.g., organically enriched midden soil, burnt animal bone); the identification and location of any discovered sites, should they be present; tabulation and recording of surface diagnostic artifacts; site sketch mapping; preliminary evaluation of site integrity; and site recording, following the California Office of Historic Preservation Instructions for Recording Historic Resources.

The Project survey areas were examined by walking parallel transects spaced at 15-m intervals. GPS units were used to space and orient the transects. Areas of dense vegetation were examined purposively and opportunistically to determine whether they contained cultural resources, with particular attention paid to rodent burrow spoils piles, cut-banks, and the cleared edges of disturbed areas. Mapping of identified sites was completed using a Trimble GEOEXPLORER 6000 Series GPS with sub-meter accuracy (Confidential Appendix B). Site boundaries, features, diagnostic artifacts and concentrations of artifacts were all plotted on the resulting GIS maps.

A preliminary assessment of site condition was conducted for each identified cultural resource and archaeological site. This was based on current groundsurface evidence for disturbance, including cultural factors such as off-road vehicle or farming impacts, as well as natural effects, such as erosion. Condition assessment also included comparisons between existing surface evidence and earlier site descriptions, when available. Formal evaluations of significance and resource eligibility were not however conducted as a part of this phase of investigation. Confidential Appendix B includes site location maps; DPR 523 forms with sketch maps, showing the locations of identified formal artifact and features, and artifact photos are in Confidential Appendix C.

Field conditions during the survey were excellent. Ground cover surface density across each of the three Project survey areas varied between areas with creosote scrub versus intrusive grasses (typically in locations that had been disked in the relatively recent past; Figures 4-1, 4-2 and 4-3). In the former, groundcover density averaged roughly 15 – 20%; in the latter, ground cover density was in places as high as 40 – 50%. This cover was, however, very low due to drought conditions and, despite its density, it did not impede surface visibility. All portions of the three Project areas were surveyed in their entirety. No cultural resources were collected during the survey.

Figure 4-1. Overview of Chaparral Solar Facility, looking southeast.

Figure 4-2. Overview of Tumbleweed Solar Facility, looking northwest.

Figure 4-3. Overview of Rabbitbrush Solar Facility, looking south.

4.1 SURVEY RESULTS

Field results are provided for each of the three individual solar facilities and collector lines below.

4.1.1 Chaparral Solar Facility Area

Six archaeological sites had been previously recorded within the Chaparral Solar Facility footprint. Three of these were re-identified and their site records updated, two of sites were not re-identified and are assumed to no longer exist and a third site has been destroyed since the original discovery and now constitutes an isolated artifact. Eight newly recoded sites and 11 newly recoded isolated artifacts were identified within the Chaparral Solar Facility footprint (Table 4.5).

PREVIOUSLY RECORDED SITES

P-15-013844 UPDATE:

Site P-15-013844 consist of small FAR concentration located [redacted]. The site was identified and recorded on June 1, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 10.6-m (N-S) by 9.2-m (E-W) and situated at an elevation of 2,524-ft amsl. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. The geology on site is comprised of fine, sandy silt with dispersed metamorphic and igneous rocks.

Site P-15-013844 was initially recorded by Pacific Legacy, Inc. (K.R. Way, 2008) as a small FAR cluster with no associated artifacts. The site was successfully reidentified in 2017 and remains virtually unchanged. The largest rock in the FAR cluster measures 9-cm by 8-cm by 5.5-cm. The site is in good condition and likely represents an agave roasting pit. It is of unknown age.

P-15-013846 UPDATE:

Site P-15-013846 was initially recorded by Pacific Legacy, Inc. (K.R. Way et al. 2008) as a sparse lithic scatter with *Tivela* shell fragments. The site was found to consist of 12 early stage reduction flakes, comprised mostly of rhyolite and one chert flake, and five *Tivela* shell fragments. The site measures approximately 50-m northwest/southeast by 23-m northeast/southwest.

P-15-013847 UPDATE:

Site P-15-013847 was initially recorded by Pacific Legacy, Inc. (K.R. Way et al., 2008) as low-density lithic scatter, located [redacted]. The site was apparently destroyed since that original discovery. During the current ASM study, a single CCS interior flake measuring 5.5-cm by 4.3-cm by 1-cm, was identified at the site location. Site P-15-013847 now constitutes an isolated artifact.

P-15-013848 UPDATE:

Site P-15-013848 was initially recorded by Pacific Legacy, Inc. (K.R. Way, 2008) as a low-density lithic scatter [redacted]. The site could not be reidentified where it was originally mapped, and no artifacts were observed in or around the existing site boundary. Site P-15-013848 was either originally mis-mapped or no longer exists.

NEWLY RECORDED SITES

AVEP-RA-12:

Site AVEP-RA-12, a sparse mid-20th century refuse scatter, is located [redacted]. The site was identified and recorded on May 25, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 337-ft (north-south) by 107-ft (east-west) and is situated at an elevation of 2,589-ft amsl. Vegetation in the area consists of creosote, Joshua tree, ephedra, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site consists of mid-20th century refuse dump (Table 4-1). A modern cardboard dump is located just north of the site. The site may represent a single incident dump but it lacks associative context. It is in poor condition.

Table 4-1. AVEP-RA-12 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Church-keyed sanitary can	10	1935 – Present[1]
Bi-metal beverage can	10	Late 1950s – 1975[1]
"Thatcher Manufacturing" bottle	1	1944 – 1985[2]
"Owens-Illinois" mason jar base	1	1929 – ca. 1960[2]

References: [1] Maples 1998; [2] Lindsey 2015

AVEP-RA-17:

Site AVEP-RA-17, a sparse lithic scatter, is located [redacted]. The site was identified and recorded on May 30, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 13.5-m (N-S) by 13-m (E-W) and situated at an elevation of 2,574-ft amsl. Vegetation in the area consists of creosote, Joshua tree, ephedra, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site contains five secondary reduction flakes (80% rhyolite, 20% CCS). It is a small lithic workshop of unknown age. The site is in good condition.

AVEP-RA-18:

Site AVEP-RA-18, a small early-to-mid 20th century can scatter, is located [redacted]. The site was identified and recorded on May 30, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 248-ft (north-south) by 230-ft (east-west) and is situated at an elevation of 2,548-ft amsl. Vegetation in the area consists of creosote, Joshua tree, ephedra, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site is a small early-to-mid 20th century can scatter comprising six hole-in-top cans (c. 1900s – 1940s), five rotary-opened multi-serve cans (1925 – present), one paint can (1906 – present), and a small sanitary juice can. The site appears to represent a single incident refuse dump, with no associative context. It is in poor condition.

AVEP-RA-19:

Site AVEP-RA-19, a mid-20th century refuse scatter, is located [redacted]. The site was identified and recorded on May 30, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 94-ft (north-south) by 88-ft (east-west) and situated at an elevation of 2,545-ft amsl. Vegetation in the area consists of creosote, Joshua tree, ephedra, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site consists of a mid-20th century refuse dump (Table 4-2). The site appears to represent a dispersed, single incident refuse dump, without associative context. It is in poor condition.

Table 4-2. AVEP-RA-19 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Rotary opened sanitary can	12	1925 – Present[1]
Hole-In-Top	1	c. 1900s – 1940s[1]
External Friction Tobacco	1	1907 – 1948[1]
"Tudor Rose" dishware	1	1930 – c. 1940s[2]
"Glass Containers Corp." bottle base	1	1934 – ca. 1968[3]
"Owens-Illinois" mason jar base	2	1929 – ca. 1960[3]

References: [1] Maples 1998; [2] Gonzalez 2017; [3] Lindsey 2015

AVEP-RA-20:

Site AVEP-RA-20, a sparse flake scatter, is located [redacted]. The site was identified and recorded on May 30, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 45.5-m (northeast-southwest) by 16-m (northwest-southeast) and is situated at an elevation of 2,541-ft amsl. Vegetation in the area consists of creosote, Joshua tree, ephedra, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site is a sparse flake scatter with approximately 10 surface flakes. The flakes are primary and secondary flakes (60% rhyolite, 30% CCS). The site is a small lithic workshop, of unknown age. It is in good condition.

AVEP-RA-21:

Site AVEP-RA-21, a small, sparse lithic scatter, is located [redacted]. An extensive modern domestic refuse scatter, of mostly fragmented items, spans the site area 100-m in either direction. Additionally, a modern concrete foundation is located [redacted]. The site was identified and recorded on May 30, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 5-m (north-south) by 4-m (east-west) and is situated at an elevation of 2,535-ft amsl. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site is a sparse lithic scatter comprised of five secondary surface flakes (60% rhyolite, 30% CCS). The flake scatter is situated in a previously plowed area and is surrounded by dirt roads on all sides. It represents a small lithic workshop, of unknown age. The site is in fair condition.

AVEP-RA-22:

Site AVEP-RA-22, an historic refuse scatter and foundation, is located [redacted]. The site was identified and recorded on October 12, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 673-ft (northwest-southeast) by 353-ft (northeast-southwest) and situated at an elevation of 2,539-ft amsl. Vegetation in the area consists of creosote, buckwheat, Tamarisk tree, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site is an historic mid-20th century refuse scatter and associated concrete foundation (Feature 1) located on open alluvial flats just south of the fault scarp. Most of the diagnostic refuse (Concentration 1) is located on the south side of an east-west oriented dirt road that cuts directly through the site. An extensive sub-modern to contemporary domestic refuse scatter, of mostly fragmented items, spans approximately 100-m in either direction of the datum and can be found mixed in with the historic refuse. In addition to the recorded square foundation, at least four additional concrete standing pipes were noted in the vicinity, including a capped pipe that has been recently modified with blue paint (datum). The concrete features likely represent the remnants of a pump house. Based on evidence of agricultural activities (i.e. adjacent disked fields, pump house features) and the presence of domestic refuse, the site appears to represent a historic farm. A search of the BLM’s General Land Office (GLO) records do not contain any homestead or ownership information for the associated land parcel. Historic aerials, however, indicate the presence of three structures (including the recorded concrete foundation) minimally from 1948 to 1976. One of these, to the southeast of the concrete pad, appears to be a house. These structures were demolished sometime prior to 1995 and, with the exception of Feature 1, no evidence of foundational remnants was observed. Two agricultural fields are visible in the aerial photos through 1976.

Feature 1 is a square concrete foundation that measures 10.5-ft (northeast-southwest) by 10.5-ft northwest-southeast. The foundation has 12 short non-threaded metal posts that protrude vertically from the surface. At least four chunks of loose concrete surround the foundation.

Concentration 1 consists of a moderately dense refuse concentration measuring 153-ft (northeast-southwest) by 79-ft (northwest-southeast). Refuse includes approximately 300 glass bottle fragments, 100 ceramic sherds, metal debris, 30 cans (aluminum, bi-metal, aerosol), and assorted plastics. Diagnostic items within the concentration are mostly fragmented and represent domestic refuse from the 1940s – 1990s (Table 4-3). The concentration is contained within a dozer push pile just south of the site datum. The site is mixed in age, and is in poor condition.

Table 4-3. AVEP-RA-22 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Rotary opened sanitary can	12	1925 – Present[1]
Hole-In-Top	1	c. 1900s – 1940s[1]
External Friction Tobacco	1	1907 – 1948[1]
"Tudor Rose" dishware	1	1930 – c. 1940s[2]
"Glass Containers Corp." bottle base	1	1934 – ca. 1968[3]
"Owens-Illinois" mason jar base	2	1929 – ca. 1960[3]

References: [1] Maples 1998; [2] Gonzalez 2017; [3] Lindsey 2015

AVEP-RA-23:

Site AVEP-RA-23, a small lithic scatter with groundstone, is located [redacted] A dense concentration of modern cans and tires is located adjacent to the site. The site was identified and recorded on May 31, 2017. A GIS sketch map was created for the site using a Trimble GEOEXPLORER 6000 Series. The site measures 35.5-m (east-west) by 26.5-m (north-south) and is situated at an elevation of 2,548-ft amsl. Vegetation in the area consists of creosote, buckwheat, ephedra, and seasonal grasses. The geology on site is comprised of silty alluvium with dispersed metamorphic and igneous rocks.

The site is a sparse lithic scatter of 10 surface flakes and one mano fragment (Artifact 1). The flakes include rhyolite secondary flakes with one interior CCS flake observed. Artifact 1 is a porphyritic mano fragment that measures 10.5-cm by 6-cm by 4.8-cm. The mano has visible grinding and polish on both sides. Site AVEP-RA-23 is a small, multi-purpose workshop, of unknown age. It is in fair condition, having been disturbed by recent dumping.

ISOLATED ARTIFACTS

Isolated artifacts are defined as less than three archaeological specimens within a 10-m^2 area. Three isolated artifact locations (containing a total of four specimens) had been previously recorded within the Chaparral Solar Facility Project area (Table 4-4), all of which were reidentified. One previously recorded site (P-15-013847) had been surface collected in 2008, with only a single artifact present when revisited in 2017, thus currently constituting an isolate.

Eleven additional isolated artifact locations (containing a total of 15 specimens) were identified and recorded in 2017 (Table 4-5), yielding a total of 15 isolate locations (with 20 total specimens) within the Chaparral Project area. All of these are examples of prehistoric debitage, or waste lithic material. Thirteen are rhyolite and 3 are CCS; 11 are secondary flakes, 3 are primary flakes, 1 is a tertiary flake, and 1 is a multi-platform core. The presence of these isolated artifacts indicates sporadic and casual prehistoric use of the study area, probably for general foraging activities.

Table 4-4. Previously Recorded Isolates within the Chaparral Solar Facility

Identifier:	Description:	Reidentified:
P-15-007340	Rhyolite secondary flake	Yes
P-15-007341	Rhyolite secondary flake	Yes
P-15-007342	Two Rhyolite secondary flakes	Yes
P-15-013847 (former site)	CCS secondary flake	Yes

Table 4-5. Newly Recorded Isolates within the Chaparral Solar Facility

Identifier:	Description:
AVEP-ISO-8	Rhyolite primary flake
AVEP-ISO-10	CCS primary flake
AVEP-ISO-11	Rhyolite secondary flake
AVEP-ISO-12	Rhyolite secondary flake
AVEP-ISO-13	Two rhyolite secondary flakes
AVEP-ISO-14	Two rhyolite secondary flakes
AVEP-ISO-15	CCS multidirectional core
AVEP-ISO-16	Rhyolite primary and secondary flakes
AVEP-ISO-17	Two rhyolite secondary flakes
RESDESIGN-ISO-1	Rhyolite secondary flake
RESDESIGN-ISO-2	Rhyolite tertiary flake

4.1.2 Rabbitbrush Solar Facility Area

No archaeological sites had been previously recorded within the Rabbitbrush Solar Facility footprint. One newly recorded archaeological site is present within the Rabbitbrush Solar Facility area, as described below. Due to the nature of this site, a Phase II test excavation and determination of significance was conducted on it. A total of 3 isolated artifact locations were identified and recorded in the Rabbitbrush Solar Facility Project footprint (Table 4-8).

AVEP-RA-31:

The site consists of a refuse scatter [redacted]. The site is located on the open flats of the Antelope Valley. The site dimensions are 390-ft (northwest-southeast) by 165-ft (east-west) and it is situated at an elevation of 2611-ft amsl.

The site consists of a cased but uncapped well pipe, presumably a dry water well (Feature 1); two shallow pits (Features 2 and 3); and early to mid-20th century domestic and construction debris in three concentrations (Concentrations 1 - 3; see Tables 4-6 & 4-7). Domestic debris includes cans, glass shards, and pieces of porcelain. Construction debris includes barbed wire and milled wood fragments. Shattered fragments of a cast iron pot are present in both concentrations. No structural remains per se, such as foundations, are present at the site. At least one modern aluminum beer can was noted within the site boundary. A two-track road is located 230-ft west of the site.

Table 4-6. Feature Designations, Dimensions, Description, and Associated Artifacts

Designation:	Measurements:	Description:	Associated Artifacts:
Feature 1	6-in diameter; Depth unknown	A 6-inch diameter well cased by metal tubing that is held together by ¼" rivets. The well opening is flush with the ground. At the time of recording, the well was covered by two small sheets of galvanized steel.	At least three large milled wood beam (8 x 8-in) fragments are in the immediate vicinity. Some wire nails located near feature.
Feature 2	5-ft diameter x 1.5-ft deep	A shallow earthen pit immediately east of Feat. 1.	At least eight juniper wood posts jumbled together by barbed wire were inside and adjacent to the pit. Some wire nails in the vicinity.
Feature 3	10-ft diameter x 1.5-ft deep	A larger shallow pit less than 100-ft south of Feat. 2. Concentration 1 is just south.	No refuse was noted inside the pit.

Table 4-7. Concentration Designations, Dimensions, and Associated Artifacts

Designation:	Measurements:	Associated Artifacts:
Concentration 1	45-ft (N-S) x 33-ft (E-S)	5 Hole-in-Top Cans (c. 1900s – 1940s[1]) 7 Sanitary Cans (1935 – Present[1]) 20 Amethyst Glass shards (c. 1880 – 1915[2]) 5 porcelain fragments
Concentration 2	18-ft (N-S) x 10-ft (E-S)	5 Hole-in-Top Cans (c. 1880 – 1940s) 3 cast iron pot fragments
Concentration 3	52-ft (N-S) x 160-ft (E-S)	20 Hole-in-Top Cans (c. 1900s – 1940s[1]) 5 Amethyst Glass shards (c. 1880 – 1915[2]) 5 porcelain fragments

References: [1] Maples 1998; [2] Munsey 2014

The apparent well (Feature 1) is a 6"-diameter vertical hole in the ground internally supported by a rivetted metal pipe casing. The casing does not extend above ground-level. Three short wooden beam fragments, possible machine/equipment supports, are located adjacent to the well-hole. The well-hole has not been capped, presumably because it never flowed. Currently a small sheet of galvanized metal covers the hole.

The fractured remnants of a cast iron pot, most likely a Dutch oven, have a maker's mark consisting of an italicized "*GRISWOLD*" within an outline-cross and circle. This represents the Griswold Manufacturing Company of Erie, Pennsylvania, which operated from 1887 into the 1960s. Renowned for the high quality of their cast iron cookware, their products were distributed globally. This mark is specific to the 1910s to early 1920s (http://www.griswoldcookware.com/history.htm).

[redacted]

A Ground Penetrating Radar (GPR) survey was conducted for a 100-x-100-m area [redacted]. Details of this survey, including field and analytical methods and results, are presented in Confidential Appendix D. [redacted]

The 1963 air photo also shows that a rectangular area, roughly 10-acres in size, surrounding the site had been cleared of vegetation at some point in the past. Although the evidence is now even fainter, there appears to still be a visible difference in the density of vegetation in this area versus the immediately surrounding terrain. This is especially true with respect to larger bushes and Joshua Trees, which reach maturity in about 60-years. This suggests that this area may have once been cleared, presumably for farming.

According to General Land Office records, as noted above, this [redacted] was patented through the Homestead Act by Clarence Rumbaugh on 6 June 1916. U.S. Census records indicate that no one by that name lived in California in 1910 or earlier. The 1920 census lists a Clarence E. Rumbaugh, a grocer born in 1877 in Indiana, as living in Stockton. The 1930 census lists a Clarence L. Rumbaugh, a farmer living in Pasadena who was born in Michigan in 1892. Either of these individuals may have been the recipient of the patent. No additional historical information could be found about either person.

Site AVEP-RA-31 appears to represent a small refuse scatter or, perhaps, a briefly occupied campsite associated with the effort to drill a well and possibly farm this location. The age of the majority of the observed artifacts, including the cookware fragments, correlate closely with the 1916 date for the patent. As suggested by the dry well-hole, the absence of readily available water would have impeded agriculture. The sum of the evidence suggests that the low-density scatter of artifacts may represent a failed attempt at farming in the Antelope Valley, most likely by Clarence Rumbaugh.

The site is currently in poor condition. Artifacts present include a mixture of different ages, despite the circa 1920 age of the majority of the specimens, suggesting different episodes of dumping. The presence of cast iron cookware fragments from the same pot in the two different concentrations suggests that artifact locations have been displaced.

[redacted]

ISOLATED ARTIFACTS

A total of 3 isolated artifact locations were identified and recorded in the Rabbitbrush Solar Facility Project area (Table 4-8). These include two rhyolite secondary flakes and an amethyst glass medicine bottle.

Table 4-8. Newly Recorded Isolates within the Rabbitbrush Solar Facility

Identifier:	Rabbitbrush Parcel	Description:
AVEP-ISO-18	East	Amethyst medicinal bottle
AVEP-ISO-19	West	Rhyolite secondary flake
AVEP-ISO-20	West	Rhyolite secondary flake

4.1.3 Tumbleweed Solar Facility Area

No archaeological sites were identified within the Tumbleweed Solar Facility footprint. A single isolated artifact (AVEP-ISO-28. Table 4-9) was identified and recorded in the east portion. This is a CCS biface fragment, which had been damaged by farming activities.

Table 4-9. Newly Recorded Isolates within the Tumbleweed Solar Facility

Identifier:	Tumblweed Parcel	Description:
AVEP-ISO-28	East	CCS biface fragment

5. SUMMARY AND RECOMMENDATIONS

An intensive Phase I cultural resources survey of the 2,117-ac AVEP Solar Project site resulted in the identification of 12 archaeological sites. Four sites had been previously recorded within the 764-ac Chaparral Solar Facility footprint, three of which were found to still exist while a fourth now comprises only an isolated artifact. Eight additional sites were identified and recording during the survey, yielding 11 extant sites. No sites had been previously recorded in the Tumbleweed or Rabbitbrush Solar Facilities footprints. One additional archaeological site was identified and recorded in the Tumbleweed Solar Facility footprint, while no sites were identified in the Rabbitbrush Solar Facility footprint.

A total of 24 isolated artifacts, at 19 locations, were also recorded within the 2,117-ac AVEP Solar Project, 15 isolate locations in the Chaparral Solar Facility footprint, 3 in the Rabbitbrush Solar Facility footprint, and one in the Tumbleweed Solar Facility footprint. Because isolates are ineligible for listing in the California Register, they are not considered Historical Resources. The recording of isolated artifacts serves to document the scientific information that they may contain, and they are considered categorically not significant under CEQA.

Recommendations for the treatment of cultural resources for each Facility are outlined below.

5.1 RECOMMEDATIONS

5.1.1 Chaparral Solar Facility

A total of eleven archaeological sites have been recorded within the proposed Chaparral Solar Facility. One previously recorded site (P-15-13847) had effectively been destroyed with only a single lithic flake still present. The Chaparral Facility therefore has the potential to result in adverse impacts to 10 extant archaeological sites (Table 5.1). It is recommended that these sites either be preserved in place, or that Phase II test excavations and determinations of significance be conducted at each of them, from which determinations of CRHR eligibility can be made and a final assessment of impacts can be established.

Table 5.1. Cultural Resources Within the AVEP Project Area

Site/Locus	Site Type	Age	Comments
Chaparral Solar Facility			
P-15-013844	Earth oven	Unknown	No comments
P-15-013846	Lithic scatter	Unknown	No comments
AVEP-RA-12	Refuse scatter	Mid-20th century	No comments
AVEP-RA-17	Lithic scatter	Unknown	No comments
AVEP-RA-18	Historic can scatter	Early 20th century	No comments

AVEP-RA-19	Refuse scatter	Mid-20th century	No comments
AVEP-RA-20	Lithic scatter	Unknown	No comments
AVEP-RA-21	Lithic scatter	Unknown	No comments
AVEP-RA-22	Refuse scatter	Mid-20th century	No comments
AVEP-RA-23	Lithic/plant workshop	Unknown	No comments

5.1.2 Rabbitbrush Solar Facility

The newly identified and recorded site in the Rabbitbrush Solar Facility footprint, site AVEP-RA-31, is the location of a putative grave which has been depicted on USGS Willow Springs topographical quadrangles since 1965, and therefore warrants discussion. A low-density historic artifact scatter is associated with this putative grave site. Because of the potential sensitivity of this resource, a Phase II test excavation and determination of significance, partly conducted using a GPR survey, was completed.

The historic scatter dates to the early to mid-twentieth century and may be associated with Clarence Rumbaugh, an early homesteader. Twenty-five subsurface anomalies identified by the GPR were tested but no evidence of a grave was uncovered at this location, and no record of such a grave exists with the Kern County Recorder and Department of Public Health. Based on the existing evidence the grave location shown on the USGS map appears to be an error.

Historical archaeological sites are primarily evaluated for eligibility to the CRHR in terms of Criterion 4/D, Research Potential. This site's eligibility may then be analyzed using the AIMS-R criteria identified by Caltrans (2007), as follows:

1. *Association* – The site appears to be associated with Clarence Rumbaugh, the initial homesteader at this location. Rumbaugh is not a person of distinction, however, and there are no historical records of his life, activities or achievements beyond his land patent. The site therefore does not have research potential based solely on its association with this individual.

2. *Integrity* – The site is a low-density surface artifact scatter which appears to have been disturbed (e.g., two pieces of a cast iron pot were identified in different areas of the site). Integrity therefore appears to have been compromised.

3. *Materials* – Few types and numbers of artifacts are present at the site, thereby limiting its research potential.

4. *Stratigraphy* – The site type precludes stratigraphic development.

5. *Rarity* – No rare or unusual features/feature types or artifacts were identified at the site.

Site AVEP-RA-31 appears to represent an expression of an important historical event, the establishment of homesteads in the Antelope Valley, and thus might be eligible under Criterion A/1. The attempt to establish a farm at this location was unsuccessful, however, and the site does not appear important within this context and does not qualify as eligible under A/1. Although site AVEP-RA-31 appears to associated with Clarence Rumbaugh, he is not a person of historical distinction or importance and the site is not eligible under Criterion B/2. The site, as a small historic refuse scatter, is a common property type that does not contain an expression of a master craftsman and is not an unusual example of its type, and it is not eligible under Criterion C/3.

Based on these criteria, AVEP-RA-31 is recommended as not significant or unique. Although the GPR survey and testing failed to find evidence that a historic grave is present at this location, such a survey is not fully conclusive. The possibility of a human burial cannot be fully precluded. It is therefore recommended that any ground disturbing activities at this location (i.e. excavation or grading, but not including post-pounding) be monitored by an archaeologist, to ensure that a grave is not uncovered and disturbed. Should such a grave be found, it is recommended that it be preserved in place. The applicant proposes the following mitigation measure:

APM Cutural-1: An archaeologist should be present to monitor ground-disturbing activities that occur within 100 feet of AVEP-RA-31. If the grave or additional cultural resources are discovered, the archaeologist should have the authority to stop work and inspect the discovery. Work should only resume with approval from the archaeologist.

5.1.3 Tumbleweed Solar Facility

No archaeological sites were identified within the Tumbleweed Solar Facility study area. No additional work related to cultural resources is recommended for the Tumbleweed Facility.

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CONFIDENTIAL APPENDICES

REDACTED

ADDENDUMS

To: County of Kern Planning and Natural Resources Department

From: David S. Whitley, Ph.D., RPA, ASM Affiliates, Inc.

Date: 23 June 2020

Re: Technical Reports Update for AVEP Solar Project Revisions

---

I. INTRODUCTION

ASM Affiliates, Inc. prepared the *Phase I Cultural Resources Survey, AVEP Solar Project, Kern County, California*, and the *Phase II Test Excavations and Determinations of Significance, AVEP Solar Project*, *Kern County, California*, for the proposed AVEP Solar Project (Project) analyzing the cultural resources (Reports). Since preparing the Reports, the Project has undergone modifications. The primary components of these modifications consist of (1) the removal of the previously identified approximate 721-acre Tumbleweed Solar Facility from the Project; and (2) increasing the proposed site for the Chaparral Solar Facility from approximately 764 acres to approximately 774 acres to include an optional location (one of two potential locations on the Chaparral Solar Facility) for a proposed energy storage system (ESS), through the addition of an approximate-10 acre parcel to the proposed Chaparral Solar Facility site.

The added Chaparral Solar Facility 10-acre parcel is located at the northwest corner of Holiday Avenue and 110th Street West, directly across Holiday Avenue from the existing Willow Springs Solar Project Substation. The proposed capacity of the ESS on both the Rabbitbrush and Chaparral Solar Facilities has been increased, to store up to 1,000 megawatt-hours (MWh) of energy on each facility (for a combined project total of up to 2,000 MWh), however, the proposed acreage of each ESS would remain at approximately five acres of land within each facility site. As shown on Figure 1 – Project Map, and Figure 2 – Site Plan, a portion or the remainder of the added 10-acre parcel to the Chaparral Solar Facility would be occupied by access easements for electric collection and temporary water lines.

This memorandum updates the technical analysis and the evaluation of the potential environmental effects of the Project as presented in the Reports. In summary, the Project modifications result in a reduction of the environmental effects as previously analyzed and presented in the above referenced Reports.

II. MODIFIED PROJECT DESCRIPTION

The Project will construct, operate, and eventually decommission two solar photovoltaic (PV) power generating facilities that would be capable of delivering a total of up to approximately 250 megawatts of alternating current (MW-ac) electricity, along with associated facilities including the

ESS units. The proposed Project consists of two non-contiguous solar generating facilities, the Rabbitbrush Solar Facility (125 MW-ac) and Chaparral Solar Facility (125 MW-ac) and ESS to store up to 1,000 megawatt-hours (MWh) for each facility, for a total of up to 2,000 (MWh).

III. MODIFICATIONS TO THE ANALYSIS

Potential environmental effects resulting from the Project modifications as compared to the Project previously analyzed in the Reports are presented below. Implementing the Project modifications, either separately or as a whole, would not result in any new or more severe environmental effects than identified in the Reports. The modifications would not affect the significance conclusions presented in the Reports. Accordingly, the modifications would not require any new recommended mitigation measures compared to those recommended in the above referenced Reports.

To reach these conclusions, this memorandum analyzes the individual effects that removing the Tumbleweed Solar Facility and the addition of an optional location for ESS at the Chaparral Solar Facility would have on cultural resources. The memorandum then analyzes the combined effect of the two actions on the impacts to cultural resources. We have reviewed our survey field data for this analysis.

Removing the Tumbleweed Solar Facility

We analyzed the impact on cultural resources due to the removal of the proposed Tumbleweed Solar Facility. We determined that the modification would reduce the environmental effects and otherwise improve the environmental condition of the Project when compared to the Project analyzed in the Reports.

The Phase I cultural resources survey of the Tumbleweed Solar Facility was conducted in combination with the survey of the Chaparral Solar Facility and Rabbitbrush Solar Facility. A joint archival records search was conducted by the Southern San Joaquin Valley Information Center at California State University, Bakersfield, for all three facilities. The elimination of the Tumbleweed Solar Facility has resulted in changes to our original records search results; specifically, only 20 previous studies have been completed within 0.50 miles of the reduced Project footprint consisting of the Chaparral Solar Facility and Rabbitbrush Solar Facility. As originally reported, no cultural resources had been previously recorded within the Tumbleweed Solar Facility, according to the Information Center records; however, after the removal of the Tumbleweed Solar Facility, only 36 cultural resources have been previously identified within the 0.50 mile radius of the modified Project site (as compared to 49 cultural resources previously identified within the 0.50 mile radius when the Tumbleweed Solar Facility was included in the Project site). Of the 36 previously recorded resources, seven were within the reduced Project footprint and 29 were in the surrounding 0.5 mile buffer.

The Phase I survey of the Tumbleweed Solar Facility resulted in the identification and documentation of a single isolated artifact, a stone tool. Isolated artifacts are categorically not eligible for listing in the California Register of Historical Resources (CRHR) and are considered not significant or unique. This isolated find therefore did not require mitigation measure(s). As a result, the removal of the Tumbleweed Solar Facility would not affect the environmental effects analysis or significance conclusions of the above referenced Reports and no change to the proposed mitigation measures is applicable.

Furthermore, assuming no changes in circumstances and no new information of substantial importance, if the Tumbleweed Solar Facility is contemplated in the future as a standalone project, the technical analysis contained in the Reports and herein can be instructive.

a. Adding optional location for the ESS for the Chaparral Solar Facility

We analyzed the impact on cultural resources due to the addition of an optional location for the ESS for the Chaparral Solar Facility. This modification includes adding a 10-acre parcel to the proposed Chaparral Solar Facility at a location at the northwest corner of Holiday Avenue and 110th Street West, directly across Holiday Avenue from the existing Willow Springs Solar Project Substation. We determined that this modification does not result in any new significant environmental effects or a significant increase in the severity of environmental effects that were previously analyzed in the Reports. Therefore, the modification would not affect the environmental effects analysis or significance conclusions of the Reports and no change to the proposed mitigation measures is applicable.

A records search of the 10-acres parcel, completed as part of our Phase I survey Project, was completed by the Southern San Joaquin Valley Information Center, California State University, Bakersfield. This indicated that the parcel had been previously surveyed in 1991 and that no cultural resources were known to exist within or adjacent to it. Given the age of this previous study, we completed an intensive Phase I pedestrian survey of this 10-acre parcel on 14 February 2020. No cultural resources of any kind were found to be present within the parcel and the development and use of it is not anticipated to result in adverse impacts to cultural resources.

As a result, the addition of an optional location for the ESS for the Chaparral Solar Facility by adding 10 acres to the Chaparral Solar Facility would not affect the significance conclusions of the above referenced Reports.

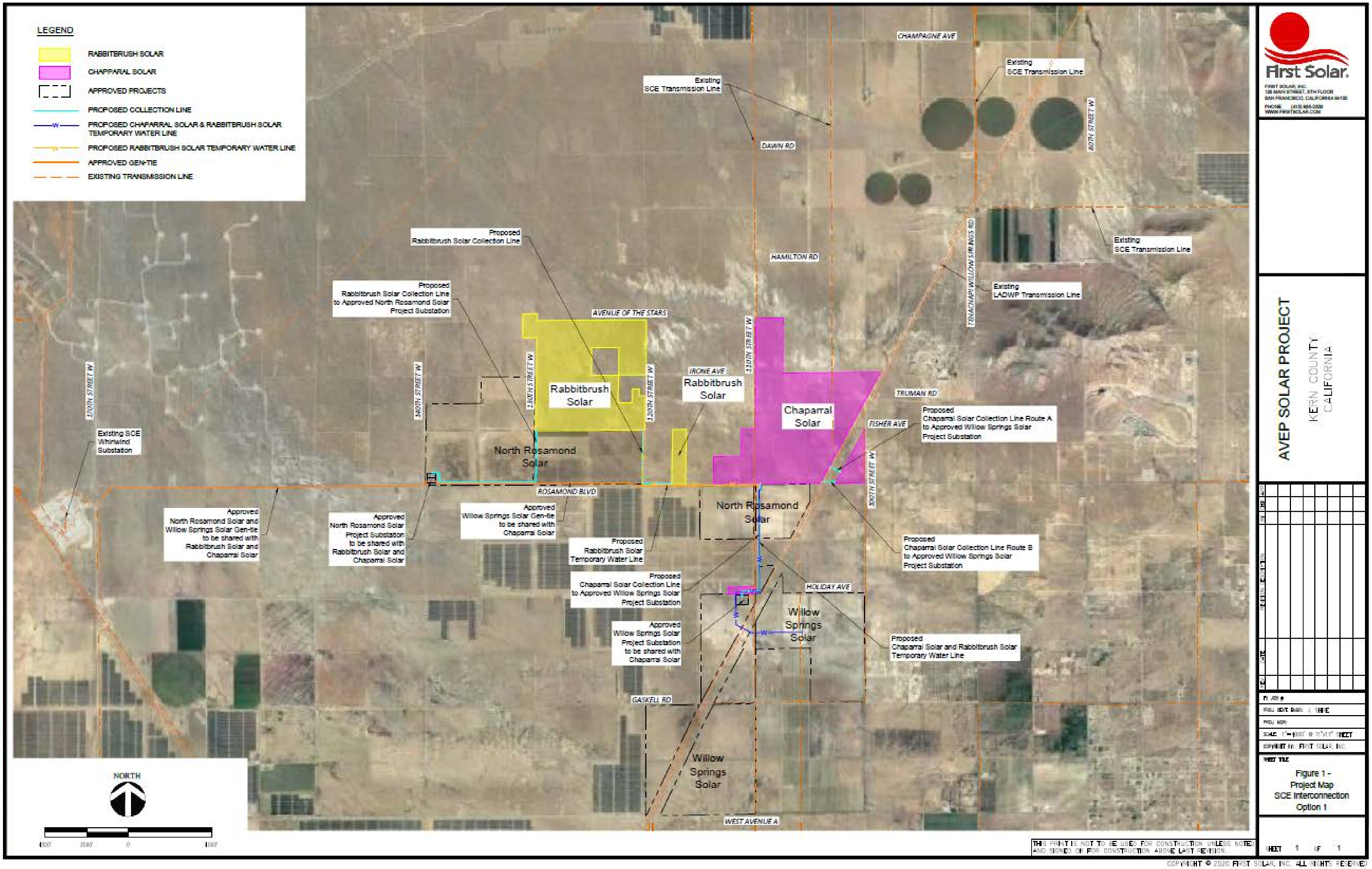
b. Combined Effect of Both Project Modifications

Finally, we analyzed the combined effect on cultural resources due to removing the proposed Tumbleweed Solar Facility and the addition of an optional location for the ESS for the Chaparral Solar Facility. We determined that the modifications, when considered together, do not result in any new or more severe significant effects compared to the effects previously identified in the above referenced Reports. Therefore, there is no need to change the prior significance conclusions or to evaluate new proposed mitigation measures.

As a result, the Project modifications would not affect the significance conclusions of the above referenced Reports.

IV. CONCLUSION

When considered both individually and together, the modifications to the Project would not result in any new or more severe significant effects to cultural resources. Accordingly, the previous analysis and conclusions of the above referenced Reports regarding impacts and recommended mitigation measures would not change.


LEGEND
RABBITBRUSH SOLAR
CHAPPARAL SOLAR
APPROVED PROJECTS
PROPOSED COLLECTION LINE
PROPOSED CHAPARRAL SOLAR & RABBITBRUSH SOLAR TEMPORARY WATER LINE
PROPOSED RABBITBRUSH SOLAR TEMPORARY WATER LINE
APPROVED GEN-TIE
EXISTING TRANSMISSION LINE
Rabbitbrush Solar
Chaparral Solar
North Rosamond Solar
Willow Springs Solar
Existing SCE Transmission Line
Existing LADWP Transmission Line
Existing SCE Whirlwind Substation
Proposed Rabbitbrush Solar Collection Line
Proposed Rabbitbrush Solar Collection Line to Approved North Rosamond Solar Project Substation
Approved North Rosamond Solar and Willow Springs Solar Gen-tie to be shared with Rabbitbrush Solar and Chaparral Solar
Approved North Rosamond Solar Project Substation to be shared with Rabbitbrush Solar and Chaparral Solar
Approved Willow Springs Solar Gen-tie to be shared with Chaparral Solar
Proposed Rabbitbrush Solar Temporary Water Line
Proposed Chaparral Solar Collection Line to Approved Willow Springs Solar Project Substation
Approved Willow Springs Solar Project Substation to be shared with Chaparral Solar
Proposed Chaparral Solar Collection Line Route A to Approved Willow Springs Solar Project Substation
Proposed Chaparral Solar Collection Line Route B to Approved Willow Springs Solar Project Substation
Proposed Chaparral Solar and Rabbitbrush Solar Temporary Water Line
CHAMPAGNE AVE
DAWN RD
HAMILTON RD
AVENUE OF THE STARS
IRONE AVE
TRUMAN RD
FISHER AVE
ROSAMOND BLVD
HOLIDAY AVE
GASKELL RD
WEST AVENUE A
170TH STREET W
140TH STREET W
130TH STREET W
120TH STREET W
110TH STREET W
100TH STREET W
80TH STREET W
TEHACHAPI WILLOW SPRINGS RD
NORTH
First Solar.
AVEP SOLAR PROJECT
KERN COUNTY CALIFORNIA
Figure 1 - Project Map SCE Interconnection Option 1
THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OR FOR CONSTRUCTION ABOVE LAST REVISION.
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LEGEND

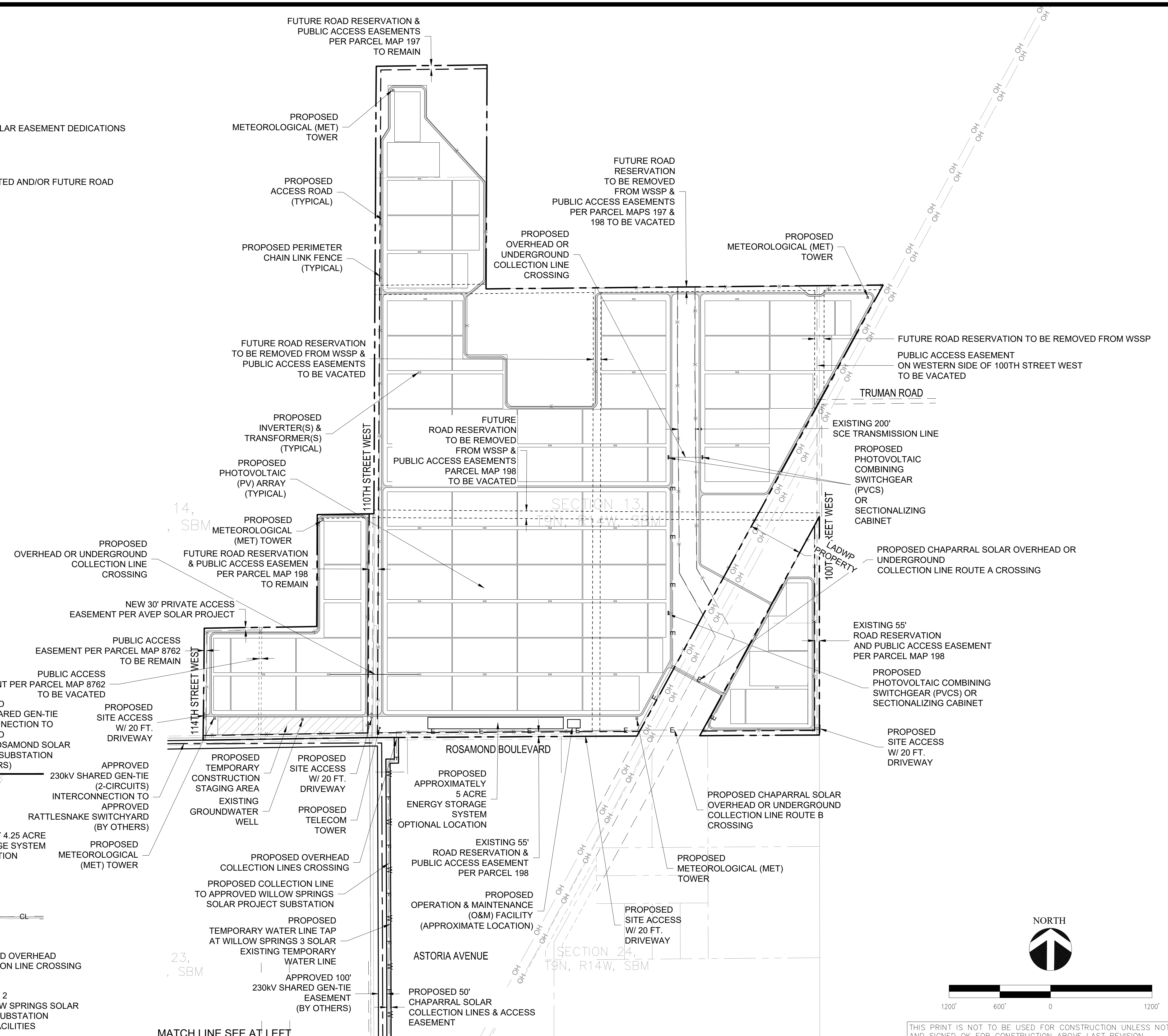
- PROJECT BOUNDARY
- E — COLLECTION LINE
- x — PERIMETER FENCE
- W — TEMPORARY WATER LINE
- WILLOW SPRINGS SOLAR & NORTH ROSAMOND SOLAR EASEMENT DEDICATIONS
- APPROVED 230kV GEN-TIE (BY OTHERS)
- OTHER EASEMENTS/RIGHTS-OF-WAY
- EXISTING PUBLIC ACCESS EASEMENT TO BE VACATED AND/OR FUTURE ROAD RESERVATION TO BE REMOVED
- EXISTING PARCEL LINE
- OH — EXISTING TRANSMISSION LINE

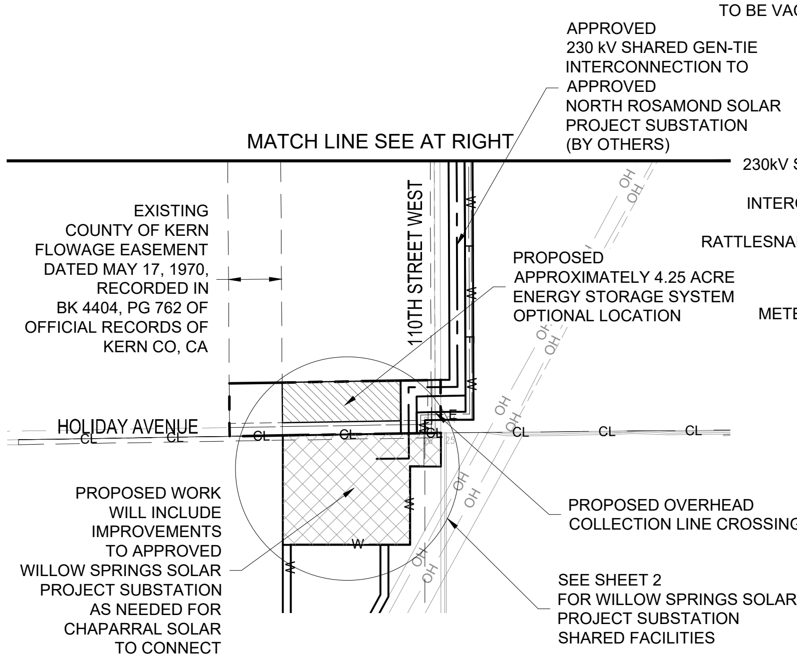
NOTES

1. NOT FOR CONSTRUCTION.
2. ARRAY, COLLECTION LINE, ENERGY STORAGE, SUBSTATION AND GEN-TIE LINE CONFIGURATION SUBJECT TO CHANGE DURING DETAIL DESIGN.
3. EXACT FENCE ALIGNMENT TO BE DETERMINED DURING DETAIL DESIGN.
4. FENCE LINE TO BE 55 FEET MINIMUM FROM SECTION LINE AND OUTSIDE OF KERN COUNTY RIGHT-OF-WAY.
5. CONSTRUCTION STAGING AREA SHOWN CONCEPTUALLY AND MAY CHANGE.
6. POTENTIAL WATER SOURCE IS TO USE AN EXISTING WELL ON SITE OR DRILL A NEW ONE (LOCATION TO BE DETERMINED). TEMPORARY WATER STORAGE (LOCATION TO BE DETERMINED).
7. AN EASEMENT RESERVED UNTO CHARLES T. WILLMARTH FOR ROAD AND UTILITY PURPOSES PER BK. 3451, PG. 306 O.R., IS PROPOSED TO BE VACATED.
8. A PRIVATE ACCESS EASEMENT PER DOC. #210048515 O.R., IS PROPOSED TO BE VACATED.

REVISION NOTES

1. CONVERT PLAN TO SEARCHABLE FORMAT.
2. REVISED SITE ACCESS.
3. ADDED COUNTY OF KERN FLOWAGE EASEMENT ON SOUTHEAST OF SECTION 23, T 9 N, R 14 W.





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First Solar.

FIRST SOLAR, INC.
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500
WWW.FIRSTSOLAR.COM

AVEP SOLAR PROJECT

KERN COUNTY CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP
1	06/17/20	SEE REVISION NOTES			
2	10/28/20	SEE REVISION NOTES			
3	11/04/20	SEE REVISION NOTES			

FS JOB #:
PROJ. DEVT. ENGR: M. DOSHI
PROJ. MGR:
SCALE: 1"=1200' @ 11"x17" SHEET
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SHEET TITLE

Figure 2c - Chaparral Solar Facility Layout

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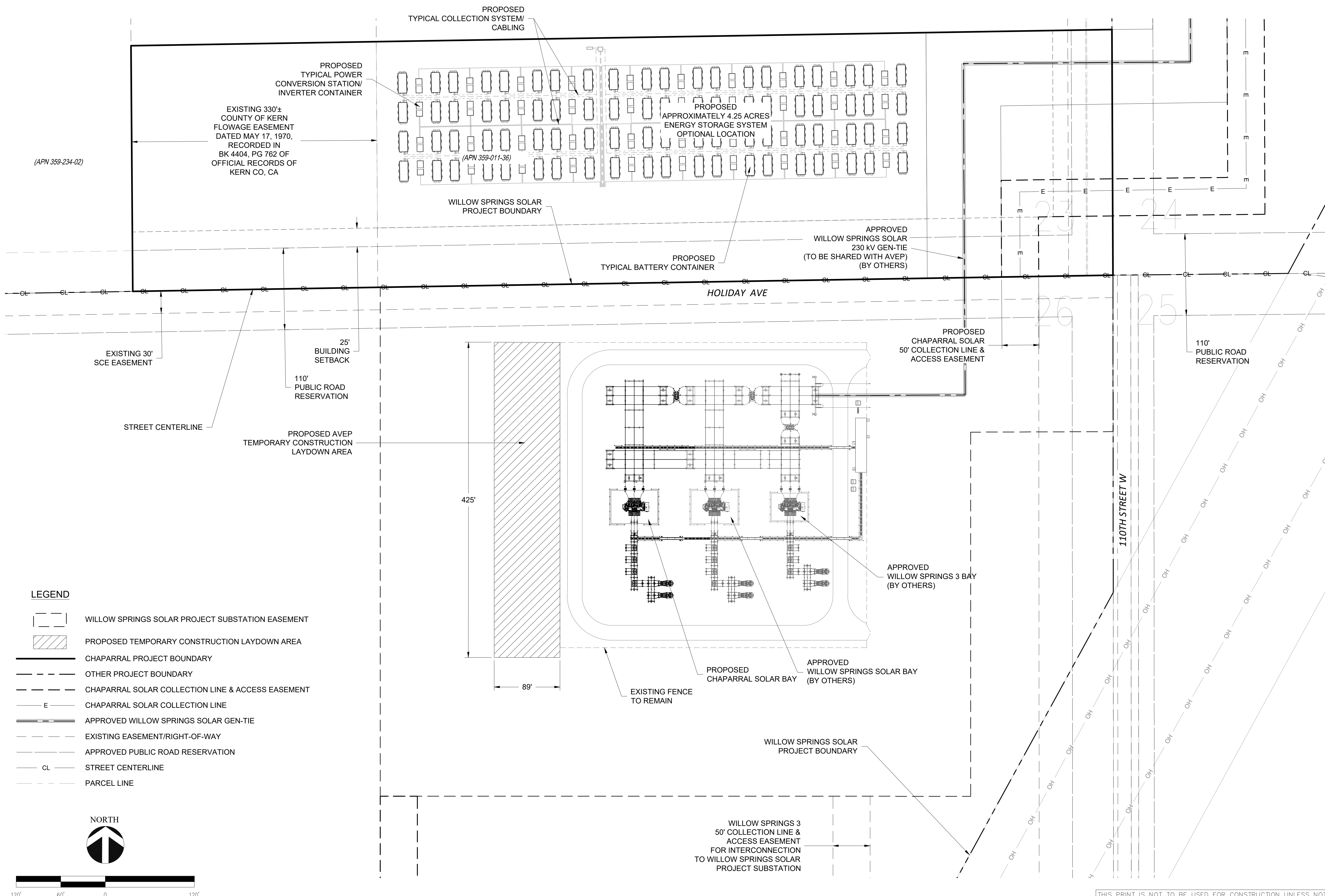
SHEET 1 OF 2



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AVEP SOLAR PROJECT

KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP
1	06/17/20	SEE REVISION NOTES			
2	10/28/20	SEE REVISION NOTES			
3	11/04/20	SEE REVISION NOTES			

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PROJ. MGR:
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SHEET TITLE

Chaparral Solar
Willow Springs Solar
Project Substation
Shared Facilities

SHEET 2 OF 2

16 September 2020

Ms. Beth Hoffman
Manager, Permitting and Siting
First Solar, Inc.
135 Main Street
San Francisco, CA 94105

RE: Addendum, Cultural Resources Technical Reports, AVEP Solar Project, Kern County, California

Dear Ms. Hoffman:

ASM Affiliates, Inc. prepared the *Phase I Cultural Resources Survey, AVEP Solar Project, Kern County, California*, and the *Phase II Test Excavations and Determinations of Significance, AVEP Solar Project, Kern County, California*, for the AVEP Solar Project (Project) analyzing the cultural resources (Reports). Since preparing the Reports, a collector line has been added that will connect the two discontiguous east and west components of the Rabbitbrush Solar Facility (Figure 1). Based on the archival records search conducted at the Southern San Joaquin Valley Information Center (IC), California State University, Bakersfield, completed for the Project, the segment of this collector line, as described below, had not been previously surveyed. I am writing to report on a Phase I survey that was conducted for this previously unsurveyed collector line segment.

Background

ASM completed an IC records search and Phase I survey of the Rabbitbrush Solar Facility in 2020 (Reports). According to the IC records, all but a segment (as shown on Figure 1 below) had been previously surveyed, and no cultural resources had been recorded in or within a half-mile radius of this unsurveyed segment. The aforementioned segment is 30-meters wide, and extends between the western boundary of the Rabbitbrush Solar Facility East to a point 30 feet east of the centerline of 120th Street West, with its southern boundary 30 feet north of the centerline of Rosamond Boulevard. The subsequent Phase I ASM survey of the Rabbitbrush Solar Facility similarly recorded no cultural resources within a half-mile radius of the unsurveyed segment. This collector line segment had not been previously surveyed, however, and an intensive pedestrian survey of it was necessary for CEQA compliance.

Phase I Survey

The previously unsurveyed Rabbitbrush collector line segment was intensively surveyed by David S. Whitley, Ph.D., RPA, on 15 September 2020. The segment is located along the north side of Rosamond Boulevard in undeveloped land (Figure 1). Rosamond Boulevard is graded below the level of original ground surface in this area, with a low berm and Russian thistle present along the road verge. A medium density cover of introduced grasses is present on the ground surface in the area of the proposed segment, but ground visibility was overall moderate, and adequate for intensive survey (Figure 2). A residential powerline currently runs in an existing easement or right-of-way along the north side of the road, presumably adjacent to the proposed collector line.

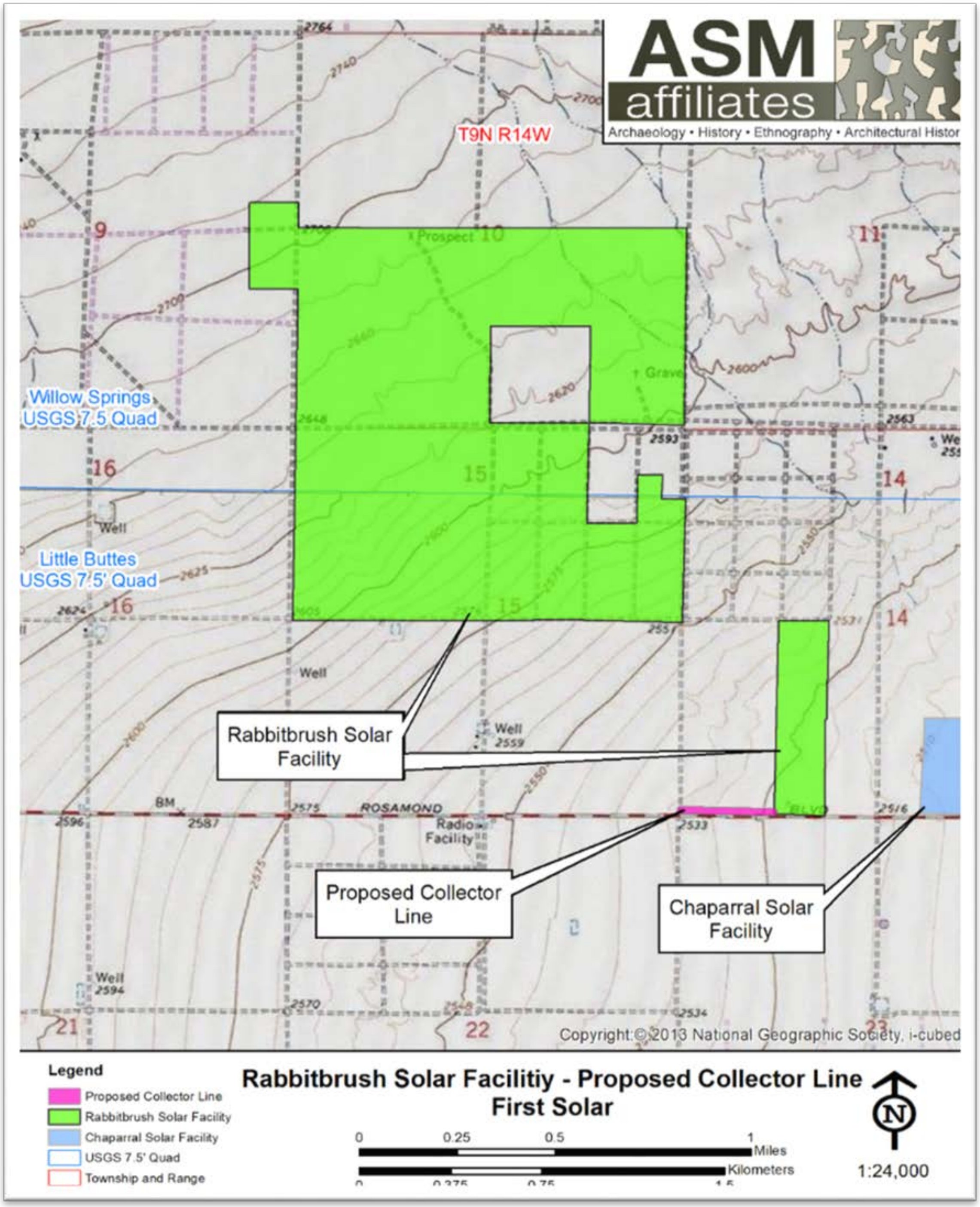

Figure 1. Previously unsurveyed segment of Rabbitbrush Solar Facility collector line

Figure 2. Unsurveyed segment of Rabbitbrush Solar Facility looking west

The segment is 30 meters wide, and was examined using two parallel abutting 15-meter wide transects. No cultural resources of any kind were identified during the intensive Phase I survey of this segment of the Rabbitbrush Solar Facility collector line.

Summary

An intensive Phase I survey was completed for the aforementioned segment of a Rabbitbrush Solar Facility collector line that, based on an IC archival records search, was determined to not have been previously surveyed. No cultural resources of any kind were identified or recorded within this collector line segment. The development and use of this corridor therefore does not have the potential to result in adverse impacts to historical resources or unique cultural resources.

Please contact me if you have any questions.

Best wishes,

David S. Whitley, Ph.D., RPA
Director

Appendix F-2

Phase II Test Excavations and Determinations of Significance

ESA

Non-Confidential - Redacted

PHASE II TEST EXCAVATIONS AND DETERMINATIONS OF SIGNIFICANCE, AVEP SOLAR PROJECT KERN COUNTY, CALIFORNIA

Prepared for:

Chaparral Solar, LLC

135 Main Street
6th Floor
San Francisco, CA 94105

Prepared by:

David S. Whitley, Ph.D., RPA
Principal Investigator

Robert Azpitarte, B.A.
Associate Archaeologist

and

Peter A. Carey, M.A., RPA
Senior Archaeologist

ASM Affiliates
20424 West Valley Blvd., Suite A
Tehachapi, California 93561

October 2020
PN 26310.01

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MANAGEMENT SUMMARY

This report documents Phase II test excavations and determinations of significance/California Register of Historical Resources (CRHR) eligibility evaluations for 10 archaeological sites within the proposed footprint of the Chaparral Solar Facility, Kern County, California. These sites are P-15-013844, -013846, -019548, -019553, -019554, -019555, -019556, -019557, -019558 and -019559. They include six prehistoric/Native American and four historical/Euro-American resources. Phase II testing including mapping each site's boundaries, diagnostic artifacts, surface features and collection units using a Trimble GeoExplorer 6000 Series GeoXH GPS unit, providing decimeter-accuracy placement; controlled collection of all identified surface artifacts and archaeological specimens; hand excavation to determine whether subsurface cultural deposits are present at these sites and, if so, the nature and significance of any such deposit; artifact washing, laboratory analysis and preparation for curation. David S. Whitley, Ph.D., served as Principal Investigator; Peter Carey, M.A., RPA, was Field Director; and Rob Azpitarte, B.A, was crew chief, with the fieldwork conducted during September 2019. Larry Nachor, representing the Tejon Indian Tribe served as tribal monitor.

1. INTRODUCTION AND REGULATORY CONTEXT

ASM Affiliates was retained by Chaparral Solar, LLC, to conduct a Phase II Test Excavations and Determinations of Significance for ten archaeological sites located within the proposed footprint of the Chaparral Solar Facility. The purpose of the Phase II study is to evaluate these cultural resources for eligibility to the California Register of Historical Resources (CRHR), to provide data to support the County environmental review pursuant to the California Environmental Quality Act (CEQA, as amended January 1, 2015), Public Resources Code (PRC), Division 13 (Environmental Quality), Chapters 2.6 §21083.2 (Archaeological Resources) and 2.6 §21084.1 (Historical Resources); and the State CEQA Guidelines (as amended December 1, 2013), California Code of Regulations (CCR) Title 14, Chapter 3, Article 5 §15064.5 (Determining the Significance of Impacts on Historical and Unique Archaeological Resources). This assessment has also been prepared in accordance with the Kern County General Plan.

This Phase II study augments an earlier Phase I survey for the Antelope Valley Solar Project (AVEP), including the Chaparral Solar Facility (ASM Affiliates 2019). The Phase II investigation was conducted by ASM Affiliates, Inc., with David S. Whitley, Ph.D., RPA, serving as Principal Investigator; Peter Carey, M.A., RPA, as Field Director; and Rob Azpitarte, B.A., as Crew Chief. Larry Nachor, representing the Tejon Indian Tribe, served as Tribal Monitor. Fieldwork for this study was conducted in September 2019, with artifact processing and laboratory analyses completed in October – November 2019.

The archaeological sites evaluated during this study are:

- P-15-013844 – This site was first recorded in 2008 as a small concentration of fire-affected rock (FAR), possibly representing a prehistoric earth oven;

- P-15-0138466 – Also recorded in 2008, this site was described as a sparse lithic scatter containing *Tivela* (Pismo clam) shell fragments;

- P-15-019548/CA-KER-10712H (Temporary designation AVEP-RA-12) – Recorded in 2019, this site is a mid-20th century refuse scatter;

- P-15 -019553/CA-KER-10717 (Temporary designation AVEP-RA-17) - This site was recorded in 2019 as a sparse lithic scatter;

- P-15-019554/CA-KER-10718H (Temporary designation AVEP-RA-18) - Site P-15-019554 is a mid-20th century refuse scatter first recorded in 2019;

- P-15-019555/CA-KER-10719 (Temporary designation AVEP-RA-19) – This is a mid-20th century refuse scatter first recorded in 2019;

- P-15-019556/CA-KER-10720 (Temporary designation AVEP-RA-20) – Recorded in 2019, this site was believed to be a sparse lithic scatter;

- P-15 -019557/CA-KER-10721 (Temporary designation AVEP-RA-21) - This site was recorded as a sparse lithic scatter in 2019;

- P-15-019558/CA-KER-10722H (Temporary designation AVEP-RA-22) - This site was recorded as a refuse scatter and concrete foundation in 2019; and

- P-15-019559/CA-KER-10723 (Temporary designation AVEP-RA-23) – Recorded as a small lithic scatter with groundstone in 2019.

All ten of these sites are located within the proposed Chaparral Solar Facility footprint. A map (Figure 1) with locations of these sites is provided in Confidential Appendix A.

This manuscript constitutes a report on the Phase II test excavations and determinations of significance. The following sections provide background to the investigation, including historic context studies; a summary of the test excavation techniques employed; and the results of the fieldwork. We conclude with management recommendations for the ten archaeological sites based on our results.

1.1 CHAPARRL FACILITY DESCRIPTION AND LOCATION

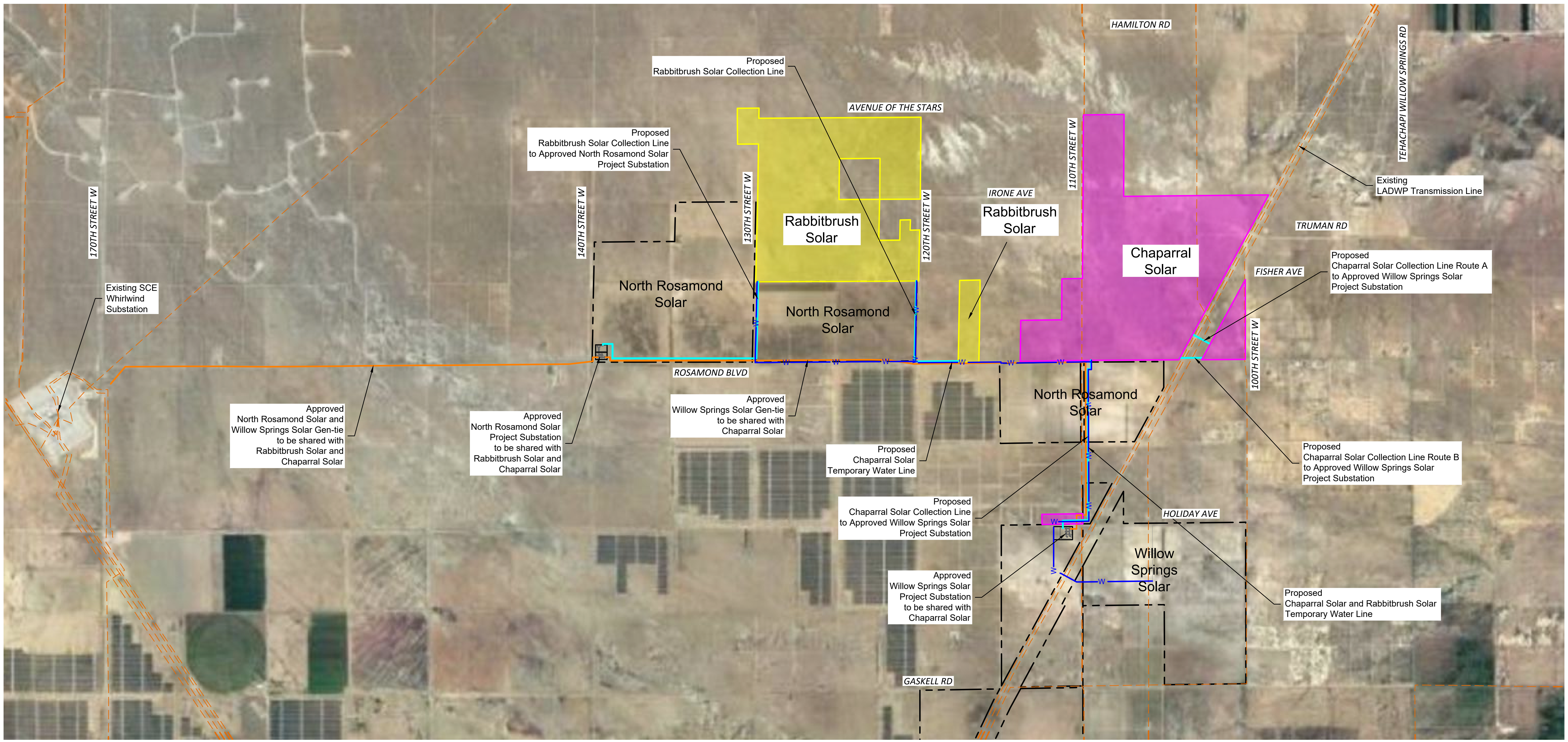
The AVEP Project would involve the construction, operation and eventual decommissioning of three solar photovoltaic power generating facilities proposed by the Applicants. These facilities, known as Tumbleweed Solar Facility, Rabbitbrush Solar Facility, and Chaparral Solar Facility, would collectively be capable of producing up to approximately 375 megawatts (MW) of renewable energy. The Project would be located on approximately 2,117-ac of private and in southeastern Kern County, California.

Major components of each Facility would include photovoltaic modules mounted on fixed-tilt or horizontal tracker systems, an onsite electrical collection system, an Energy Storage System (ESS), one or two microwave or other telecommunications towers, two meteorological stations, meteorological towers (if tracker technology is utilized), private access roads and an on-site and off-site collection system. Each facility would have a single O&M building of up to approximately 1,000 square feet, 1,500 square foot graveled area for employee parking, an aboveground water storage tank, permanent water lines, a septic system, and other associated facilities. Permanent chain-link security fencing would be installed around the individual facility site perimeters, substations, ESSs, and other areas requiring controlled access.

The 125 MW Chaparral Solar Facility, the only of the three facilities with archaeological sites within its proposed footprint, comprises approximately 774-ac of undeveloped open desert. The Facility is generally bordered by Rosamond Boulevard to the south, 100th Street West to the east, Avenue of the Stars to the north and 114th Street West to the west. The Chaparral Solar Facility would have two microwave or other telecommunications towers and the Chaparral Solar ESS will be approximately 5-ac.

LEGEND

- RABBITBRUSH SOLAR
- CHAPPARAL SOLAR
- APPROVED PROJECTS
- PROPOSED COLLECTION LINE
- PROPOSED CHAPARRAL SOLAR & RABBITBRUSH SOLAR TEMPORARY WATER LINE
- APPROVED GEN-TIE
- EXISTING TRANSMISSION LINE



NORTH

3400' 1700' 0 3400'

First Solar.

FIRST SOLAR, INC.
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500
WWW.FIRSTSOLAR.COM

AVEP SOLAR PROJECT

KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVL. ENGR: M. DOSHI
PROJ. MGR:
SCALE: 1"=3400' @ 11"x17" SHEET
COPYRIGHT BY: FIRST SOLAR, INC.

SHEET TITLE

Figure 1a -
Project Map
SCE Interconnection
Option 1

SHEET 1 OF 1

THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OK FOR CONSTRUCTION ABOVE LAST REVISION.

C:\Users\FS104849\AVEP\AVEP Figure 1a - 091020.dwg FS104849 Sep 13, 2020 - 6:29pm

1.2 REGULATORY CONTEXT

1.2.1 State

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Public Resources Code [PRC], Section 21084.1). A *historical resource* is a resource listed in, or determined to be eligible for listing, in the California Register of Historical Resources (CRHR), a resource included in a local register of historical resources or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be *historically significant* (State CEQA Guidelines, Section 15064.5[a][1-3]). A resource shall be considered *historically significant* if it:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2) Is associated with the lives of persons important in our past;
3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4) Has yielded, or may be likely to yield, information important in prehistory or history.

In addition, if it can be demonstrated that a project would cause damage to a *unique archaeological resource*, the lead agency may require reasonable efforts to permit any or all of these resources to be preserved in place or left in an undisturbed state. See PRC, Section 21083.2(b). To the extent that resources cannot be left undisturbed, mitigation measures are required (PRC, Section 21083.2[a], [b], and [c]).PRC, Section 21083.2(g) defines a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

CEQA further states that a significant adverse change to the significance of an historical resource is a significant effect on the environment. This occurs when a historical resource, including archaeological sites, are physically demolished, destroyed or altered (State CEQA Guidelines, Section 15064.5[b][c]).

1.2.2 Kern County General Plan

The policies, goals, and implementation measures in the Kern County General Plan that pertain to cultural resources are provided below.

1.2.3 Archaeological, Paleontological, Cultural, and Historical Preservation (General Provisions in the Land Use, Open Space, and Conservation Element)

Policy

Policy 25: The County will promote the preservation of cultural and historic resources that provide ties with the past and constitute a heritage value to residents and visitors.

Implementation Measures

- **Measure K:** Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.
- **Measure L:** The County shall address archaeological and historical resources for discretionary projects in accordance with CEQA.
- **Measure M:** In areas of known paleontological resources, the County should address the preservation of these resources where feasible.
- **Measure N:** The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
- **Measure O:** On a project-specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

2. ENVIRONMENTAL AND CULTUAL BACKGROUND

2.1 ENVIRONMENTAL SETTING

The Project would be located in southeastern Kern County, California, about 50 miles (mi) southeast of the City of Bakersfield and about 10-mi west of the unincorporated community of Rosamond, in the western portion of the Antelope Valley. The Antelope Valley is within the west Mojave Desert and is bounded by the Tehachapi Mountains to the northwest and the San Gabriel Mountains to the southwest. The Antelope Valley and Project area land uses include undeveloped desert (i.e., Mojave Basins; Griffith et al. 2016), fallow and active agriculture, low-density residences, and renewable energy (e.g., solar and wind).

Elevation within the Chaparral Solar Facility ranges between approximately 2,470 feet (ft) above mean sea level (amsl) to approximately 2,600-ft amsl. Annual average precipitation in the town of Mojave is approximately 6 inches (in), with January, February, and March receiving nearly half the annual rainfall (Western Regional Climate Center 2017). The average low temperature is 32 degrees Fahrenheit (°F) in December, and the average high temperature is 97°F in July.

The Antelope Valley is within the South Lahontan Basin, which is considered an isolated watershed (i.e., it is not hydrologically connected to other wetlands or water bodies). Soils in the Project area are generally well drained sandy loams and loamy sands with negligible to moderate runoff rates. The Project area comprises a mix of desert scrub communities, dominated by creosote, fallow fields, active agriculture, and developed lands that support a variety of wildlife species. The Project region has experienced considerable growth in renewable energy projects in recent years. Large-scale wind and solar projects have become interspersed with desert scrub and agricultural land uses (WEST 2019).

The major topographic feature within the region is the Willow Springs (also called Rosamond) fault scarp (cf. Dibblee 1963), located outside of the Project area. This trends southeast to northwest, north of the Chaparral Solar Facility. As a natural aquitard for groundwater moving downslope/south from the Tehachapi Mountains, it has created a series of springs and seeps. The largest and best known of these is the Willow Springs locality, a short distance northeast of the Chaparral Solar Facility. Willow Springs included seven flowing water sources when assessed in 1911 and was considered the most significant water resource along the scarp. Bean Spring, located in the approximate middle of Section 12 due north of the Chaparral Solar Facility, was considered the second most important at that time (Johnson 1911:49-51). Fossil spring-eyes are present along the face of the fault scarp, indicating that seeps and springs have migrated, over time, along this southwestward-facing front. [redacted] It has also promoted the development of small and localized riparian habitats within a region otherwise characterized by desert scrub.

2.2 ETHNOGRAPHIC BACKGROUND

Though the western Mojave Desert and environs were poorly reported in the early ethnographic summaries, Earle (e.g., 2003, 2005) has provided a synthesis for the region. A summary of his recent ethnohistorical conclusions provide an appropriate overview for the aboriginal history of the region.

According to Earle's reconstruction, the western Mojave was inhabited during the Historic/Protohistoric period by three distinct language-speakers, one group of whom could be further subdivided into two (and perhaps three) fairly distinctive dialects. The most significant linguistic division existed between the Kawaiisu speakers, who lived in Tehachapi Valley through the southern Sierra Nevada and eastward across Fremont Valley towards Red Mountain and into southern Panamint Valley, and the groups to the south and west in Antelope Valley, per se. The Kawaiisu language is a member of the Numic branch of the Uto-Aztecan language family and is thereby most closely related to the Shoshone and Paiute languages of the Great Basin.

South and westward of the Kawaiisu were two other members of the Uto-Aztecan language family, but in this instance, both were distinct languages belonging to the Takic (as opposed to Numic) branch, specifically to the Serran Takic branch. Along the south westernmost side of the Antelope Valley, including the northern foothills of the Liebre Mountains and the southern side of the Sierra Pelona, were the Tataviam. Related to them linguistically, but speaking a distinct language, were the Kitanemuk, who occupied the westernmost Antelope Valley and the Tehachapi Mountains west of Tehachapi Pass. Living to the east of the Kitanemuk, who extended to approximately the current location of Highway 14 where it heads north across the Antelope Valley, were a Serrano clan. According to Earle's analysis, there was a linguistic continuum along the northern side of the San Gabriel Mountains in the Western Mojave Desert, from the Serrano on the east to the Kitanemuk, at the western end.

The study area thus falls in a slightly ambiguous zone near the Kawaiisu, Kitanemuk and Serrano boundaries. Despite this uncertainty, these groups were culturally similar. All three, for example, were foragers, with food sources derived principally from gathering. The exact plant species exploited was dependent on seasonal availability as well as precise geographical/environmental location. In the higher montane portions of the region (e.g., towards the Tehachapis), acorn-bearing oak and pinyon nuts were staples. In the lower lying more desertic zones, including the study area, mesquite, yucca and a variety of other edible plants were emphasized. Hunting also contributed meat protein, and principally emphasized small game, such as hares, rabbits and rodents.

Following general California patterns, there were also a number of similarities in social and political organization across the Antelope Valley. The Haminat may have been organized into exogamous clans and moieties, whereas the western groups might have lacked these, and in this sense the Haminat could have been more like the southern California Desert groups like the Serrano and Cahuilla, with the other groups more similar to the south-central California culture of the Chumash and related peoples. Although there is debate about their prehistoric origins (e.g., Sutton 2017), it appears that the region as a whole lacked any political organization beyond that of the tribelet, or what Earle has identified in the Spanish records as *naciones*. These were autonomous land-owning groups, focused on a principal village and led by a headman or chief, and probably comprising a lineage system or clan. In this sense, the Antelope Valley can be said to follow the political organizational pattern found throughout most of Native California. This, of course, further links it with Californian, as opposed to Great Basin, cultural patterns.

In general terms, major historical villages were located at well-watered spots, such as springs. Most of these, for this reason, are located in the San Andreas Rift Zone, along the south side of the Antelope Valley, which is unusually well-watered. The only known village in the general project vicinity is Willow Springs (CA-KER-129), located at the east end of the Willow Springs fault scarp, approximately one-mile northeast of the Chaparral Solar Facility. Indigenous names in Serrano (*Chibubit* or *Punakavea*), Kawaiisu (*SeSevjek*) and Kitanemuk (*šeševiyək*) are known for this village; according to the Kawaiisu informant Andy Greene, it was a Kitanemuk village (site record for P-15-000129).

2.3 PRE-CONTACT ARCHAEOLOGICAL BACKGROUND

The following summary of regional archaeology is derived from Gardner (2009), Glennan (1971), Scharlotta (2014), Sutton (1996, 2017), Way and Jackson (2009), Whitley (1994, 1998, 2000), and Whitley et al. (2006).

Pre-Clovis (earlier than 12,000 YBP)

The initial occupation of North America is still a topic of research and debate, with the date of initial human entry onto the continent not yet known, and little understood about the lifeways of the earliest occupants. This Late Pleistocene occupation is generally referred to as the Pre-Clovis (cultural) Period, dated at earlier than 12,000 years before present (YBP). During this period, many of the valley floors of the Mojave Desert and the Great Basin where filled with a large lake system, including Lake Thompson in the Antelope Valley. Although a number of claims have been made for Pre-Clovis sites in the Mojave Desert generally, these have either been disproven or remain controversial and uncertain. Possible Pre-Clovis petroglyph dates for the Coso Range have been proposed by Whitley (2013), but still require verification by additional tests.

Paleoindian (12,000 - 9000 YBP)

Although the initial occupation of the continent is controversial, there is widespread agreement on the subsequent Paleoindian period, which is typically viewed as pertaining to mobile big-game hunters who exploited Pleistocene megafauna. The hallmarks of the Paleoindian period are the fluted, collaterally-flaked and basally-thinned and -ground Clovis and Folsom spear points, during the earlier portions of the period, followed by a series of large, well-flaked but unfluted lanceolate points towards the end of the period, some of which are stemmed. Some scenarios suggest that the big-game hunting practiced by these Paleoindian peoples may be responsible for the extinction of the Pleistocene megafauna, such as Imperial Mammoth, *Bison antiquus*, and the North American horse. Aside from this so-called Pleistocene overkill problem, the image of Paleoindians as specialized big-game hunters has become pervasive for North America though it is far from proven in all parts of the continent. Recent evidence, however, indicates that the earlier portions of the Paleoindian period comprised a lengthy and severe drought, thus demonstrating that the large mammal herds were already under extreme environmental stress, regardless of the effects of human predation. Paleoclimatic reconstruction in the vicinity of the study area indicates that a drought also occurred in this specific region, further supporting the notion that all Mojave Desert populations – human and animal – existed in stressed conditions at that time.

Very substantial although sometimes overlooked evidence of Paleoindian use of eastern California has been found in a number of areas, including Pilot Knob Valley, northeast of the study area; on the shores of Pleistocene Lake China and within the Coso Range, again to the northeast; in Fort Irwin, northeast of Barstow; at Boron, to the west; in the El Paso Mountains, northeast of the study area; on Edwards Air Force Base, to the east; and in the Tehachapi Mountains, to the north. Typically, the Paleoindian evidence consists of isolated (in some cases reused) Paleoindian projectile points, although there is also evidence for Paleoindian petroglyph manufacture in the Cosos. Although it is likely that Paleoindian habitation sites are somewhere preserved in the region, they have yet to be found and a better understanding of the Paleoindian period in this portion of eastern California will only be obtained when such sites are discovered and investigated

Early Archaic (9000 - 6000 YBP)

The Early Archaic period, or so-called Western Pluvial Lakes Tradition, represents the early Holocene in paleoenvironmental terms. Its hallmark is generally considered to be the widely dispersed but ambiguously-dated Western Stemmed Tradition projectile points. These include the local variants known as Lake Mohave and Silver Lake points, which may in fact actually date between 10,500 and 7,500 YBP and thus be partly coeval with fluted points. Combined with studies of the lithic technologies of Early Archaic and Paleoindian sites, this chronological overlap suggests that the Western Stemmed Tradition may have been an in-situ development out of the earlier Paleoindian tradition.

Early Archaic sites are most commonly found on the lowest terraces above latest Pleistocene and early Holocene lake basins and stream deltas. (Notably, fluted points are also sometimes found at these same sites and geomorphological locations, contributing to the chronological ambiguity of both point types). Early Archaic sites are, accordingly, widely regarded as part of a lacustrine-focused adaptive strategy. Although a number of authors have cautioned against too simplistic an interpretation of these associations, pointing to the fact that Early Archaic sites are also found in other environments (e.g., Way and Jackson 2009), it nonetheless is apparent that, in eastern California at least, this environmental association and its inferred subsistence implications maintain some verity. Indeed, it can be noted that recent research in the Great Basin has emphasized the general importance of lacustrine adaptations in general terms. Although lakeshore exploitation may have been practiced during the Early Archaic in this portion of eastern California, this period apparently also included mobile hunting in other environments as well.

Middle Archaic (6000 to 4000 YBP)

Be this early evidence as it may, what is incontrovertible is that, regardless of date of *initial* occupation, *substantial* inhabitation did not occur until much later, with the start of the Middle Archaic or Pinto Period, at about 6000 YBP. This lasted until approximately 4000 YBP. A number of sites from this time period are known from the Rosamond area, specifically associated with the prehistoric shoreline of Rosamond Lake.

The Middle Archaic, however, corresponds essentially to the Altithermal paleoenvironmental period, a hot and dry climatic regime. In the Coso area to the north, but not necessarily elsewhere in eastern California, there is little if any evidence for Middle Archaic occupation. Existing evidence could be interpreted to signal a diminution in occupation, if not an outright abandonment, in this region, apparently corresponding to the hot and dry climatological conditions of the Altithermal. It is also possible, however, that local inhabitants may have adopted a subsistence strategy and settlement pattern with little archaeological visibility on the landscape during this period; e.g., a highly mobile pattern. Although this alternative interpretation of the apparent dearth of Middle Archaic sites must be acknowledged, it seems implausible in light of the fact that extremely dry conditions would be more commonly predicted to result in a stronger form of "tethered nomadism", and thus greater archaeological visibility, around water sources. Moreover, there is very clear evidence for Middle Archaic settlements in the Fort Irwin area, to the east of Barstow, suggesting that not all portions of eastern California were abandoned at this time; emphasizing the possibility of more regional variability than heretofore acknowledged.

Late Archaic (4000 to 1500 YBP)

Much less controversy surrounds the subsequent Late Archaic period, or Elko Period, lasting from about 4000 to 1500 years B.P., which correlates with improved and wetter environmental conditions across the far west, including within the study area. Although sites from this time period are sometimes considered rare in the Mojave Desert, it is notable that many of the subsequent Rose Spring Period villages (see below) were first occupied during this earlier phase. That is, as has been noted by a number of authors, there seems to be a strong continuity between the Elko Period and subsequent times, with the latter period materials masking or burying the Elko remains. In the Antelope Valley region, this begins with a major increase in population by at least about 3000 YBP.

Similar patterns have been noted in surrounding regions. For example, the start of the Late Archaic in the Coso Range region, to the north, is posited to represent the initial establishment of the primary settlement and subsistence systems that are currently archaeologically visible, while this same period has been recognized as experiencing a major, far western North American-wide expansion of settlements into new environments and increases in population, stretching from the Great Basin of eastern California, through the southern Sierra Nevada, across the Transverse Ranges, and down to the coast. The primary temporal diagnostics for the Late Archaic are Elko and Gypsum series projectile points.

In the Coso Range, the Late Archaic is signaled by the establishment of major winter villages, typically at springs, in valley bottoms on the western and wetter side of the range. Analyses of paleoethnobotanical and faunal remains suggest a generalized foraging strategy, emphasizing all available resources, including buckwheat stands around small mud-playas. This evidence is complemented by an extensive but seemingly non-logistically organized use of all upland environments. Included here is a significant quantity of isolated projectile points in the uplands, suggesting mobile hunting patterns. Furthermore, the Late Archaic witnessed the beginning of the intensive exploitation of the Coso Sugarloaf obsidian quarry, an event that apparently correlates with the beginning of the inland-to-coastal obsidian trade in south-central California.

Rose Spring (1500 - 800 YBP)

The Rose Spring Period is differentiated from the earlier Late Archaic/Elko Period by the introduction of the bow and arrow and a change from spear points to arrow points at circa AD 500. This transition is, in technical terms, dramatic. In fact, the introduction of this new weaponry technology probably did not have any immediate major impacts on social or cultural systems. At least initially, the settlement and subsistence systems were stable, and lithic technology and production did not noticeably change.

Moreover, and as implied above, in all other respects Rose Spring times appear to have been a continuum from the earlier patterns, so that the change in hunting technology was probably less important than we might otherwise presume. Within the Antelope Valley area, Desert Village Complexes, representing a major change in magnitude of settlements, were founded at least by Rose Spring times, and perhaps towards the end of the earlier Elko phase. Two of these have been identified in the foothills of the Antelope Valley, with a third between Rosamond and Rogers Dry Lake, a fourth at Koehn Lake. It is possible, if not likely, that these represent the founding of the tribelet system of political organization in the region. It is also likely that a fifth Desert Village Complex is present at Willow Springs.

At approximately AD 1000 - 1200, however, a shift in settlement and subsistence practices began that, ultimately, culminated in the protohistoric/ethnographic patterns referred to as the Later Prehistoric or Numic Period (discussed below). This involved the abandonment of some winter villages (or at least a reduction in the intensity of their use); the establishment of logistical base camps around springs in the upland environments; an increasing emphasis on a relatively specialized diet focused on seeds and the pinyon nut; and a great increase in the production of petroglyphs. That is, settlement patterns became more organized and focused, while subsistence was increasingly specialized, and ritual became more common. The causes for this transition are still debated and not yet fully understood.

Late Prehistoric (800 - 140 YBP)

The Late Prehistoric (or, in some areas, Numic) Period, from 800 YBP to the Historic Period, represents a continued growth in local population, with numbers of people apparently quite high. It is distinguished from previous Rose Spring times by the introduction of brownware ceramics and a change in projectile point types: from Rose Springs types to Desert Side-Notched and Cottonwood Triangular. A boundary of some sort may have developed during this period, with Desert Side-Notched points, brownware ceramics and obsidian common from the Fremont Valley northward. South of this area, in the Antelope Valley proper, ceramics and obsidian are rare, and Cottonwood Triangular points are the predominant projectile point type. This apparently correlates with similar patterns further towards the coast: at about 800-1000 years ago the desert-to-coast obsidian trade dried up, and Rose Spring-like projectile points were replaced by Cottonwood-like points, with Desert Side-Notched points rare.

The Protohistoric/Historic phase of the Late Prehistoric, representing the last 300 years, is apparently marked by a major disruption in indigenous settlement, and a corresponding paucity of sites. Missionization pulled many of the region's inhabitants away. Note, however, that ~300 YBP also represents a brief period of extreme drought. Hence deteriorating environmental conditions may have contributed to social disruptions combined with the introduction of new diseases, all of which would have had detrimental effects on the local population. Subsequently, the Antelope Valley area was used as a staging ground for rustlers and other miscreants, who were raiding the missions' livestock. The result was that the area became somewhat of a no-man's land which, no doubt, has also contributed to the paucity of ethnographic information on it.

2.4 HISTORICAL BACKGROUND

Perhaps because of the use of the Antelope Valley as a staging area for Indian raids on the *estancias* and missions closer to the coast, Euro-American settlement and development of the area was a little later dating than in other parts of southern California. As a result, the history of the Antelope Valley to about the 1860s principally involved various explorers who traversed it: for example, Pedro Fages crossed the southern valley in 1772; Fr. Garcés crossed the west end and went through Willow Springs in 1776; Jedediah Smith, similarly, went across the western valley in 1827 and also visited Willow Springs, as did John C. Fremónt and his guide Kit Carson in 1844. The Rogers and Manly party - the Jayhawkers or Death Valley '49ers - camped at Willow Springs towards the end of their dramatic 1849 expedition across the Mojave Desert, as well. And Lt. Edward Beale, at the lead of a caravan of camels, came across the southern side of the valley in his 1857 trip to Fort Tejon (Starr 1988; Settle 1963).

It was not until the 1860s that the first settlers moved into this region, settling mostly in the Elizabeth Lake region and the southern foothills of the Tehachapi Mountains, and involved principally in ranching. With the development in 1868 of the Cerro Gordo silver mine in Inyo County, however, the Antelope Valley became a major thoroughfare for the movement of bullion and goods between Los Angeles and the Owens Valley; indeed, efforts to wrestle control over the Inyo silver trade away from Los Angeles became a major theme of California economic history in the 1870s. Los Angeles managed to maintain its monopolization of this trade, nonetheless, with Remi Nadeau's freight-line playing a major part in the transshipment of goods and ore across the valley. Willow Springs and its adobe tavern served as a major stop on this route, with the stage line then essentially heading south (on the route that would eventually be adopted by the railroad), for a 28-mile stretch through Cow Hole to Barrel Springs, at the mouth of Soledad Canyon, and subsequently through the canyon for the uphill climb through the San Gabriel Mountains. Old Nadeau Road, which parallels Pearblossom Highway near the Vincent Hills, is apparently a remnant of this original freight-line route, which proved so instrumental in the growth of Los Angeles as the economic center of southern California. It is a few miles east of the study area (Starr 1988).

Shortly after the establishment of the first permanent school in the region, in 1869 at Elizabeth Lake, a number of settlers' colonies sprang-up within the valley, including Wicks, Manzana, Chicago, Kingsbury, John Brown, Old Palmdale and Almondale (Settle 1963). However, the major impetus to settlement resulted with the completion of the Southern Pacific railway through the valley in 1876, fostering the establishment of Rosamond, Lancaster and Palmdale by 1882.

The Southern Pacific Railroad arrived in Mojave on August 8, 1876. The location of the current depot, on the west side of Highway 14, was the location of the original depot site, although the existing depot building is a later construction. A freight depot was added on August 20 of the same year and, before long, the town turned into a division point for the rail line. With the railhead at Mojave, the San Bernardino Borax Company began hauling its borax to the town on mule teams; the Baldheaded Eagle Borax Company began using the town as its railhead a few years later, in 1881. The Santa Fe Railroad arrived in 1884, as did the famous "20 Mule Teams" of the Pacific Borax Company, truly making the town a transportation hub for the region. The Pacific Borax Company continued with its mule team loads to the railhead until 1889, when a spur line reached their mining operations (Deaver 1967).

The original town site of Mojave was laid-out by the Southern Pacific at the time that the rail went through. Initially it was simply a residential camp for railroad employees consisting of a few wooden shacks, but it was of sufficient importance that a post office was opened in October 1876. Because of its position as a transportation hub, Mojave quickly attracted additional residents but was not filed as a subdivision until 1905 (ibid). Growth at and after that point was spurred by two early twentieth century developments. The first was the increasingly important mining activities at Standard Hill and Soledad Mountain, south of town. The second was the construction of the Los Angeles Aqueduct, built between 1907 and 1913, which brought literally thousands of workers into the region. In addition to its function as a transport hub, Mojave served as the "watering hole" for the mine and aqueduct crews, and was widely renowned for its saloons and brothels, which were said to outnumber the churches in town by 10 to one.

Rosamond was also a Southern Pacific depot originally named Sand Creek but was given its current name in honor of a daughter of a rail official. A post office opened here in 1885 and the Butterworth Ranch was homesteaded, for cattle, in 1888, six miles west of Rosamond. The origin of the town proper is somewhat later. The town site was purchased by C.C. Calkins in 1907 who sold the mortgage to Charles M. Stinson. Stinson in turn donated the mortgage to the Union Rescue Mission of Los Angeles, who foreclosed on the property in 1916. In 1935 the Mission began selling lots in the town site, initiating its residential development (Settle 1967; DeWitt 1989).

Rosamond's history is also tied to early mining in the region; specifically, the development of Tropico Mine which began in the 1870s and, for over two decades, solely involved clay mining, for Ezra Hamilton's brickworks and pottery in Los Angeles. Hamilton purchased the mining property in the 1890s. Recognizing the presence of gold dust in the clay, he prospected the area, finally discovering a profitable load in 1896. By 1907 his Lida mines had yielded more than 8000 tons of ore averaging 1.2 ounces of gold and 7.5 ounces of silver per ton. Hamilton sold his mines in 1908, with the property eventually becoming the Tropico Mining and Milling Company (Settle 1967). Mining and custom milling continued until 1956 when the operation was shut down.

Willow Springs (California Historical Landmark 130), a short distance west of Rosamond, figured in much of the early history of the region (as noted above), serving as a watering stop on the main trail through the area. Fages, in 1772, Garces, in 1776, and Fremont, in 1844, are all thought to have stopped at the spring. Stage routes from Los Angeles to both Havilah and Inyo ran through the spring, starting in the 1860s, with Remi Nadeau (responsible for the Los Angeles to Inyo freight route) building a corral at the spring. Because they were running livestock in the Antelope Valley, the Tejon Ranch purchased the spring at about this same time. The spring was subsequently purchased around 1900 by Ezra Hamilton, after his discovery of gold in the area, who was responsible for constructing most of the existing stone buildings at this location (Starr 1988; Settle 1967).

According to an account by Hamilton himself, written in 1913, he made about $200,000 from the Lida Mine (Settle 1963). He paid $3500 to the Beale estate for Willow Springs and 160 acres of surrounding land, and created a farm and health resort. Hamilton claimed that, in 1913, there were 27 stone houses, a hotel, bath-house, public hall, dance hall, school, and auto and blacksmith shops. The school was the first in the area (ibid.). Willow Springs was connected to Los Angeles by a paved Highway in 1921, when the Mint Canyon Highway (later renamed Sierra Highway) was completed, greatly facilitating the location as a tourist resort (Way and Jackson 2009). Despite this fact, Willow Springs is only mentioned in passing in *Thompson's Routes to Watering Places in the Mohave Desert Region*, published in 1921, indicating that it was not a major destination.

The Chaparral Solar Facility is located approximately one-half mile southwest of Willow Springs. Bean Spring is located north of the facility, within Section 12 about one-mile west of Willow Springs. Bean Spring is named after early settler Charles F. Bean who acquired 480-ac (the north half and southwest quarter) of Section 12 in 1892 under the Desert Land Act of 1877 (Figure 1.5); this includes the northwesternmost portion of the Chaparral facility extending into Section 12. This patent required a recipient to settle and irrigate the land. In 1896 Bean augmented his holding with an additional 160-ac (the southeast quarter of Section 12; outside of the Chaparral facility), obtained under the Timber Culture Act of 1873. The Timber Culture Act required planting 40-ac of trees (Way and Jackson 2009). Bean Canyon, located northeast of the spring in the Tehachapi Mountains, also appears to have been named after him.

Bean's timing was unfortunately poor: a severe draught from 1897 – 1899 caused many Antelope Valley homesteads to fail (Thompson 1921:292). As noted by Johnson (1911:49), the seven separate springs and seeps at Willow Springs were only capable of watering about 33-ac in non-drought conditions, and this was the best water source along the fault scarp, making Bean's requirement to cultivate 40-ac of timber untenable. By the 1910 census Bean was living in Los Angeles and was listed as a miner working at his "own mine," apparently having abandoned his desert homestead (Way and Jackson 2009). With the exception of two ponds, a burn pit (likely not historical) and some barbed wire fencing, there is little evidence of historical development at the spring, and no evidence for historical development or use within the Chaparral Solar Facility footprint related to this patent.

Historical use of the Project area, as a result, primarily has resulted from mid-twentieth century farming in the region.

2.5 GEOARCHAEOLOGICAL BACKGROUND

The Project area consists of the open flats of the Antelope Valley. A Caltrans geoarchaeological study that included the Project area classified this location as having Very Low to Moderately Low sensitivity for subsurface sites (Meyer et al. 2010). This study involved first determining the location and ages of late Pleistocene (>25,000 years old) landforms in Kern County and the southern San Joaquin Valley. These were identified by combining a synthesis of 2,400 published paleontological, soils and archaeological chronometric dates with geoarchaeological field testing. The ages of surface landforms were then mapped to provide an assessment for the potential for buried archaeological deposits. These ages were derived primarily from the Soil Survey Geographic Database (SSURGO) and the State Soils Geographic (STATSGO) database. A series of maps were created from this information that ranked locations in 7 ordinal classes for sensitivity for buried soils, from Very Low to Very High. Based on this analysis, the sites within the Chaparral Solar Facility were unlikely to contain subsurface archaeological deposits.

3 METHODS AND RESULTS

3.1 PHASE II TESTING

Phase II archaeological fieldwork at the 10 study sites in the proposed Chaparral Solar Facility footprint was intended to establish the nature and significance of each cultural resource, and to thereby provide baseline data from which a determination of the ultimate disposition of these cultural resources could be made. This required the collection of a representative sample of artifacts and archaeological indicators from each of these cultural resources, the establishment of the vertical and horizontal boundaries of each cultural deposit, and an analysis of the recovered artifact assemblage from these archaeological localities.

Procedures followed in the collection of data useful for establishing the nature and significance of the sites included mapping, photographic documentation, surface collecting of artifacts lying on the ground-surface, mapping of surface features, and test excavation of pits to establish the presence or absence of a subsurface archaeological deposit, as well as to characterize such a deposit if found to be present on the sites considered in this study. Existing site records were also updated (Confidential Appendix B). Though these procedures were systematized so that the recovered data would be comparable between each site, as well as with previous studies in the region, the magnitude of effort varied between the sites, reflecting the field conditions specific to each locale. We discuss each of these field methods below, with details on the level of effort expended at each site provided in the subsequent chapter.

3.1.1 Surface Collection

In order to determine the maximum areal extent of each site, the initial field procedure was to locate, map and collect all surface remains present on the ground surface. In order to identify all such remains, the general area of each site was walked by crew-members using 2-m transects. Identified artifacts and archaeological indicators were then marked with flagging tape. A high-precision Trimble Geoexplorer GPS unit, with sub-meter accuracy, was used subsequently to map all artifacts, which were numbered and collected by these provenience points.

Because surface artifacts may become naturally embedded in the top few centimeters of topsoil, one or more surface shovel scrapes (SC) were completed on each excavated test unit (TU) prior to initial ground break. These measured 0.5 by 1-m in size, with the scraped soil screened through 1/8th inch mesh. These scrapes extended to an approximate depth of about 2 to 3-cm and were intended to potentially increase the number of surface artifacts recovered from all site test units.

No surface collection was conducted on the historical/Euro-American sites because these sites contain recent, mass-produced materials. The surface components of each such site were however, documented, tabulated and mapped.

3.1.2 Test Excavations

Two methods were employed to test for the presence of subsurface deposits: hand excavated test units (TU), 1 x 1-m in size, and shovel test pits (STP). Employing a procedure used at all sites tested during this Phase II project, the number and location of the test pits placed on each site were predicated on an evaluation of localized geomorphological conditions present. Specifically, test pits were placed in areas on the prehistoric sites where the probability of deposition was deemed highest, including in areas of surface artifact concentrations, with subsequent pits located to delineate any such discovered deposits.

Given the nature of the historical/Euro-American sites, which consisted of low density refuse scatters with minimal likelihood of buried deposits, subsurface testing was limited to the excavation of STPs to ensure the absence of subsurface materials.

Excavation units dug on each site were designated numerically. Each unit was dug with pick, shovel and trowel in arbitrary 10-cm spits or levels. Spoils from each of these levels was screened through 1/8th-inch mesh. All artifacts and archaeological indicators were collected and bagged by unit level. All excavation was continued through two culturally sterile levels (i.e., 20-cm), or until sterile parent soil or decomposing bedrock was encountered. The highest corner of each test unit was used as that unit's datum, when TUs were not on level ground, for subsurface measurements. These were recorded as centimeters below datum (cmbd).

STPs were approximately 30-cm in diameter. These were dug in approximate 20-cm levels, with all removed soils screened through 1/8th-inch mesh.

All surface archaeological specimens were mapped, numbered and collected. Subsurface artifacts and specimens were collected by unit and excavation level for laboratory processing and analysis.

3.1.3 Laboratory Procedures

Following the completion of the Phase II fieldwork, the recovered artifact assemblages were taken to the ASM Affiliates laboratory for washing, processing and analysis. After each specimen was washed and labeled, metrical and typological analyses were performed. We provide measurements and weights for the various artifacts and archaeological indicators in each site's discussion below.

3.2 FIELD RESULTS

Results for the Phase II test excavations of 10 sites are provided below.

3.2.1 Test Excavation Results

A total of six TUs and twelve STPs were excavated on the six prehistoric/Native American sites within the Chaparral Solar Facility Phase II study footprint (Table 1.1). Soils in this area consisted of sand/sandy loam with few lithic clasts. As noted above, this area was flat with minimal topographical relief.

The results of these excavations are provided below. Updated site photographs and a catalog of collected items for all tested sites are included in site record update forms in Confidential Appendix B.

Table 1.1. Excavation Units Per Prehistoric Site

Site	Shovel Test Pits	1x1-meter Test Pits
P-15-013844	0	1
P-15-013846	1	1
P-15-19548/CA-KER-10721H	0	2
P-15-19553/CA-KER-10717	1	0
P-15-19554/CA-KER-10718H	1	0
P-15-19555/CA-KER-10719	1	0
P-15-19556/CA-KER-10720	2	1
P-15-19557/CA-KER-10721	1	0
P-15-19558/CA-KER-10722H	3	0
P-15-19559/CA-KER-10723	2	1

3.2.2 P-15-013844

Site P-15-013844 was originally recorded by Pacific Legacy, Inc. in 2008 as a small FAR concentration. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Only one surface artifact, labeled A1, was identified and collected from the site. A1 is a crypto-crystalline (CCS) secondary interior flake that measures 3.5 x 1.4 x 0.7-cm. A disturbed FAR concentration is present on the site. Based on the distribution of these specimens, the site area is approximately 36-m northwest/southeast by 11-m northeast/southwest.

Test Excavations:

One subsurface test unit (TU-1) was were excavated on the site, in the approximate middle of the FAR concentration. Soil conditions across the site are uniform, consisting of a brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

TU-1 was excavated in three levels down to 20 - 30-cmbd with no cultural material (including charcoal) identified or recovered. The unit was terminated after two culturally sterile levels (10 - 20; 20 - 30-cmbs) were excavated. To extend the depth of the subsurface testing, STP-1 was placed in the approximate center of the last sterile test unit level (20 - 30-cmbs). It was excavated down two levels to a total depth of 70-cmbd. Soil conditions within the test unit consists of brown (Munsell 10YR 5/3) loamy sand. No cultural materials recovered from STP-1.

Results:

Site P-15-013844 is a small fire-affected rock (FAR) concentration that lacks a subsurface component. The single identified flake on site is chert, while the previously identified FAR consisting of the rhyolitic cobbles, which occur naturally across the Antelope Valley alluvial plain. The site is best interpreted as a disturbed hearth rather than roasting pit, probably only used on a single occasion. Its age is unknown.

3.2.3 P-15-013846

Site P-15-013846 was originally recorded by Pacific Legacy, Inc. in 2008 as a sparse lithic scatter with *Tivela* shell fragments. The site was relocated during the 2019 fieldwork. It consists of 12 early stage reduction flakes, comprised mostly of rhyolite and one chert flake, which were subsequently collected. Five *Tivela* shell fragments were identified on site. The site is located on [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Twelve surface artifacts, labeled A1 - 12, were collected from the site. The surface collected artifacts consist mostly of rhyolite flakes with only one CCS flake identified. The collected artifacts are presented below in Table 1.2. Based on the distribution of these artifacts, the site area is 50-m northwest/southeast by 23-m northeast/southwest.

Table 1.2. Site P-15-013846 – Surface Collected Artifacts

Artifact Designation:	Type:	Description:	Weight (g):	Measurement (L x W x T):
A1	Debitage	Rhyolite interior flake	0.5	1.6 x 1.1 x 0.3
A2	Debitage	Rhyolite interior flake	0.2	1.3 x 0.8 x 0.1
A3	Debitage	Rhyolite interior flake	0.4	1.5 x 1.1 x 0.2
A4	Debitage	Rhyolite interior flake	0.3	1.3 x 1.1 x 0.1
A5	Debitage	Rhyolite interior flake	1.9	1.4 x 1.6 x 0.5
A6	Debitage	Rhyolite interior flake	0.5	1.8 x 1.2 x 02
A7	Debitage	Rhyolite interior flake	6.5	3.9 x 3 x 0.6
A8	Debitage	Rhyolite interior flake	0.4	2.1 x 1 x 0.2
A9	Debitage	Rhyolite interior flake	0.9	1.9 x 1 x 0.3
A10	Debitage	Rhyolite interior flake	0.9	1.9 x 1.5 x 0.3
A11	Debitage	Rhyolite interior flake	0.7	1.5 x 1.2 x 0.3
A12	Debitage	CCS interior flake	0.2	1.1 x 0.8 x 0.1

Test Excavations:

One subsurface test unit (TU-1), and one subsurface shovel test pit (STP-1) were excavated on the site. Soil conditions vary slightly within the test unit, with the initial 2-cmbs (shovel scrape) consisting of a light grayish brown (Munsell 10YR 5/2) top layer that transitions to brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

TU-1 was excavated two levels down to 10 - 20-cmbd with no cultural material recovered. The unit was terminated after two culturally sterile levels (0 - 10; 10 - 20-cmbs) were excavated.

STP-1 was excavated down three 20-cm levels to a depth of 40 - 60-cmbd. Soil conditions within the test unit consists of brown (Munsell 10YR 5/3) loamy sand. No cultural materials recovered from STP-1.

Results:

Site P-15-0138446 is a sparse lithic scatter with a small quantity of *Tivela* shell fragments. The site lacks a subsurface component. It is not certain whether the flakes and the *Tivela* shell fragments are in primary association, with both types of specimens left prehistorically, or instead if this is a secondary association: *Tivela* shell scatters, left by farm workers, are occasionally encountered in the region. Assuming the association is primary, the presence of the shell fragments at the site indicates trade with the coast, most likely the central coast, with a sandy bottom shoreline.

The flakes on site represent early lithic reduction flakes with the majority of debitage comprised of locally available rhyolite. The site is best interpreted as a small lithic workshop, most likely only used on one occasion. Its age is unknown.

3.2.4 P-15-019548/CA-KER-10712H

Site P-15-019548 was originally recorded by ASM Affiliates in 2017 as a mid-20th century refuse dump. The site consists of low-density scatter of assorted historic cans and glass fragments. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. The site area is 337-ft north/south by 107-ft east/west.

Surface Collection:

No surface artifact collection was undertaken at this site. Tabulated diagnostic historical artifacts at the site are provided in Table 3.3.

Table 1.3 P-15-019548 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Church-keyed sanitary can	10	1935 – Present[1]
Bi-metal beverage can	10	Late 1950s – 1975[1]
"Thatcher Manufacturing" bottle	1	1944 – 1985[2]
"Owens-Illinois" mason jar base	1	1929 – ca. 1960[2]

References: [1] Maples 1998; [2] Lindsey 2015

Test Excavations:

Two subsurface shovel test pits (STP-1 and 2) were excavated on the site. Soil conditions were uniform across the site and consisted of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

Both STP-1 and STP-2 were excavated down three 20-cm levels to a depth of 40 - 60-cmbd. Soil conditions within the shovel test pits consisted of yellowish brown (Munsell 10YR 5/4) loamy sand. No cultural materials were recovered from either STP.

Results:

Site P-15-019548 is a sparse mid-20th century refuse scatter that lacks a subsurface component. It is best interpreted as a single incident dump of household debris. The site lacks associative context and is in poor condition.

3.2.5 P-15-019553/CA-KER-10717

Site P-15-019553 was originally recorded by ASM Affiliates in 2018 as a sparse lithic scatter consisting of nine early stage reduction rhyolite flakes. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Nine surface artifacts, labeled A1 - 9, were collected from the site. The surface collected artifacts all consist of rhyolite flakes associated with early stage lithic reduction (Table 3.4). Based on the distribution of these artifacts, the site area is 20-m northwest/southeast by 13-m northeast/southwest.

Table 1.4. Site P-15-019553 – Surface Collected Artifacts

Artifact Designation:	Type:	Description:	Weight (g):	Measurement (L x W x T):
A1	Debitage	Rhyolite interior flake	0.9	2.1 x 1.1 x 0.4
A2	Debitage	Rhyolite interior flake	1.9	2.5 x 1.9 x 0.3
A3	Debitage	Rhyolite interior flake	0.6	2 x 1.4 x 0.2
A4	Debitage	Rhyolite interior flake	2.4	2.4 x 2.2 x 0.5
A5	Debitage	Rhyolite interior flake	1	1.6 x 1.6 x 0.2
A6	Debitage	Rhyolite interior flake	0.8	2 x 1.5 x 0.2
A7	Debitage	Rhyolite interior flake	6.5	3.6 x 2.8 x 0.7
A8	Debitage	Rhyolite interior flake	3.1	3.2 x 2 x 0.7
A9	Debitage	Rhyolite interior flake	1.6	2.3 x 2 x 0.2

Test Excavations:

One subsurface shovel test pit (STP-1) was excavated on the site. Soil conditions consisted of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

STP-1 was excavated down three 20-cm levels to a depth of 40 - 60-cmbd. Soil conditions within the shovel test pit consisted of brown (Munsell 10YR 5/3) loamy sand. No cultural materials were recovered from STP-1.

Results:

Site P-15-019553 is a sparse lithic scatter that lacks a subsurface component. The flakes represent early lithic reduction with all debitage on site comprised of locally available rhyolite. The site is best interpreted as a small lithic workshop, most likely only used on one occasion. Its age is unknown.

3.2.6 P-15-019554/CA-KER-10718H

Site P-15-019554 was originally recorded by ASM Affiliates in 2017 as a small early-to-mid 20th century can scatter. The site consists of 13 assorted historic cans. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. The site area is 248-ft north/south by 230-ft east/west.

Surface Collection:

No surface artifact collection was undertaken at this site. Six hole-in-top cans (c. 1900s – 1940s), five rotary-opened multi-serve cans (1925 – present), one paint can (1906 – present), and a small sanitary juice can were tabulated on the site surface, however. These indicate that the site minimally would date from 1940 but most likely during the Depression era.

Test Excavations:

One subsurface shovel test pit (STP-1) was excavated on the site. Soil conditions consisted of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

STP-1 was excavated down two 20-cm levels to a total depth of 20 - 40-cmbd. Soil conditions within the shovel test pit consisted of brown (Munsell 10YR 5/3) loamy sand. No cultural materials were recovered from STP-1.

Results:

Site P-15-019554 is a small early-to-mid 20th century can scatter that lacks a subsurface component. The site is best interpreted as a single incident dump of household debris. The site lacks associative context and is in poor condition.

3.2.7 P-15-019555/CA-KER-10719H

Site P-15-019555 was originally recorded by ASM Affiliates in 2017 as a mid-20th century refuse scatter. The site consists of light density scatter of assorted historic cans, dishware fragments, and glass bottle bases. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. The site area is 94-ft north/south by 88-ft east/west.

Surface Collection:

No surface artifact collection was undertaken at this site. Table 1-5 lists the surface artifacts documented on the site.

Test Excavations:

One subsurface shovel test pit (STP-1) was excavated on the site. Soil conditions consisted of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

STP-1 was excavated down three 20-cm levels to a depth of 40 - 60-cmbd. Soil conditions within the shovel test pit consisted of brown (Munsell 10YR 5/3) loamy sand. No cultural materials recovered from STP-1.

Table 1-5. P-15-019555 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Rotary opened sanitary can	12	1925 – Present[1]
Hole-In-Top	1	c. 1900s – 1940s[1]
External Friction Tobacco	1	1907 – 1948[1]
"Tudor Rose" dishware	1	1930 – c. 1940s[2]
"Glass Containers Corp." bottle base	1	1934 – ca. 1968[3]
"Owens-Illinois" mason jar base	2	1929 – ca. 1960[3]

References: [1] Maples 1998; [2] Gonzalez 2017; [3] Lindsey 2015

Results:

Site P-15-019555 is mid-20th century refuse scatter that lacks a subsurface component. The site is best interpreted as a dispersed, single incident refuse dump of household debris. The site lacks associative context and is in poor condition.

3.2.8 P-15-019556/CA-KER-10720

Site P-15-019556 was originally recorded by ASM Affiliates in 2018. It consists of 35 flakes along with seven groundstone artifacts and one CCS core/chopper, all of which were collected. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Thirty-five surface artifacts, labeled A1 - 35, were collected from the site. The collected flakes include both CCS and rhyolite with early and late stage lithic reduction indicated. The collected artifacts are presented below in Table 1-6. In addition, three small FAR concentrations were also observed and labeled (Concentration 1 – 3). TU-1 was excavated within Concentration 1, the densest of these FAR concentrations, containing approximately 20 FAR fragments. Based on the distribution of these artifacts and these three features, the site area is 112-m northeast/southwest by 80-m east/west.

Table 1-6. Site P-15-019556 – Surface Collected Artifacts

Artifact Designation:	Type:	Description:	Weight (g):	Measurement (L x W x T):
A1	Debitage	CCS interior flake	0.7	2.3 x 1.3 x 0.3
A2	Debitage	CCS interior flake	1.6	2.2 x 1.6 x 0.7
A3	Debitage	Rhyolite metate fragment	155.5	7.5 x 5.9 x 5.5
A4	Debitage	CCS interior flake	3.1	2.4 x 2.2 x 0.6
A5	Debitage	Rhyolite interior flake	8.5	4.8 x 2.6 x 1
A6	Groundstone	Granitic mano fragment	91.1	7.2 x 5.4 x 2.9
A7	Debitage	CCS core/chopper	151	7.9 x 6.5 x 3.6
A8	Debitage	CCS interior flake	3.5	2.7 x 2.2 x 0.6
A9	Debitage	Rhyolite interior flake	37.9	6.3 x 3.6 x 2.7
A10	Debitage	Rhyolite interior flake	1.4	2 x 1.7 x 0.9
A11	Debitage	Rhyolite interior flake	1.2	2.4 x 1.5 x 0.5
A12	Groundstone	Sierra Pelona schist re-fit metate fragments	330 383.5	9.3 x 7.9 x 3.3 11.7 x 8.2 x 3.3
A13	Debitage	CCS interior flake	0.6	1.7 x 0.9 x 0.3
A14	Debitage	CCS interior flake	2.4	2.9 x 2.2 x 0.3
A15	Debitage	Rhyolite interior flake	3.6	3.4 x 2.5 x 0.4
A16	Debitage	CCS interior flake	2.2	2.2 x 1.8 x 0.6
A17	Debitage	CCS interior flake	0.7	1.7 x 1.4 x 0.4
A18	Debitage	CCS interior flake	13.4	4.1 x 2.9 x 1.4
A19	Debitage	CCS interior flake	0.8	2.1 x 1.6 x 0.2
A20	Debitage	CCS interior flake	15.9	6 x 4.7 x 0.7
A21	Debitage	CCS shatter	24.3	4.8 x 3.5 x 1.5
A22	Debitage	Rhyolite interior flake	1.3	2.4 x 1 x 0.4
A23	Debitage	FGV interior flake	0.7	2.3 x 1.3 x 0.3
A24	Debitage	Rhyolite interior flake	0.4	1.6 x 1.2 x 0.1
A25	Debitage	Rhyolite interior flake	2.2	2.2 x 1.8 x 0.6
A26	Debitage	Rhyolite interior flake	29.6	6.2 x 3.5 x 2.2
A27	Groundstone	Granitic metate fragment	5715.2	21.8 x 18.5 x 11
A28	Groundstone	Rhyolitic re-fit metate fragments	43.9 71.5	5 x 2.7 x 4 6.4 x 3.8 x 4.1
A29	Groundstone	Granitic metate fragment	6622.4	26.5 x 15 x 12.5
A30	Debitage	CCS interior flake	4.1	3.6 x 1.6 x 0.7
A31	Debitage	CCS interior flake	2.6	3.1 x 2.1 x 0.4
A32	Debitage	Rhyolite interior flake	5.5	3.9 x 2.9 x 0.7
A33	Debitage	Rhyolite interior flake	12.9	4.4 x 3.4 x 1.2
A34	Debitage	Rhyolite interior flake	0.9	2.1 x 1.6 x 0.3
A35	Groundstone	Granitic mano fragment	278.9	8.3 x 7.3 x 4.7

Test Excavations:

One subsurface test unit (TU-1) and two shovel test pits (STP-1) were excavated on the site. Soil conditions were uniform across the site, consisting of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

TU-1 was excavated down four levels to 40-cmbd, with an additional shovel test pit placed in the approximate center of the test unit. This was excavated an additional 20-cm, yielding a total excavation depth of 60-cmbs. Artifacts were present from 0 – 40-cmbs; the unit was culturally sterile from 40 – 60-cmbs.

A total of 28 artifacts, including 25 flakes, two Olivella shell beads, and one likely historic porcelain fragment, were collected from TU-1. The collected artifacts are presented in Table 1.7.

Table 1-7. Site P-15-019556 - Test Unit 1 Collected Specimens

Site:	Depth:	Artifact:	Count:	Material:			Bone:	
				Rhyolite	CCS	FGV	Cultural	Non-cultural
P-15-019556	Level 1 (0-10 cmbs)	*Olivella* shell bead	1	—	—	—	—	—
		Debitage	11	2	9	—	—	—
		Porcelain dishware fragment	1	—	—	—	—	—
	Level 2 (10-20 cmbs)	*Olivella* shell bead	1	—	—	—	—	—
		Debitage	12	2	10	—	—	—
	Level 3 (20-30 cmbs)	Debitage	1	1	—	—	—	—
	Level 4 (30-40 cmbs)	Debitage	1	1	—	—	—	—
	Level 5, STP (40-60 cmbs)	—	—	—	—	—	—	—

STP-1 was excavated down two levels to a depth of 20 – 40-cmbs, while STP-2 was excavated down three levels to a depth of 40 - 60-cmbd. Soil conditions within both shovel test pits were uniform and consisted of brown (Munsell 10YR 5/3) loamy sand. One flake was recovered from STP-1 in Level 1 (10 – 20-cmbs). The flake consists if a rhyolite interior flake that measures 1.4 x 0.8 x 0.2-cm.

Results:

Site P-15-019556 most likely represents a small campsite as it includes groundstone (manos and metates) for plant processing, tool manufacturing waste (all using locally available lithic materials), and two shell ornaments. The two ornaments are both *Olivella biplicata* cup beads. These have been perforated with a stone drill. Based on work at the Humaliwo site, Gibson (1975) classifies this bead type as Late Prehistoric in age, dating roughly between AD 1200 and 1750.

A porcelain dishware sherd was also recovered. This was found in the 0 – 10-cmbs level and most likely is intrusive.

One other artifact from P-15-019556 warrants comment. This is the two re-fit flat-slab metate fragments made of Sierra Pelona schist, found on the site ground surface. As the name indicates, this lithic material is from the Sierra Pelona, in the Acton – Agua Dulce area south of the Antelope Valley, within Tataviam territory. [redacted]

[redacted]. Whether these metates were traded in from the Sierra Pelona, or instead reflect Tataviam use of the project area, is uncertain and is worthy of additional study.

3.2.9 P-15-019557/CA-KER-10721

Site P-15-019557 was originally recorded by ASM Affiliates in 2017 as a sparse lithic scatter. The site consists of nine early stage reduction rhyolite and CCS flakes. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Nine surface artifacts, labeled A1 - 9, were collected from the site. These are all rhyolite with only the exception of one CCS flake. The flakes are all associated with early stage lithic reduction. For clarity, the collected artifacts are presented below in Table 1-8. Based on the distribution of these artifacts, the site area is 25-m northwest/southeast by 15-m east/west.

Table 1-8. Site P-15-019557 – Surface Collected Artifacts

Artifact Designation:	Type:	Description:	Weight (g):	Measurement (L x W x T):
A1	Debitage	Rhyolite interior flake	1.4	2.1 x 1.8 x 0.4
A2	Debitage	CCS interior flake	1.9	2.6 x 2.1 x 0.6
A3	Debitage	Rhyolite interior flake	0.2	1.2 x 0.9 x 0.1
A4	Debitage	Rhyolite interior flake	6.8	3.8 x 2.7 x 1.6
A5	Debitage	Rhyolite interior flake	0.2	1.3 x 0.9 x 0.1
A6	Debitage	Rhyolite interior flake	1.3	2.7 x 1.3 x 0.6
A7	Debitage	Rhyolite interior flake	0.4	1.8 x 1.1 x 0.1
A8	Debitage	Rhyolite interior flake	1.5	2.2 x 1.6 x 0.4
A9	Debitage	Rhyolite interior flake	0.2	1.4 x 1.2 x 0.2

Test Excavations:

One shovel test pit (STP-1) was excavated on the site. STP-1 was excavated down two 20-cm levels to a total depth of 40-cmbd. Soil conditions consisted of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density. No cultural materials recovered from STP-1.

Results:

Site P-15-019557 is a sparse lithic scatter that lacks a subsurface component. The flakes represent early lithic reduction with the debitage on site comprised of locally available rhyolite and one CCS flake. The site is best interpreted as a small lithic workshop, probably representing a single use event. The age of the site is unknown.

3.2.10 P-15-019558/CA-KER-10722H

Site P-15-019558 was originally recorded by ASM Affiliates in 2017 as an historic refuse scatter and foundation. The site remains consists of mixed age debris scatters and concrete features possibly associated with a pump house. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses. Intrusive Tamarisk trees, often planted as wind breaks, are also present. The site area is 673-ft northwest/southeast by 353-ft northeast/southwest.

The site is an historic mid-20th century refuse scatter and associated concrete foundation (Feature 1). Most of the diagnostic refuse (Concentration 1) is located on the south side of an east-west oriented dirt road that cuts directly through the site. An extensive modern/contemporary domestic refuse scatter, of mostly fragmented items, is present and is mixed with the historical refuse. In addition to the recorded square foundation, at least four additional concrete standing pipes were noted in the vicinity, including a capped pipe that has been recently modified with blue paint (datum). The concrete features likely represent the remnants of a pump house. Based on evidence of agricultural activities (i.e. adjacent disked fields, pump house features) and the domestic refuse, the site appears to represent a historic farm. The BLM's General Land Office (GLO) records do not contain any homestead or ownership information for the associated land parcel. Historic aerials, however, indicate the presence of three structures (including the recorded concrete foundation) minimally from 1948 to 1976. One of these, to the southeast of the concrete pad, appears to be a house. These structures were demolished sometime prior to 1995 and, with the exception of Feature 1, no evidence of foundational remnants is currently present. Two agricultural fields are visible in the aerial photos through 1976.

Feature 1 is a square concrete foundation that measures 10.5-ft (northeast-southwest) by 10.5-ft northwest-southeast. The foundation has 12 short non-threaded metal rebar posts that protrude vertically from the surface. At least four chunks of loose concrete surround the foundation.

Surface Collection:

No surface artifact collection occurred at this site due to the age and mass-produced nature of the artifacts present. Concentration 1 consists of a moderately dense refuse concentration measuring 153-ft (northeast-southwest) by 79-ft (northwest-southeast). Refuse includes approximately 300 glass bottle fragments, 100 ceramic sherds, metal debris, 30 cans (aluminum, bi-metal, aerosol), and assorted plastics. Diagnostic artifacts within the concentration are mostly fragmented and represent domestic refuse from the 1940s – 1990s (Table 1-9). The concentration is primarily contained within a dozer push pile just south of the site datum.

Table 1-9. P-15-019558 Diagnostic Refuse Inventory

Description:	Count (Approximate):	Date Range:
Rotary opened sanitary can	12	1925 – Present[1]
Hole-In-Top	1	c. 1900s – 1940s[1]
External Friction Tobacco	1	1907 – 1948[1]
"Tudor Rose" dishware	1	1930 – c. 1940s[2]
"Glass Containers Corp." bottle base	1	1934 – ca. 1968[3]
"Owens-Illinois" mason jar base	2	1929 – ca. 1960[3]

References: [1] Maples 1998; [2] Gonzalez 2017; [3] Lindsey 2015

Test Excavations:

The ground surface of this site had been substantially disturbed by bulldozing and grubbing, including the demolition and removal of the former structures. Encountering subsurface materials was anticipated during the test excavation as a result of this disturbance. Three subsurface shovel test pits (STP-1, 2, and 3) were excavated on the site. STP-1 and STP-3 were excavated to a total depth of 60-cmbd, while STP-2 was excavated to a depth of 40-cmbd. Soil conditions within STP-1 and STP-3 consisted of brown/dark brown (Munsell 10YR 4/3) loamy sand with loose, single grains, ~5 - 8 percent subangular to subrounded gravels, no ped structure, and moderate bulk density. STP-2 soils consisted of grayish brown (Munsell 10YR 3/1) loamy sand with loose, single grains, ~3 percent subangular to subrounded gravels, no ped structure, and moderate bulk density. The dramatic change in soil relative to the other STPs is a result of the proximity of STP-2 tpo trash burn pit.

An abundance of mixed aged (primarily modern/contemporary but including older/historical) refuse was encountered within STP-1 and STP-2. A minimal amount of refuse comprised of glass and metal fragments was encountered in the initial two levels of STP-3. Although burned and unburned domestic refuse was encountered during the excavations, no culturally significant or historically diagnostic materials were recovered from any of the STP, and potentially historical materials were found combined with modern materials. The subsurface materials at this site do not represent an intact deposit but instead are in a disturbed context that has resulted from grading.

Results:

Site P-15-019558 appears to represent a mid-20th century farm complex. With the exception of a concrete foundation pad, probably for a pump house, no structural remains are present. Grading and grubbing, including structure demolition and removal, has heavily disturbed the ground surface and subsurface soils. The site lacks an intact subsurface component as a result. Based on the degree of disturbance, the site lacks integrity.

3.2.11 P-15-019559/CA-KER-10723

Site P-15-019559 was originally recorded by ASM Affiliates in 2018 as a lithic scatter with groundstone. The surface scatter consists of 90 lithic and groundstone artifacts. The site is located [redacted]. Soil on site consists of a loamy sand with dispersed granite and quartz rocks. Vegetation in the area consists of creosote, buckwheat, and seasonal grasses.

Surface Collection:

Ninety surface artifacts, labeled A1 - 90, were collected from the site. A total of 88 collected flakes include rhyolite, CCS, and fine grain volcanic (FGV) material associated with late stage lithic reduction. Two collected manos are grano-diorite. The surface collected artifacts are presented below in Table 1-10. Based on the distribution of these artifacts, the site area is 95-m north/south by 63-m east/west.

Table 1-10. Site P-15-019559 – Surface Collected Artifacts

Artifact Designation:	Type:	Description:	Weight (g):	Measurement (L x W x T):
A1	Debitage	FGV primary flake	4.1	5.2 x 4.5 x 1.6
A2	Debitage	Rhyolite interior flake	1.8	1.6 x 1.8 x .6
A3	Debitage	Rhyolite interior flake	0.1	1.1 x .8 x .1
A4	Debitage	Rhyolite interior flake	.2	1.6 x 1.0 x .1
A5	Debitage	CCS interior flake	1.0	2.9 x 0.9 x 0.5
A6	Debitage	Rhyolite interior flake	0.1	1.4 x 0.9 x 0.1
A7	Debitage	Rhyolite interior flake	0.5	2.2 x 1.1 x 0.3
A8	Debitage	Rhyolite interior flake	0.1	1 x 0.6 x 0.1
A9	Debitage	Rhyolite interior flake	0.2	1.1 x 1 x 0.1
A10	Debitage	Rhyolite interior flake	0.5	1.9 x 1.1 x 0.2
A11	Debitage	Rhyolite interior flake	0.4	1.6 x 1.3 x 0.2
A12	Debitage	Rhyolite interior flake	0.4	1.8 x 1.2 x 0.1
A13	Debitage	Rhyolite interior flake	0.4	1.3 x 1.1 x 0.2
A14	Debitage	Rhyolite interior flake	0.1	0.9 x 0.7 x 0.1
A15	Debitage	Rhyolite interior flake	0.5	1.8 x 1.2 x 0.2
A16	Debitage	Rhyolite interior flake	0.3	1.3 x 1.2 x 01
A17	Debitage	Rhyolite interior flake	0.1	1.1 x 0.5 x 0.1
A18	Debitage	Rhyolite interior flake	2.0	2.0 x 2.0 x 0.3
A19	Debitage	Rhyolite interior flake	0.1	1.0 x 0.7 x 0.1
A20	Debitage	Rhyolite interior flake	0.2	1.3 x 1 x 0.2
A21	Debitage	Rhyolite interior flake	0.1	1.4 x 0.6 x 0.1
A22	Debitage	Rhyolite interior flake	0.3	1.6 x 1.3 x 0.2
A23	Debitage	Rhyolite interior flake	0.8	2.0 x 1.8 x 0.2
A24	Debitage	Rhyolite interior flake	0.4	1.4 x 1.1 x 0.2
A25	Debitage	Rhyolite interior flake	0.2	1.3 x 1 x 0.1

A26	Debitage	Rhyolite interior flake	0.3	1.5 x 1.2 x 0.1
A27	Debitage	Rhyolite interior flake	2.4	3.4 x 2.3 x 0.3
A28	Debitage	Rhyolite interior flake	1.2	2.5 x 1.6 x 0.3
A29	Debitage	Rhyolite interior flake	0.1	1 x 0.7 x 0.1
A30	Debitage	Rhyolite interior flake	1.2	2 x 1.7 x 0.2
A31	Debitage	Rhyolite interior flake	0.3	1.7 x 1.0 x 0.2
A32	Debitage	Rhyolite interior flake	0.3	1.1 x 1 x 0.1
A33	Debitage	Rhyolite interior flake	0.2	1.1 x 0.7 x 0.1
A34	Debitage	Rhyolite interior flake	0.2	1.2 x 0.6 x 0.1
A35	Debitage	Rhyolite interior flake	0.2	1.1 x 0.8 x 0.1
A36	Debitage	Rhyolite interior flake	0.3	1.3 x 1.1 x 0.2
A37	Debitage	Rhyolite interior flake	0.4	1.5 x 1.6 x 0.2
A38	Debitage	Rhyolite interior flake	0.5	1.5 x 1 x 0.3
A39	Debitage	Rhyolite interior flake	0.3	1.5 x 1 x 0.1
A40	Debitage	Rhyolite interior flake	0.1	1.3 x 0.9 x 0.1
A41	Debitage	Rhyolite interior flake	0.1	1.1 x 0.9 x 0.2
A42	Debitage	CCS interior flake	5.1	3.5 x 2.3 x 1
A43	Debitage	Rhyolite interior flake	0.1	1 x 0.8 x 0.1
A44	Debitage	Rhyolite interior flake	0.7	1.8 x 1.1 x 0.2
A45	Debitage	Rhyolite interior flake	0.1	1.5 x 0.8 x 0.1
A46	Debitage	Rhyolite interior flake	0.3	2.2 x 0.6 x 0.2
A47	Debitage	Rhyolite interior flake	0.1	1.3 x 0.9 x 0.1
A48	Debitage	Rhyolite interior flake	0.2	1.3 x 1 x 0.1
A49	Debitage	Rhyolite interior flake	0.3	1.7 x 1.1 x 0.2
A50	Debitage	Rhyolite interior flake	7.2	3.9 x 3.1 x 0.6
A51	Debitage	Rhyolite interior flake	1.7	2.2 x 2.0 x 0.7
A52	Debitage	Rhyolite interior flake	3.9	4.4 x 2.3 x 0.4
A53	Debitage	Rhyolite interior flake	0.5	1.3 x 0.9 x 0.6
A54	Debitage	Rhyolite interior flake	6.5	4.2 x 2.2 x 0.7
A55	Debitage	Rhyolite interior flake	2.4	2.5 x 1.8 x 0.7
A56	Debitage	Rhyolite interior flake	4.2	4 x 2.2 x 0.4
A57	Groundstone	Granitic mano fragment	286.9	10.7 x 5 x 5.4
A58	Debitage	Rhyolite interior flake	6.7	3.5 x 3.3 x 0.6
A59	Debitage	Rhyolite interior flake	5	3.2 x 3 x 0.5
A60	Debitage	Rhyolite interior flake	4.9	3.2 x 2.3 x 0.8
A61	Debitage	Rhyolite interior flake	3.4	2.8 x 2 x 0.6
A62	Debitage	Rhyolite interior flake	0.8	1.6 x 1.4 x 0.3
A63	Debitage	FGV interior flake	1.9	3.3 x 2 x 0.5
A64	Debitage	Rhyolite interior flake	1.1	2.1 x 1.4 x 0.3
A65	Debitage	Rhyolite interior flake	1.6	2.5 x 1.9 x 0.4
A66	Debitage	Rhyolite interior flake	1.9	2.2 x 1.4 x 0.5
A67	Debitage	CCS interior flake	6.4	3.3 x 3.2 x 0.8
A68	Debitage	Rhyolite interior flake	2.9	4 x 1.6 x 0.4
A69	Debitage	Rhyolite interior flake	0.3	1.2 1 x 0.1
A70	Debitage	Rhyolite interior flake	0.6	1.4 x 1.3 x 0.2
A71	Debitage	Rhyolite interior flake	0.4	1.5 x 1.2 x 0.3
A72	Debitage	Rhyolite interior flake	0.1	0.8 x 0.6 x 0.2
A73	Debitage	FGV interior flake	2.9	3.2 x 2.6 x 0.4
A74	Debitage	FGV interior flake	1.8	3 x 2.4 x 0.3
A75	Debitage	Rhyolite interior flake	0.5	1.7 x 1.4 x 0.3

A76	Debitage	Rhyolite interior flake	0.2	1.2 x 1 x 0.2
A77	Debitage	FGV interior flake	6.3	4.1 x 3.8 x 0.6
A78	Debitage	Rhyolite interior flake	0.2	1.4 x 1.2 x 0.2
A79	Debitage	FGV interior flake	0.2	1.3 x 1.1 x 0.2
A80	Debitage	FGV interior flake	0.5	1.5 x 1.2 x 0.3
A81	Debitage	Rhyolite interior flake	2.1	2.7 x 1.8 x 0.6
A82	Debitage	Rhyolite interior flake	0.2	1.3 x 1 x 0.2
A83	Debitage	FGV interior flake	0.5	1.8 x 1.4 x 0.3
A84	Debitage	FGV interior flake	4.8	7.4 x 2.2 x 0.6
A85	Debitage	Rhyolite interior flake	5.5	4.8 x 2.9 x 0.6
A86	Debitage	Rhyolite interior flake	1.6	2.5 x 1.7 x 0.4
A87	Debitage	Rhyolite interior flake	0.2	1.2 x 1.1 x 0.1
A88	Groundstone	Granitic mano fragment	74.4	5.7 x 3.5 x 4.4
A89	Debitage	Rhyolite interior flake	6.1	4.1 x 3.4 x 0.5
A90	Debitage	Rhyolite interior flake	3.1	3.6 x 1.7 x 0.7

Test Excavations:

One subsurface test unit (TU-1) and two shovel test pits (STP-1 and 2) were excavated on the site. An additional STP was placed in the approximate center of TU-1 to extend the depth of excavation at this location. Soil conditions were uniform across the site, consisting of brown (Munsell 10YR 5/3) loamy sand with loose, single grains, ~10 percent subangular to subrounded gravels, no ped structure, and moderate bulk density.

TU-1 was initially excavated to 70-cmbs as a 1 x 1-m pit. An STP was placed in the approximate center of the pit to continue the excavation to a total depth of 130-cmbs. An archaeological deposit was identified that extended to 70-cmbs depth. Three flakes were recovered from between 70 – 110-cmbs in the STP. These represent down-profile movement due to krotovinas. No artifacts or archaeological specimens were recovered below 110-cmbs.

A total of 227 artifacts, including 212 flakes, one flake tool and 14 burned faunal bone fragments, were collected from TU-1. The collected artifacts are presented in Table 1.11.

Table 1.11. Site P-15-019559 - Test Unit 1 Collected Specimens

Site:	Depth:	Artifact:	Material:			Bone:	
			Rhyolite	CCS	FGV	Cultural	Non-cultural
P-15-019559	Level 1 (0-10 cmbs)	Debitage	40	—	—	—	—
	Level 2 (10-20 cmbs)	Debitage	25	—	1	2	—
	Level 3 (20-30 cmbs)	Debitage	42	1	—	2	—
	Level 4 (30-40 cmbs)	Debitage	41	1	—	2	2
	Level 5 (40-50 cmbs)	Debitage	30	—	—	3	12

	Level 6 (50-60 cmbs)	Debitage	17	—	—	—	6
	Level 7 (60-70 cmbs)	Debitage	11	—	—	5	3
		Flake Tool	—	1	—		
	Level 8, STP (70-90 cmbs)	Debitage	2	—	—	—	—
	Level 9, STP (90-110 cmbs)	Debitage	1	—	—	—	—
	Level 10, STP (110-130 cmbs)	—	—	—	—	—	—

STP-1 and STP-2 were excavated down three levels to a total depth of 40 – 60-cmbs. Soil conditions within both shovel test pits were uniform and consisted of brown (Munsell 10YR 5/3) loamy sand. A total of 18 flakes were recovered from STP-1, while STP-2 produced only one flake. The flakes represent early and late stage reduction and consist mostly of locally available rhyolite with only one fine grain volcanic (FGV) flake identified. The excavated artifacts are presented in Table 1.12.

Table 1-12. Site P-15-019559 Shovel Test Pits

STP Designation:	Level:	Artifact:	Material:			Bone:	
			Rhyolite	CCS	FGV	Cultural	Non-cultural
STP-1	Level 1 (0-20 cmbs)	—	—	—	—	—	—
	Level 2 (20-40 cmbs)	Debitage	8	—	—	—	—
	Level 3 (40-60 cmbs)	Debitage	9	—	1	—	—
STP-2	Level 1 (0-20 cmbs)	Debitage	1	—	—	—	—
	Level 2 (20-40 cmbs)	—	—	—	—	—	—
	Level 3 (40-60 cmbs)	Debitage					

Results:

Site P-15-019559 is prehistoric campsite of unknown age. Give its proximity to site P-15-019558 and the similarities in their artifact assemblages, however, it is possible to infer that it is roughly the same age (Late Prehistoric or circa AD 1200 – 1750). Note however that the depth of the deposit at P-15-019559, to 70-cmbs, suggests a significant depositional time span. Our best inference is that the lower levels of the deposit are earlier than the Late Prehistoric Period, but this is admittedly speculative.

The mix of artifact types—lithic debitage, groundstone and faunal remains—indicates a wide range of activities: plant processing, tool manufacture and hunting. The lithics are all locally available and primarily rhyolite, with no materials traded-in from any significant distance. (CCS sources, for example, are located in the Boron area to the east.) The debitage is almost entirely late stage tool production and maintenance (only one primary flake was recovered), indicating that quarrying and early stage lithic manufacturing occurred off-site. The absence of formal (worked) stone tools is unusual but may be indicative of casual as opposed to formal/curated tool use. Artifact collecting/looting may have also contributed to the paucity of worked artifacts on the site.

The faunal remains are fragmentary, reflecting the standard practice of bone breaking to extract marrow. With one exception, they are all small mammal (e.g., rabbit, hare, rodent) in size. The exception is one large mammal long-bone fragment. This was examined by Dr. Danny Walker, zooarchaeologist, who concluded that it could not be identified and that it represents either a deer, bighorn or antelope bone fragment—the large mammals in this region.

The archaeological deposit lacks any indication of a developed (organically-enriched) midden. This could reflect age of deposit (with organics leaching-out over time) or, more likely, long-term but only sporadic and non-intensive site occupation by a small group of people. In contrast to sites nearby in the Bean Springs area which include developed middens, site P-15-019559 does not appear to have been a winter, aggregation phase village but instead was most likely a seasonal camp.

4. SUMMARY AND RECOMMENDATIONS

4.1 SUMMARY

Phase II test excavations and determinations of significance were conducted at 10 archaeological sites within the proposed footprint of the Chaparral Solar Facility, Kern County, California. Six of these sites are prehistoric/Native American and four are historical/Euro-American in origin. Phase II testing included site boundary, diagnostic artifact and feature mapping; collection of all surface artifacts; excavation of 1 x 1-m hand-dug test pits and approximately 30-cm diameter shovel test pits; and artifact processing, washing and laboratory analysis. Results of this study are summarized by site below:

- P-15-013844 – This site is a small, dispersed scatter of fire-affected rock. One piece of lithic debitage was collected from the site and no subsurface deposit is present. Its age is unknown, and the site likely is a disturbed hearth, used only a single time. The site area is approximately 36-m northwest/southeast by 11-m northeast/southwest.

- P-15-013846 - This site is a sparse lithic scatter consisting of 12 flakes with a few fragments of *Tivela* shell. No subsurface deposit is present at the site, which is of unknown age. The site is a single-use lithic workshop. Site size is approximately 50-m northwest/southeast by 23-m northeast/southwest.

- P-15-019548/CA-KER-10712H (Temporary designation AVEP-RA-12) – Site P-15-019548 is a sparse, mid-20th century refuse scatter. No subsurface deposit is present at this site, and it lacks associative context. The site likely is a single-incident refuse dump. Site area is 337-ft north/south by 107-ft east/west.

- P-15 -019553/CA-KER-10717 (Temporary designation AVEP-RA-17) – Site P-15 -019553 is a sparse lithic scatter that contained nine pieces of debitage. It lacks a subsurface deposit and is of unknown age. The site is a single-incident lithic workshop. It measures approximately 20-m northwest/southeast by 13-m northeast/southwest.

- P-15-019554/CA-KER-10718H (Temporary designation AVEP-RA-18) – This site is a small early-to-mid 20th century can scatter that lacks a subsurface component. The site is a single incident dump of household debris. The site lacks associative context and is in poor condition. The site area is 248-ft north/south by 230-ft east/west.

- P-15-019555/CA-KER-10719H (Temporary designation AVEP-RA-19) – Site P-15-019555 is an early to mid-20th century refuse scatter that lacks a subsurface component. The site is a dispersed, single incident refuse dump of household debris. The site lacks associative context and is in poor condition. The site area is 94-ft north/south by 88-ft east/west.

- P-15-019556/CA-KER-10720 (Temporary designation AVEP-RA-20) – Site P-15-019556 is a small campsite that includes groundstone for plant processing, tool manufacturing waste, and two shell ornaments. The site has a subsurface deposit that extends to approximately 20-cmbs. Based on diagnostic artifacts, the site dates to the Late Prehistoric Period, from approximately AD 1200 – 1750. The site area is about 112-m northeast/southwest by 80-m east/west.

- P-15 -019557/CA-KER-10721 (Temporary designation AVEP-RA-21) – Site P-15-019557 is a sparse lithic scatter containing nine flakes. It has no subsurface component. The site is a small, single use lithic workshop. The age of the site is unknown. It is 25-m northwest/southeast by 15-m east/west in size.

- P-15-019558/CA-KER-10722H (Temporary designation AVEP-RA-22) - Site P-15-019558 is a demolished mid-20th century farm complex. With the exception of a concrete foundation pad, probably for a pump house, no structural remains are present. Grading and grubbing, including structure demolition and removal, has heavily disturbed the ground surface and subsurface soils. The site lacks an intact subsurface component as a result. Based on the degree of disturbance, the site lacks integrity. The site area is 673-ft northwest/southeast by 353-ft northeast/southwest.

- P-15-019559/CA-KER-10723 (Temporary designation AVEP-RA-23) - Site P-15-019559 is prehistoric campsite, probably a seasonal camp, of unknown age. It contains a subsurface deposit extending to 70-cmbs. The site area is 95-m north/south by 63-m east/west.

4.2 RECOMMENDATIONS

Prehistoric/Native American sites P-15-013844, -013846, -019553, and -019557 are sparse lithic scatters that lack subsurface archaeological deposits. They lack associative context and thus are not eligible under CRHR Criteria 1 or 2 resulting from association with significant events or person; and they do not contain examples distinctive of type, style or artistry and are not eligible under CRHR Criterion 3. According to the California Office of Historic Preservation (1988), furthermore, sparse lithic scatters are categorically not eligible for listing in the National Register of Historic Places, and are thus not eligible for the California Register of Historical Resources (CRHR) under Criterion 4, research potential. Phase II studies at these sites, furthermore, have resulted in the collection of all artifacts present at each of these cultural resources. This has served to mitigate any adverse impacts or effects that might occur to these sites due to Project development and use. No additional archaeological work is recommended for these four sites.

Prehistoric/Native American sites P-15-019556 and -19559 are both campsites with intact subsurface archaeological deposits. Both sites contain a variety of artifacts and archaeological specimens that provide information about prehistoric lithic technology, subsistence and trade. Both sites are therefore CRHR eligible under Criterion 4, research potential. Development or use of the areas of these sites has the potential to result in adverse impacts to significant historical resources. It is recommended that adverse impacts to these two sites be mitigated by preservation in place, or that Phase III data recovery be conducted at the sites to salvage the information they contain. It is further recommended that the final disposition of the recovered archaeological collections will be determined through mutual agreement between First Solar, the Kern County Planning and Natural Resources Department and participating Native American Tribes.

Historic/Euro-American sites P-15-019548, -019554 and -019555 are small, primarily mid-20th century refuse scatters, resulting from single incident dumps. They lack associative context and thus are not eligible under CRHR Criteria 1 or 2 resulting from association with significant events or person; and they do not contain examples distinctive of type, style or artistry and are not eligible under CRHR Criterion 3. Their lack of context also indicates that they lack research potential under Criterion 4. They are recommended as not CRHR eligible, and development and use of the locations of these sites does not have the potential to result in adverse impacts to significant historical resources. No additional archaeological work is recommended for these three historical sites.

Historic/Euro-American site P-15-019558 is a demolished mid-20th century farm complex. Demolition and removal of the structures that were once present at this site has disturbed the context and integrity of the location. Due to the lack of integrity, this site lacks research potential (Criterion 4). The site is also not associated with an important event (Criterion 1) or significant historical figure (Criterion 2). This site is recommended as not CRHR eligible, and no further archaeological work is recommended for it.

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CONFIDENTIAL APPENDICES REDACTED

Appendix G

Energy Consumption Technical Memorandum

ESA

First Solar.

June 15, 2020

Randall Cates
Kern County Planning and Natural Resources Department
2700 "M" Street, Suite 100
Bakersfield, CA 93301

AVEP Solar Project –Energy Consumption Technical Memorandum

Introduction

This memorandum assesses construction and operational energy demand impacts by the development of the approximately 250 megawatt alternating current (MWac) AVEP Solar Project (referred to hereafter as the "Project") proposed by Rabbitbrush Solar, LLC and Chaparral Solar, LLC (the "Applicants"). The Project will consist of two individual solar facilities totaling approximately 1,406 acres of private land in southeastern Kern County and are referred to hereafter by individual Facility name: "Rabbitbrush Solar" and "Chaparral Solar" (individually a "Facility" or collectively "Facilities"). Each Facility would include an energy storage system (ESS) with the capacity to store up to 1,000 megawatt-hours (MWh) energy, for a combined Project total of approximately 2,000 megawatt-hours (MWh) of energy storage systems.

Facility	**Size (Acres)**	**Generating Capacity**
Chaparral Solar	**774**	125 MW
Rabbitbrush Solar	**632**	125 MW

The Project site is located approximately 5.5 miles west of the unincorporated community of Rosamond in the western portion of the Antelope Valley, in the northwestern portion of the Mojave Desert. Each Facility would interconnect to the California Independent System Operator (CAISO) grid at the existing Southern California Edison (SCE) Whirlwind Substation.

The Project will share the use of existing transmission facilities, substation and other existing infrastructure, where possible.

Standards of Significance for Fuel Consumption

The 2018 CEQA Guidelines Appendix G includes Section VI- *Energy*, which is an analysis of potential impacts of a project related to the consumption of energy resources. The thresholds as written in the Guidelines are:

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

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

While no quantitative thresholds related to energy are included, the Guidelines state the following:

> The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:
>
> 1. decreasing overall per capita energy consumption,
> 2. decreasing reliance on natural gas and oil, and
> 3. increasing reliance on renewable energy resources.

Impact Analysis of Fuel Consumption

Methodology

Energy consumption for both construction and operation of the Project were calculated using methods from the California Emissions Estimator Model version 2016.3.2 (CalEEMod), standard assumptions from CARB's Emissions Factors 2017 (EMFAC2017), as well as figures from the *Air Quality/Greenhouse Gas Assessment* (Michael Baker, 2019) prepared for the Project.

Construction Phase

Construction of the Project is anticipated to take 12 to 24 months. Each Facility will have different completion dates depending upon power procurement contracts. Refer to section 1.4 of the *Air Quality/Greenhouse Gas Assessment* (Michael Baker, 2020) for more information on construction activities.

Energy demand during the construction phase would result from the transportation of materials, construction equipment, and employee vehicle trips. The solar modules and balance of systems would be delivered from outside of the air district, the border of which is around 50 miles from the Project site. This would require 2,100 trips per facility which occur as necessary throughout system installation. Using a typical fuel efficiency of 8.7 miles per gallon (EMFAC2017), delivery of the Project components is expected to require approximately 48,276 gallons of diesel.

Construction equipment includes but is not limited to bore/drill rigs, cement and mortar mixers, cranes, excavators, graders, off-highway trucks, water trucks, rubber-tired dozers, scrapers, tractors, and forklifts. The CalEEMod, 2016.3.2, with inputs on construction averages from previous First Solar projects, was used to arrive at miles travelled for each type of vehicle. Using the EMFAC2017 for each vehicle type's respective fuel consumption and dividing into miles travelled, onsite construction of the Project is expected to consume approximately 16,609 gallons of diesel fuel. All other construction activities of the proposed Project, excluding the delivery of solar modules and other materials, is expected to require a total of approximately 21,476 gallons of diesel fuel. Total gasoline used by construction workers is expected to be approximately 193,559 gallons. The Project will not use natural gas during the construction phase. Fuel efficiency standards for medium- and heavy-duty trucks apply to trucks used during construction of the Project, per CAFE standards.

Minimal electrical usage is anticipated during construction outside of well water pumping. Well water pumping is expected to require a total of 395,909 kWh of power. At maximum, continuous output the pump would consume 664 kWh per day throughout the construction period of 12-24 months on days given it was needed. Power requirements would be met through drop down electrical service provided by Southern California Edison (SCE).

Based on data from the EMFAC2017 Web Database, which indicates the amount of gasoline sold in Kern County in 2018 was 454,000,000 gallons, it is estimated that the Project would represent only 0.043% of all gasoline sold in Kern County in 2018. The diesel consumed during construction of the Project would represent only 0.028% of all 308,000,000 gallons of diesel sold in the county during the same period. In addition, there are no unusual Project characteristics that would cause the use of construction equipment to be less energy efficient compared with other similar construction sites in other parts of the State. Thus, construction-related fuel consumption at the Project would not result in inefficient, wasteful, or unnecessary energy use.

Operational Phase

Energy demand during the operational phase would result from maintenance equipment and employee vehicle trips, the Operations and Maintenance Facility building, and ESS. Operational water for the two Facilities will be supplied from either wells on each individual facility site or trucked in from wells shared by one or both facilities or the nearby Willow Springs Solar Project site.

Data collected from previous projects constructed by First Solar combined with EMFAC 2017 fuel efficiency calculations estimate that water trucks delivering water from the Willow Springs Project to the Project site would require approximately 150 gallons of diesel per year in the case that water is trucked from offsite. Pumping of operational phase water—an estimated 20 acre-feet per year—would expend 13,214 kWh annually.

The ESS systems would be connected to the power grid, but are assumed to be 50% dependent on the renewable energy produced by the individual solar facilities. This energy use assumed for the ESS is 677,376 kWh/year. Refer to section 1.4 of the Air Quality/Greenhouse Gas Assessment (Michael Baker, 2020) for more information energy use related to the ESS.

No electricity will be used during panel cleaning activities. General maintenance trucks would add 320 total miles traveled per year, which would require approximately 14 gallons of gasoline per year. Finally, employee light auto/light truck trips would add another 6,953 miles traveled per year and approximately 302 gallons of gasoline per year. In total, the operation phase of the proposed Project is anticipated to require approximately 150 gallons of diesel and approximately 316 gallons of gasoline on an annual basis. The Project will not use natural gas during the operation phase.

Potential Changes in Electricity Usage

No major changes in electricity usage are anticipated throughout the construction and operation of the proposed Project. The Project would generate 250 MWac of renewable, solar electricity over an approximately 30-year or greater life span and this production is anticipated to remain relatively constant throughout the operation of the proposed Project. Additionally, the electricity required to construct and operate the Project will be negligible compared to the amount of renewable electricity generated by the Project. Activities involved with the decommissioning of the Project would be similar to those involved with construction but would be expected to result in lower fuel demand as technology improves and equipment becomes more fuel efficient.

Compliance with State and Local Renewable Energy Plans

State

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

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

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

In December 2008, CARB released a Scoping Plan outlining the state's strategy to achieve the 2020 GHG emissions limit. In October 2015, Governor Brown signed into law Senate Bill 350, which establishes a new Renewable Portfolio Standard (RPS) for all electricity retailers in the state. Electricity retailers must adopt the new RPS goals of 50% of retail sales from renewables by the end of 2030.

Senate Bill No. 100
Senate Bill No. 100 was approved by the California Governor on September 10, 2018.

(a.) This act shall be known as the 100 Percent Clean Energy Act of 2018.

(b.) The Legislature finds and declares that the Public Utilities Commission (PUC), State Energy Resources Conservation and Development Commission, and State Air Resources Board should plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045.

(c.) It is the intent of the legislature in enacting this act and expand policies established pursuant to the California Renewables Portfolio Standard Program (Article 16 (commencing with Section 399.11) of Chapter 2.3 of Part 1 of Division 1 of the Public Utilities Code), and to codify the policies established pursuant to Section 454.53 of the Public Utilities Code, and that both be incorporated in long-term planning.

Kern County General Plan Chapter 5: Energy Element Solar Energy Development

Goal

Encourage safe and orderly commercial solar development.

Policies

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

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

As a renewable energy project, the Project will help generate electricity to the utility grid to meet the established RPS standard. In addition to the inherent energy savings that would result from the construction of the Project, additional strategies would be implemented where possible to further reduce the Project's energy consumption, specifically during the construction phase. The Project includes measures to reduce energy consumption such as shutting down equipment when not in use for extended periods, limiting the usage of construction equipment to eight cumulative hours per day, usage of electric equipment for construction whenever possible in lieu of diesel or gasoline powered equipment, and encouragement of employees to carpool to retail establishments or to remain on-site during lunch breaks.

Energy Saving Measures Included in Project

The construction of the Project would result in the annual generation of 250 MWac of electricity over a 30-year or greater life span. Because the Project will generate electricity from a renewable source of energy, operation of the Project would displace energy production that would otherwise be generated by non-renewable energy facilities using either natural gas or coal.

Approximately 222,851 MTCO2e of greenhouse gases annually would be displaced by the implementation of the Project. Including displacement emissions, the proposed project would result in a net decrease in GHG emissions of between 222,590 MTCO2e annually (without decommissioning emissions) and 222,228 MTCO2e annually (with decommissioning emissions). Over the 30-year anticipated life of the Project, the total displaced emissions would be approximately 6,666,840 MTCO2e which would assist in the attainment of the State's goal to reduce GHG emissions to 1990 levels by 2020.

Conclusion

The construction phase of the Project would result in the consumption of approximately 86,361 gallons of diesel and 193,559 gallons of gasoline, while the operation phase would result in a yearly consumption of approximately 150 gallons of diesel and 316 gallons of gasoline. Once operational, the Project will generate up to approximately 22,155 GWh of renewable electrical energy over its lifespan. This is equivalent to the carbon footprint of burning 1,772,307,235 gallons of gasoline (EPA, 2019).

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

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First Solar®

APPENDIX

Appendix A:
CalEEMod Calculations and Fuel Consumption Estimates

Table 1: Solar Panel & BOS Delivery Fuel Consumption Estimate

Light Heavy Duty Truck Trips	Miles per trip	Facilities	Miles per Gallon[1]	Total Gallons Diesel
2,100	100	2	8.7	48,276

Table 2: Site Construction and Installation Fuel Consumption Estimate

Vehicle Type	Miles	Miles Per Gallon[1]	Idling Hours	Idling Gal/hr* x Hr	Total Gallons Diesel
Haul Truck	7.5 miles	6.3	2,784 hours	0.8	2,228
Dump Truck	12 miles	8.7	2,784 hours	0.8	2,228
Water Truck	10,776 miles	6.3	6,912 hours	0.8	7,241
On-Road Pickup	3,980 miles	8.7	5,568 hours	0.8	4,912
Total				**Total Gallons:**	16,609

*Gal/hr is assumed to be 0.8 (U.S. DOE, 2015)

Table 3: Offsite Construction Activities Fuel Consumption Estimate

Vehicle Type	Miles	Miles per Gallon[1]	Total Gallons Diesel
Haul Truck	6,000	6.3	952
Water Truck	129,300	6.3	20,524
Total			21,476

Table 4: Worker Vehicle Offsite Fuel Consumption Estimate

Vehicle Type	Miles	Miles per Gallon[1]	Total Gallons Gasoline
Worker Vehicle	4,460,880	23	193,559

[1] Source: EMFAC2017 (2007 Categories). Miles per Gallon calculated by dividing Vehicle Miles Traveled per Day by Gallons per Day.

Table 5: Operational Water Truck Fuel Consumption Estimate

Water Demand (ac-ft)	Gallons per ac-ft	Water Truck Capacity (gal)	Trips Required	Avg. Miles per trip	Miles per Gallon[1]	**Total Gallons Diesel**
20	325851	5000	1,303.404	1	8.7	150

Table 6: Water Pumping Energy Consumption Estimate

Phase	HP	Watts / HP	kW / 1000 Watts	Gallons per Minute	Total Gallons Required	Time (min)	Hr / 60 Min	**Total kWh**
Construction	55.7	746	0.001	342	195,510,600	571,668	9,528	395,909
Operational	55.7	746	0.001	342	6,517,020	19,056	318	13,214

Table 7: Operational Maintenance & Employee Vehicle Fuel Consumption Estimate

Vehicle Type	Miles Travelled	Miles per Gallon[1]	**Gallons Gasoline**
Maintenance Truck	320	23	14
Employee Truck	6,953	23	302
Total			316

Appendix H

Report of Expected Geotechnical Conditions

ESA

July 27, 2018
Revised on April 23, 2019
Addendum 1 Added November 13, 2020

Tumbleweed Solar, LLC, Rabbitbrush Solar LLC and Chaparral Solar, LLC
135 Main Street
San Francisco, CA 94105

Attn: Mr. Eric Thornbrew

Re: Report of Expected Geotechnical Conditions
AVEP Solar Project
Kern County, CA
Terracon Project No. 60185059

Dear Mr. Thornbrew:

We are pleased to present this Report of Expected Geotechnical Conditions for the AVEP Solar Project (Project) referenced above. This report includes:

Section A	Project Information
Section B	Information Sources
Section C	Expected Subsurface Conditions
Section D	Potential Environmental Impacts
Section E	Recommended Pre-Construction Subsurface Exploration

This report utilized a GIS application that has been developed specific for this Project using Terracon's proprietary GIS platform providing our local practitioners with dynamic access to the information compiled for this Project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Joshua R. Morgan, P.E.
Department Manager

Fred Buhamdan, P.E.
Principal

SECTION A
PROJECT INFORMATION

The AVEP Project would involve the construction, operation and eventual decommissioning of three solar photovoltaic power generating facilities proposed by Tumbleweed Solar, LLC, Rabbitbrush Solar, LLC, and Chaparral Solar, LLC (the Applicants). These facilities, known as Tumbleweed Solar Facility, Rabbitbrush Solar Facility, and Chaparral Solar Facility, would collectively be capable of producing up to approximately 375 megawatts (MW) of renewable energy. The Project would be located on approximately 2,117 acres of private land in southeastern Kern County, California.

Major components of each Facility would include photovoltaic modules mounted on fixed-tilt or horizontal tracker systems, an onsite electrical collection system, an Energy Storage System (ESS), one or two microwave or other telecommunications towers, two meteorological stations, meteorological towers (if tracker technology is utilized), private access roads and an on-site and off-site collection system. Each Facility would have a single O&M building of up to approximately 500 square feet, 1,500 square foot graveled area for employee parking, an aboveground water storage tank, permanent water lines, a septic system, and other associated facilities. Permanent chain-link security fencing would be installed around the individual facility site perimeters, substations, ESSs, and other areas requiring controlled access.

The 125 MW Tumbleweed Solar Facility comprises approximately of 721 acres of active agriculture and undeveloped open desert in two non-contiguous portions (eastern and western). The Facility is generally bordered by West Avenue A to the south, 100th Street West to the east, Willow Avenue to the north and 117th Street West to the west. The Tumbleweed Solar Facility would have one microwave or other telecommunications tower and the Tumbleweed Solar ESS will be approximately 5 acres.

The 125 MW Rabbitbrush Solar Facility comprises approximately 632 acres of undeveloped open desert and scattered low density rural land in two non-contiguous portions (eastern and western). The Facility is generally bordered by Rosamond Boulevard to the south, 115th Street West to the east, Avenue of the Stars to the north and 130th Street West to the west. The Rabbitbrush Solar Facility would have one microwave or other telecommunications towers and the Rabbitbrush Solar ESS will be approximately 5 acres.

The 125 MW Chaparral Solar Facility comprises approximately 764 acres of undeveloped open desert. The Facility is generally bordered by Rosamond Boulevard to the south, 100th Street West to the east, Avenue of the Stars to the north and 110th Street West to the west. The Chaparral

Solar Facility would have two microwave or other telecommunications towers and the Chaparral Solar ESS will be approximately 5 acres.

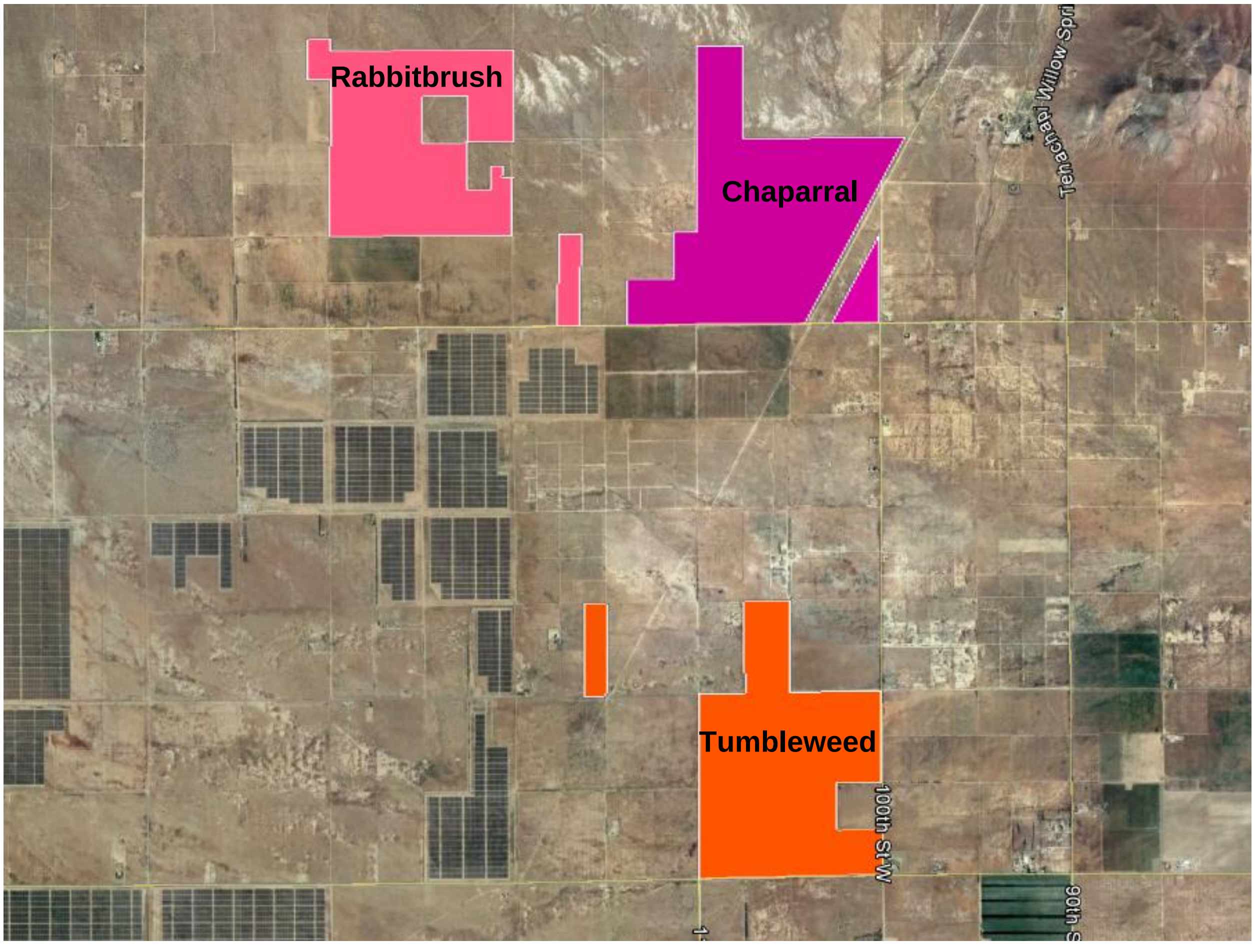
Each Facility would construct an off-site collection system to interconnect into one of the two interconnection options. Interconnection Option 1 to the California Independent System Operator (CAISO) grid at the Southern California Edison (SCE) Whirlwind Substation; or Interconnection Option 2 to the Los Angeles Department of Water and Power (LADWP) Barren Ridge – Rinaldi transmission line via a switchyard being developed by LADWP.

Our understanding of the project was developed based upon information provided by Tumbleweed Solar, LLC, Rabbitbrush Solar LLC and Chaparral Solar, LLC. The purpose of this geotechnical report is to assess the surface and subsurface soil and rock conditions based on publicly available information regarding soils, geologic settings, topography, depth to groundwater and other site specific data in conjunction with a review of Terracon's historic geotechnical data in the area for use by Kern County in analyzing potential impacts of the Project to assist the County in complying with its responsibilities under the California Environmental Quality Act (CEQA). It is not intended as an engineering design-level report for construction.

<table>
<tr><th>Item</th><th colspan="4">Description</th></tr>
<tr><td>Project Description</td><td colspan="4">The total area of the Project is approximately 2,117 acres and will be developed as three photovoltaic (PV) solar power facilities. The Project will also include inverters, transformers, switchgear and buried or overhead power lines to interconnect the three facilities to the regional transmission grid. In addition, one or more on-site substations and operations and maintenance buildings will be included as part of the Project.</td></tr>
<tr><td rowspan="5">Project Location</td><td>Facility</td><td>Approximate Acreage</td><td>Latitude</td><td>Longitude</td></tr>
<tr><td>Chaparral</td><td>764</td><td>34.8708°</td><td>-118.3187°</td></tr>
<tr><td>Rabbitbrush</td><td>632</td><td>34.8742°</td><td>-118.3576°</td></tr>
<tr><td>Tumbleweed</td><td>721</td><td>34.8282°</td><td>-118.3197°</td></tr>
<tr><td colspan="4">Refer to the site map presented as Figure 1 below. This map was generated from a set of kmz files provided by the Applicants.</td></tr>
<tr><td>Planned Construction</td><td colspan="4">We anticipate the grade of the solar array fields will follow the existing site grades.
The PV array fields are anticipated to be comprised of PV modules attached to a fixed tilt or tracker racking system that is supported on driven steel piles. We anticipate there will be array blocks classified as Interior or Exterior, and within these blocks there will be piles classified as Motor or Pier.</td></tr>
<tr><td>Foundation Loads</td><td colspan="4">Axial Compression and Tension loads are anticipated to range from 1,500 lbs. to 4,000 lbs.
Shear (Lateral) loads are anticipated to range from 1,000 lbs. to 3,500 lbs.</td></tr>
</table>

Item	Description
Expected Foundations	PV modules and inverters are expected to be supported on driven W-Section steel piles. Switchgear, transformers and other electronic equipment is expected to be supported on mat foundations. We also anticipate there will be pole mounted equipment inside of the substation, and large drilled shafts for any dead-end transmission line structures within or near the substation(s). Shallow foundations are likely to be used for the support of operations and maintenance buildings.

Figure 1:



SECTION B
INFORMATION SOURCES

Public Data Sources Reviewed

Category	Source
Topographic Overview	USGS National Map web mapping service provided by ESRI
Aerial Imagery Overview	USDA FSA imagery provider, data source NAIP
USGS Geology	USGS Preliminary Integrated Geologic Map Database for the United States
Karst Geology	US Karst Areas web mapping service provided by ESRI
Slope of Terrain	USGS National Elevation Dataset provided by ESRI
Soil and Surficial Materials	NRCS Soil Survey Geographic (SSURGO) Databases for the United States
Depth to Shallow Bedrock	NRCS Soil Survey Geographic (SSURGO) Databases for the United States
Depth to Shallow Water Table	NRCS Soil Survey Geographic (SSURGO) Databases for the United States
Soil Hydrologic Groups	USGS Preliminary Integrated Geologic Map Database for the United States
Flooding Frequency	NRCS Soil Survey Geographic (SSURGO) Databases for the United States

Terracon Historic Records in Project Vicinity

Our review of Terracon's proprietary database of historic soil, groundwater and rock conditions in the vicinity of the Project site indicated six relevant sites with existing geotechnical data within five miles of the Project site. These sites are solar facilities and associated transmission lines. The locations of these projects in addition to the approximate center of the three Facility sites addressed in this report are illustrated in the following aerial image.

Figure 2:

SECTION C
EXPECTED SUBSURFACE CONDITIONS

Site Geology

The Project site is situated within the western portion of the Mojave Desert Geomorphic Province in Southern California. Geologic structures within the Mojave Desert tend to consist of isolated mountain ranges separated by vast expanses of desert plains, with a predominate northwest-southeast faulting trend, with a secondary trend of east-west (parallel to the Transverse Ranges Province). Principal bounding faults include the San Andreas Fault to the southwest and the Garlock Fault to the north.[1, 2] Based on our review of the Geologic Map of California, Los Angeles Sheet 1969, the three Facility sites are situated in Quaternary alluvium of Holocene (recent) age.

Typical Subsurface Profile

Based on publicly available information regarding the existing subsurface conditions in the vicinity of the Project and previous explorations at neighboring sites, the subsurface materials will generally consist of loose to very dense sand with variable amounts of silt and clay. Localized layers of sandy lean clay have been observed within the upper 20 feet.

The sandy soils in the upper 15 feet are expected to have unit weights ranging between 95 and 110 pcf and friction angles between 30 and 32 degrees. Clayey soils expected with the near surface are likely to have low to medium plasticity with low expansion potential.

Groundwater

Based on historical groundwater level data collected from 1948 to 1962 and 2005 to 2008 from two monitoring wells in the vicinity of the Project sites, the depth to groundwater is anticipated to be greater than 100 feet bgs.[3]

[1] Harden, D. R., "*California Geology, Second Edition*," Pearson Prentice Hall, 2004.

[2] Norris, R. M. and Webb, R. W., *"Geology of California, Second Edition,"* John Wiley & Sons, Inc., 1990.

[3] Data collected from Well Nos. 09N14W23A001S & 09N14W21D001S (http://www.water.ca.gov/waterdatalibrary/)

SECTION D
POTENTIAL ENVIRONMENTAL IMPACTS

Fault Rupture Potential and Estimated Ground Motion

The Project site is located in Southern California, which is a seismically active area exposed to relatively strong seismic ground shaking. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. The fault with the most significant effect at the site from a design standpoint, as calculated using the USGS Unified Hazard Tool deaggregations, is the San Andreas Fault.

Characteristics and Estimated Earthquakes for Regional Faults		
Fault Name	**Approximate Distance to Sites (kilometers)**	**Maximum Credible Earthquake (MCE) Magnitude**
San Andreas	20 - 25	7.89
Garlock	17 - 23	7.72

The Willow Springs fault is located just north of the Chaparral and Rabbitbrush sites. Information regarding the absolute age of latest displacement is not available for the Willow Springs fault; however, consensus information indicates that the latest age of activity is pre-Holocene. Therefore, the Willow Springs fault is considered inactive for planning and design purposes.

The site is not mapped within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.[4] Based on the USGS Unified Hazard Tool deaggregations, the mean earthquake magnitude affecting the sites ranges between 7.3 and 7.4. Based on the proximity to active faults, the potential for fault surface rupture within the Project site is considered low.

Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The California Geologic Survey (CGS) has designated certain areas within Southern California as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table. The Project site has not been mapped for liquefaction hazard potential based on the California Geologic Survey (CGS). Based on the historical depth to groundwater, we consider

[4] California Department of Conservation Division of Mines and Geology (CDMG), *"Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region"*, CDMG Compact Disc 2000-003, 2000.

liquefaction hazard potential to be low. Furthermore, seismic hazards associated with liquefaction such as lateral spreading is also considered low.

Slope Stability and Landslide Hazards

The Project site is located within a relatively flat area with no ascending or descending slopes. Geologic hazards associated with slopes, landslides, and rock fall hazards are negligible.

Lateral Spreading

Lateral spreading hazard is a horizontal deformation caused by liquefiable soils beneath slopes, near vertical cuts, or within abrupt topography change. Since the project site is located within a relatively flat area and the liquefaction potential onsite is considered low due to the anticipated depth of groundwater, the lateral spreading hazard potential can also be considered low.

Percolation and Septic Systems

Based on our experience with the subsurface conditions within the vicinity, it is our opinion that the anticipated soil profile and expected percolation rates are considered feasible for the design of septic systems such as leach fields.

SECTION E
RECOMMENDED PRE-CONSTRUCTION SUBSURFACE EXPLORATION

Based upon the expected subsurface conditions presented in this report, we expect that the Project can be constructed and operated in a manner that does not present significant unmitigable impacts arising from geologic or soil conditions. We do recommend that the Applicants perform pre-construction subsurface exploration to confirm the subsurface conditions and utilize the information and recommendations obtained through that exploration to complete the final design of the Project and associated structures in consultation with the County in a manner that meets applicable State and County building, grading and construction codes, ordinances and standards.

Based on the results of pre-construction geotechnical testing, various measures may be employed to minimize site-specific geologic or soil hazards, including, but not limited to, avoiding the location of Project facilities on or immediately adjacent to a fault trace, engineering Project facilities to withstand probable seismically induced ground shaking at the site and plan compliance with Kern County requirements for erosion control, grading and stormwater management.

CONCLUSION

Based on the findings in this Report of Expected Geotechnical Conditions, a completed questionnaire for the Geology and Soils Section has been included in Appendix B.

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

November 13, 2020

Tumbleweed Solar, LLC, Rabbitbrush Solar LLC, and Chaparral Solar LLC
135 Main Street
San Francisco, California 94105

Attn: Ms. Beth Hoffman

Re: Report of Expected Geotechnical Conditions - Addendum 1
AVEP Solar Project
Kern County, California
Terracon Project No. 60185059

Dear Ms. Hoffman:

Terracon previously prepared a Report of Expected Geotechnical Conditions which was revised April 23, 2019. Based on information provided by the client, a new isolated 10-acre parcel has been added to the Chaparral Solar project footprint since the time of that report. The additional parcel is located northwest of the intersection of 110th Street and Holiday Avenue in Kern County, California and will be utilized as an energy storage system with typical power conversion station/inverter containers. Coordinates for the approximate center of the new area are 34.84929°N, 118.32902°W. A revised site location map showing the new project boundaries is provided in the figure below.

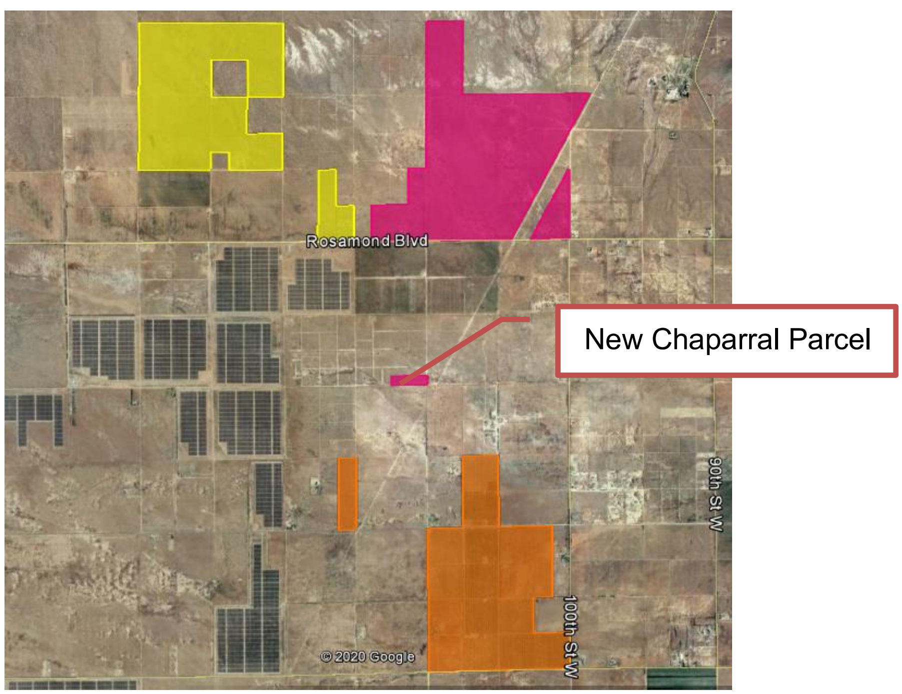


Figure 1: Revised Site Boundaries

Based on our review of the new parcel location, the anticipated subsurface conditions are not anticipated to vary significantly from the conditions of the originally assessed areas. Therefore, the recommendations and considerations provided in our Report of Expected Geotechnical Conditions, are considered suitable for use in evaluating the new parcel site.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this letter, or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.

Joshua R. Morgan, P.E.
Geotechnical Department Manager

Ryan W. Feist, P.E. (CO)
Principal

Appendix I

Paleontological Resources Assessment

ESA

PALEOSERVICES
SAN DIEGO NATURAL HISTORY MUSEUM

Paleontological Resource Assessment

AVEP Solar Project
Kern County, California

Tumbleweed Solar Facility
Rabbitbrush Solar Facility
Chaparral Solar Facility

August 29, 2019
Revised November 10, 2020 (Addendum A)

Prepared for:
ASM Affiliates
20424 West Valley Blvd., Suite A
Tehachapi, California 93561

Prepared by:
Department of PaleoServices
San Diego Natural History Museum
P.O. Box 121390
San Diego, California 92112-1390

Katie M. McComas, Paleontological Report Writer
Shelly L. Donohue, Paleontological Report Writer
Thomas A. Deméré, Ph.D., Principal Paleontologist

theNAT
SAN DIEGO NATURAL HISTORY MUSEUM

Executive Summary

This Paleontological Resource Assessment was prepared for the AVEP Solar Project (the Project) located in the Antelope Valley in unincorporated Kern County, California. The Project would involve the construction, operation and eventual decommissioning of three solar photovoltaic power generating facilities proposed by Tumbleweed Solar, LLC, Rabbitbrush Solar, LLC, and Chaparral Solar, LLC (the Applicants). These facilities, known as Tumbleweed Solar Facility, Rabbitbrush Solar Facility, and Chaparral Solar Facility, would collectively be capable of producing up to approximately 375 megawatts (MW) of renewable solar electricity. The Project would be located on approximately 2,117 acres of private land.

The purpose of this report is to identify and summarize paleontological resources that occur within the Project site, identify Project construction elements that may negatively impact paleontological resources, and provide recommendations and mitigation measures to reduce any potential negative impacts to less than significant levels. The report includes the results of institutional records searches from the Natural History Museum of Los Angeles County (LACM), the San Bernardino County Museum (SBCM), and the San Diego Natural History Museum (SDNHM).

The Project site is located within the Antelope Valley of the western Mojave Desert, and is entirely underlain by alluvial deposits of Holocene to Pleistocene-age that are derived from the regional erosion of the surrounding highlands (e.g., Tehachapi Mountains, San Gabriel Mountains). The specific geologic units underlying the Project site include late Holocene-age alluvial valley and alluvial fan deposits (Qa and Qf) and undivided surficial deposits (Qsu), Holocene to late Pleistocene-age young alluvial valley and young alluvial fan deposits (Qya and Qyf), and middle to early Pleistocene-age old alluvial fan deposits (Qof). Alluvial deposition in the Antelope Valley has been ongoing since at least the early Pleistocene, therefore it is believed that Holocene-age alluvial deposits (i.e., Qa, Qf, Qsu, Qya, Qyf) transition downsection (i.e., at depth) into older alluvial deposits of Pleistocene-age. Based on the results of paleontological mitigation programs for adjacent projects (e.g., Solar Star Project), it is believed that the gradational contact between Holocene and Pleistocene-age deposits may occur as shallow as 15 feet below the ground surface.

The institutional records searches indicate that there are no known fossil collection localities from Holocene to Pleistocene-age alluvial deposits within a 1-mile radius of the Project site. However, both the LACM and SBCM document several localities discovered in alluvial and lacustrine deposits of the western Mojave Desert, with additional fossil localities documented in the paleontological literature. These localities yielded fossil remains of large-bodied mammals (e.g., mammoth, horse, antilocaprid antelope, camel, bison, dog), as well as small mammals (e.g., rodents, bats, shrews, rabbits) and other terrestrial vertebrates (e.g., snakes, lizards, tortoises, birds).

Following the paleontological potential criteria developed by the Society of Vertebrate Paleontology (SVP, 2010), the late Holocene and Holocene to late Pleistocene-age alluvial deposits (i.e., Qa, Qf, Qsu, Qya, Qyf) within the Project site are assigned a low paleontological potential at depths of less than 15 feet below grade (where they are assumed to be Holocene in age), and an undetermined paleontological potential at depths greater than 15 feet below grade (where the strata may represent alluvial deposits of Pleistocene-age). Middle to early Pleistocene-age old alluvial fan deposits (Qof) are assigned an undetermined paleontological potential at all depths. Geologic units with undetermined paleontological potential are considered to be potentially fossiliferous until proved otherwise; therefore, following a conservative approach, Project-related earthwork that would disturb deposits with an undetermined potential are assumed in this report to potentially result in impacts to paleontological resources, unless mitigated.

Potential impacts to paleontological resources can be reduced through implementation of recommended mitigation measures PAL-1 (development and implementation of a Paleontological Resources Monitoring and Mitigation Plan), and PAL-2 (procedures to be implemented in the event of an inadvertent discovery). These measures reduce impacts through construction monitoring, and the salvage and conservation of an unearthed fossils. As outlined in PAL-1, paleontological monitoring is recommended specifically for all earthwork in areas of undetermined paleontological potential (the northern and northeastern portions of the Chaparral Solar Facility and in the northeastern and central portions of the Rabbitbrush Solar Facility), and only earthwork that occurs at a depth of 15 feet or deeper below the ground surface in areas of low paleontological potential. Post-driving and small-diameter augering (less than 18 inch diameter auger) do not require monitoring. The monitoring strategy should involve ongoing evaluation of the paleontological potential of impacted alluvial deposits over the course of the monitoring program, with the goal of refining the paleontological potential ranking of these deposits (e.g., to low potential or high potential). If during paleontological monitoring no fossils are observed and/or no evidence for the preservation of fossils (e.g., paleosol horizons, rootlets, carbonate nodules, or other indicators of the potential presence of organic material) is recorded, the paleontological potential may be locally downgraded to low potential, and monitoring may subsequently be reduced or eliminated at the discretion of the Project Paleontologist. However, if fossils, or strong evidence suggesting the possible preservation of fossils, are documented, monitoring shall continue at the discretion of the Project Paleontologist.

Contents

1.0 Introduction

1.1 Project Description

This technical report provides an assessment of paleontological resources at the AVEP Solar Project (the Project). The Project would involve the construction, operation and eventual decommissioning of three solar photovoltaic power generating facilities proposed by Tumbleweed Solar, LLC, Rabbitbrush Solar, LLC, and Chaparral Solar, LLC (the Applicants). These facilities, known as Tumbleweed Solar Facility, Rabbitbrush Solar Facility, and Chaparral Solar Facility, would collectively be capable of producing up to approximately 375 megawatts (MW) of renewable. The Project would be located on approximately 2,117 acres of private land in southeastern Kern County, California.

Major components of each Facility would include photovoltaic modules mounted on fixed-tilt or horizontal tracker systems, an onsite electrical collection system, an Energy Storage System (ESS), one or two microwave or other telecommunications towers, two meteorological stations, meteorological towers (if tracker technology is utilized), private access roads and an on-site and off-site collection system. Each facility would have a single O&M building of up to approximately 500 square feet, 1,500 square foot graveled area for employee parking, an aboveground water storage tank, permanent water lines, a septic system, and other associated facilities. Permanent chain-link security fencing would be installed around the individual facility site perimeters, substations, ESSs, and other areas requiring controlled access.

Project construction activities will include site preparation and clearing/grading, collection system installation, foundations, PV system installation, testing, and site cleanup/restoration work. Within the solar field areas, a combination of mowing, "disk-and-roll" techniques and, where necessary, conventional grading may be used to prepare the site for array installation. In areas where mowing will not yield a satisfactory work surface, disk-and-roll techniques may be utilized. Disk-and-roll site preparation uses tractors pulling disking equipment to till under vegetation. Grading will be minimized to the extent practical. Conventional grading techniques may be used for access roads, parking areas, substations, energy storage systems, building or equipment foundations, detention and retention ponds, and laydown areas.

The construction of the solar field will proceed in array blocks and will include the following:

- Installation of steel posts and mounting system;
- Installation of PV modules;
- Installation of concrete pads or precast vaults for PCS, PVCS, or other electrical equipment;
- Installation of overhead, aboveground, or underground collection system cable and associated equipment on concrete pads, vaults, posts or poles; and
- Concrete foundations for substation equipment, ESS, and O&M buildings. Final concrete specifications will be determined during detailed design engineering in accordance with applicable building codes. These concrete foundations may be precast or cast in place.

Within the solar fields, site preparation related ground disturbance is expected to be less than 24 inches, with maximum depth of grading to be approximately 5 feet. For all structural foundations, posts will be driven into the ground, requiring no excavation. Posts supporting the PV arrays will be embedded 5 to 8 feet below grade, while the foundation posts for all other project structures may be embedded 10 to 12 feet. Rotary drilling for the foundations of the generation-tie line poles is anticipated to be 6.5 feet in diameter and at a depth of 30 feet. Underground cables will be used in some limited areas, which will require excavation of trenches up to three feet deep.

The 125 MW Tumbleweed Solar Facility comprises approximately 721 acres of active agriculture and undeveloped open desert in two non-contiguous portions (eastern and western). The Facility is generally bordered by West Avenue A to the south, 100th Street West to the east, Willow Avenue to the north and 117th Street West to the west. The Tumbleweed Solar Facility would have one microwave or other telecommunications tower and the Tumbleweed Solar ESS will be approximately 5 acres.

The 125 MW Rabbitbrush Solar Facility comprises approximately 632 acres of undeveloped open desert and scattered low density rural land in two non-contiguous portions (eastern and western). The Facility is generally bordered by Rosamond Boulevard to the south, 115th Street West to the east, Avenue of the Stars to the north and 130th Street West to the west. The Rabbitbrush Solar Facility would have one microwave or other telecommunications towers and the Rabbitbrush Solar ESS will be approximately 5 acres.

The 125 MW Chaparral Solar Facility comprises approximately 764 acres of undeveloped open desert. The Facility is generally bordered by Rosamond Boulevard to the south, 100th Street West to the east, Avenue of the Stars to the north and 110th Street West to the west. The Chaparral Solar Facility would have two microwave or other telecommunications towers and the Chaparral Solar ESS will be approximately 5 acres.

Each Facility would construct an off-site collection system to interconnect into one of the two interconnection options. Interconnection Option 1 to the California Independent System Operator (CAISO) grid at the Southern California Edison (SCE) Whirlwind Substation; or Interconnection Option 2 to the Los Angeles Department of Water and Power (LADWP) Barren Ridge – Rinaldi transmission line via a switchyard being developed by LADWP.

For Interconnection Option 1, the Project would require modifications to the previously approved Rosamond and Willow Springs Solar Projects substations and SCE improvements made at the existing SCE Whirlwind substation.

For Interconnection Option 2, the Project would require the construction of one new substation on the Chaparral Solar Facility and on the Tumbleweed Solar Facility, where the electrical output would be transformed to a voltage of 230 kilovolts (kV), a 500 to 2,500 foot 230-kV gen-tie line to interconnect with LADWP and LADWP improvements made at the LADWP switchyard.

Figure 1a – Project Map SCE Interconnection Option 1, Figure 1b – Project Map LADWP Interconnection Option 2 (Scenario 2A), and Figure 1c – Project Map LADWP Interconnection Option 2 (Scenario 2B) show the location for the proposed Project and the interconnection options.

1.2 Scope of Work

The Project occurs in an area underlain by native sedimentary rocks. For this reason, a paleontological resource assessment was conducted to determine whether construction of the Project has the potential to negatively impact paleontological resources. This assessment report is intended to summarize existing paleontological resource data within the Project site, discuss the significance of these resources, examine Project related potential impacts to paleontological resources, and suggest mitigation measures to reduce potential impacts to paleontological resources to less than significant levels. The assessment includes the results of institutional records searches of the paleontological collections at the Natural History Museum of Los Angeles County (LACM), San Bernardino County Museum (SBCM), and

San Diego Natural History Museum (SDNHM). This report was written by Katie M. McComas, Shelly L. Donohue, and Thomas A. Deméré of the Department of PaleoServices, SDNHM.

1.3 Definition of Paleontological Resources

As defined here, paleontological resources (i.e., fossils) are the buried remains and/or traces of prehistoric organisms (i.e., animals, plants, and microbes). Body fossils such as bones, teeth, shells, leaves, and wood, as well as trace fossils such as tracks, trails, burrows, and footprints, are found in the geologic units/formations within which they were originally buried. The primary factor determining whether an object is a fossil or not is not how the organic remain or trace is preserved (e.g., "petrified"), but rather the age of the organic remain or trace. Although typically it is assumed that fossils must be older than ~10,000 years (i.e., the generally accepted end of the last glacial period of the Pleistocene Epoch), organic remains older than recorded human history and/or older than middle Holocene (about 5,000 radiocarbon years) can also be considered to represent fossils (Society of Vertebrate Paleontology [SVP], 2010).

Fossils are considered important scientific and educational resources because they serve as direct and indirect evidence of prehistoric life and are used to understand the history of life on Earth, the nature of past environments and climates, the membership and structure of ancient ecosystems, and the pattern and process of organic evolution and extinction. In addition, fossils are considered to be non-renewable resources because typically the organisms they represent no longer exist. Thus, once destroyed, a particular fossil can never be replaced. Finally, paleontological resources can be thought of as including not only the actual fossil remains and traces, but also the fossil collecting localities and the geologic units containing those localities.

1.3.1 Definition of Significant Paleontological Resources

The Society of Vertebrate Paleontology (SVP) defines significant paleontological resources as consisting of "fossils and fossiliferous deposits … consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information" (SVP, 2010).

1.4 Regulatory Framework

Paleontological resources are considered scientifically and educationally significant nonrenewable resources; they are protected under a variety of laws, regulations, and ordinances. The Project site is located within Kern County, California. As such, state and local regulations are applicable to the Project.

1.4.1 State: California Environmental Quality Act

The California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) addresses paleontological resources in the context of an environmental review for a discretionary state or local agency action. Guidelines for the Implementation of CEQA are included in the California Code of Regulations (CCR), sections 15000 *et seq*. Within the CCR, paleontological resources are specifically addressed in the Environmental Checklist (CCR Section 15023, Appendix G): "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature."

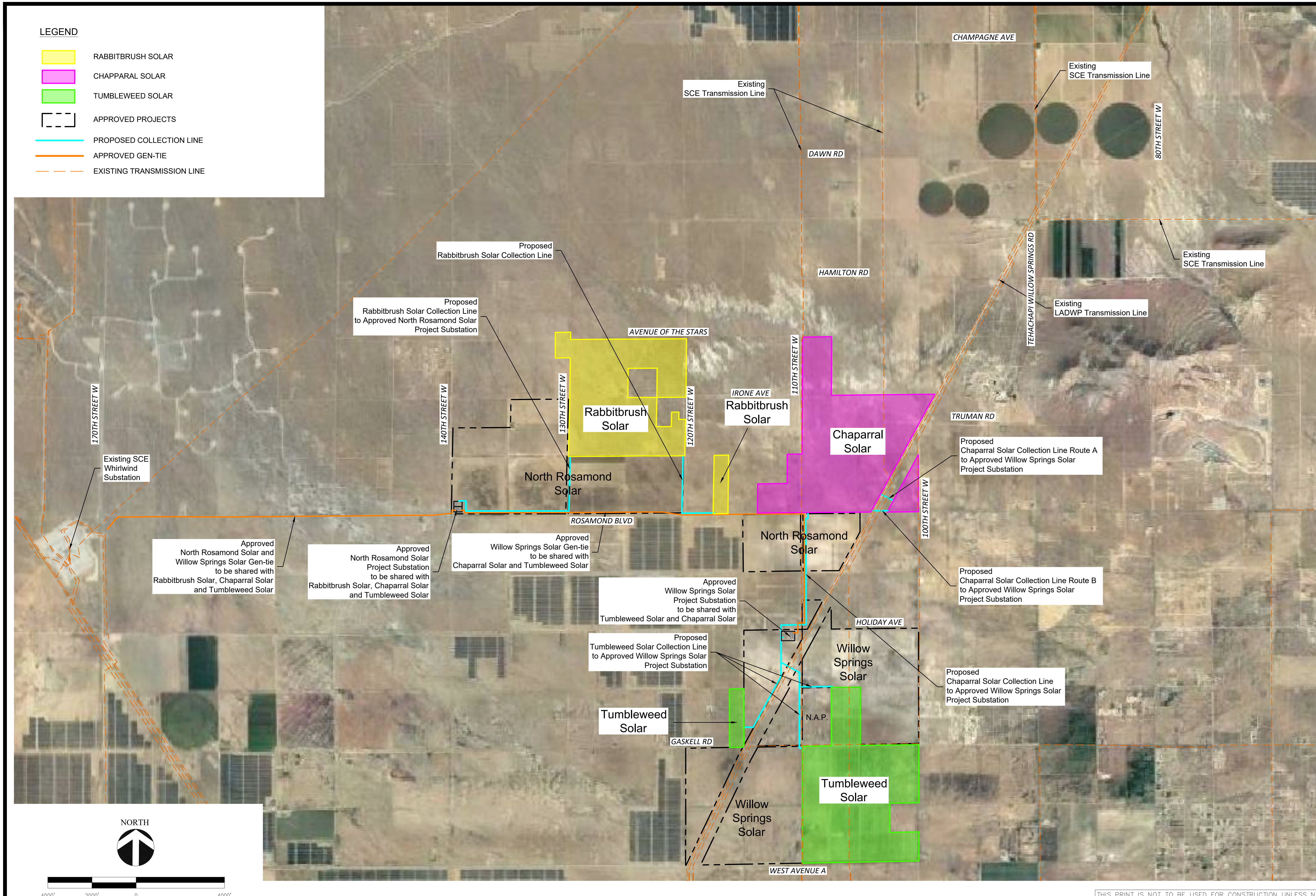
CEQA does not provide a definition for a "unique paleontological resource" in the Environmental Checklist (CCR Section 15023, Appendix G), nor does it include specific guidelines for the mitigation of paleontological resources under Section 15126.4, Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects. Therefore, most CEQA lead agencies follow the definitions and guidelines provided by SVP (2010), which are in line with industry standards (e.g., Murphey et al., 2014;

and see Section 1.3.1). The SVP (2010) additionally provides criteria for determining the significance of paleontological resources (see sections 1.3.1 and 2.2), and for appropriate measures to minimize impacts to paleontological resources. As advised by SVP (2010), impacts to paleontological resources can be minimized to a level below the threshold of significance through 1.) the permanent preservation of a fossil locality and its contained fossil resources); or 2.) the implementation of a paleontological mitigation program that would reduce any adverse impacts to a level below the threshold of significance through the salvage and permanent storage of any salvaged fossils in an established scientific institution.

1.4.2 Local: Kern County

The 2009 Kern County General Plan, Land Use, Conservation, Open Space Element (Section 1.10.3 Archeological, Paleontological, Cultural, and Historical Preservation) includes the following Policy and Implementation Measure relevant to paleontological resources:

- Implementation Measure M: In areas of known paleontological resources, the County should address the preservation of these resources, where feasible.



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AVEP SOLAR PROJECT

KERN COUNTY CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:

PROJ. DEVT. ENGR: J. SHIRE

PROJ. MGR:

SCALE: 1"=4000' @ 11"x17" SHEET

SHEET TITLE

Figure 1a -
Project Map
SCE Interconnection
Option 1

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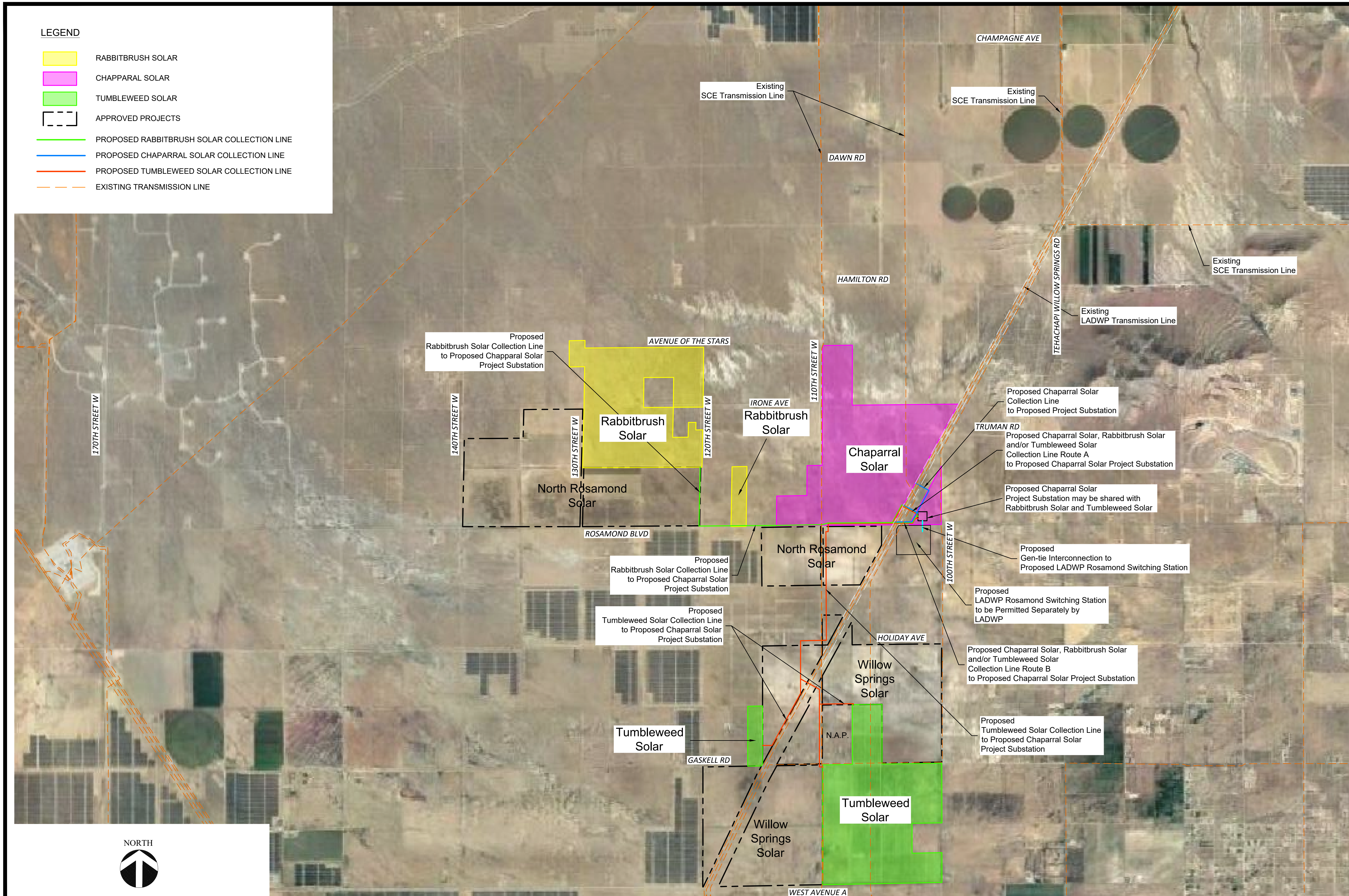
SHEET 1 OF 1



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AVEP SOLAR PROJECT

KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

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PROJ. DEVT. ENGR: J. SHIRE
PROJ. MGR:
SCALE: 1"=4000' @ 11"x17" SHEET
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SHEET TITLE

Figure 1b -
Project Map
LADWP Interconnection
Option 2A

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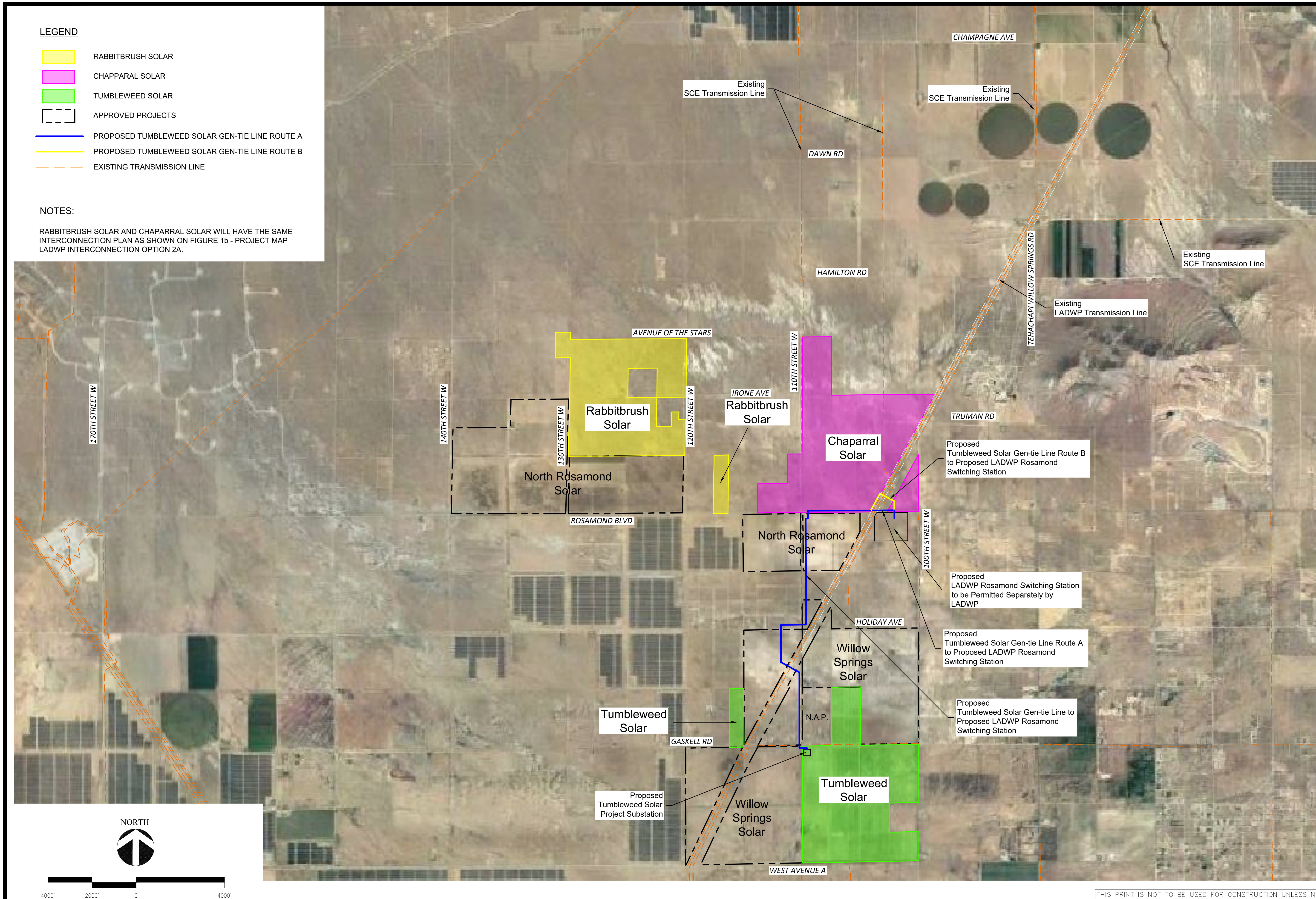
SHEET 1 OF 1



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AVEP SOLAR PROJECT

KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

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PROJ. MGR:
SCALE: 1"=4000' @ 11"x17" SHEET
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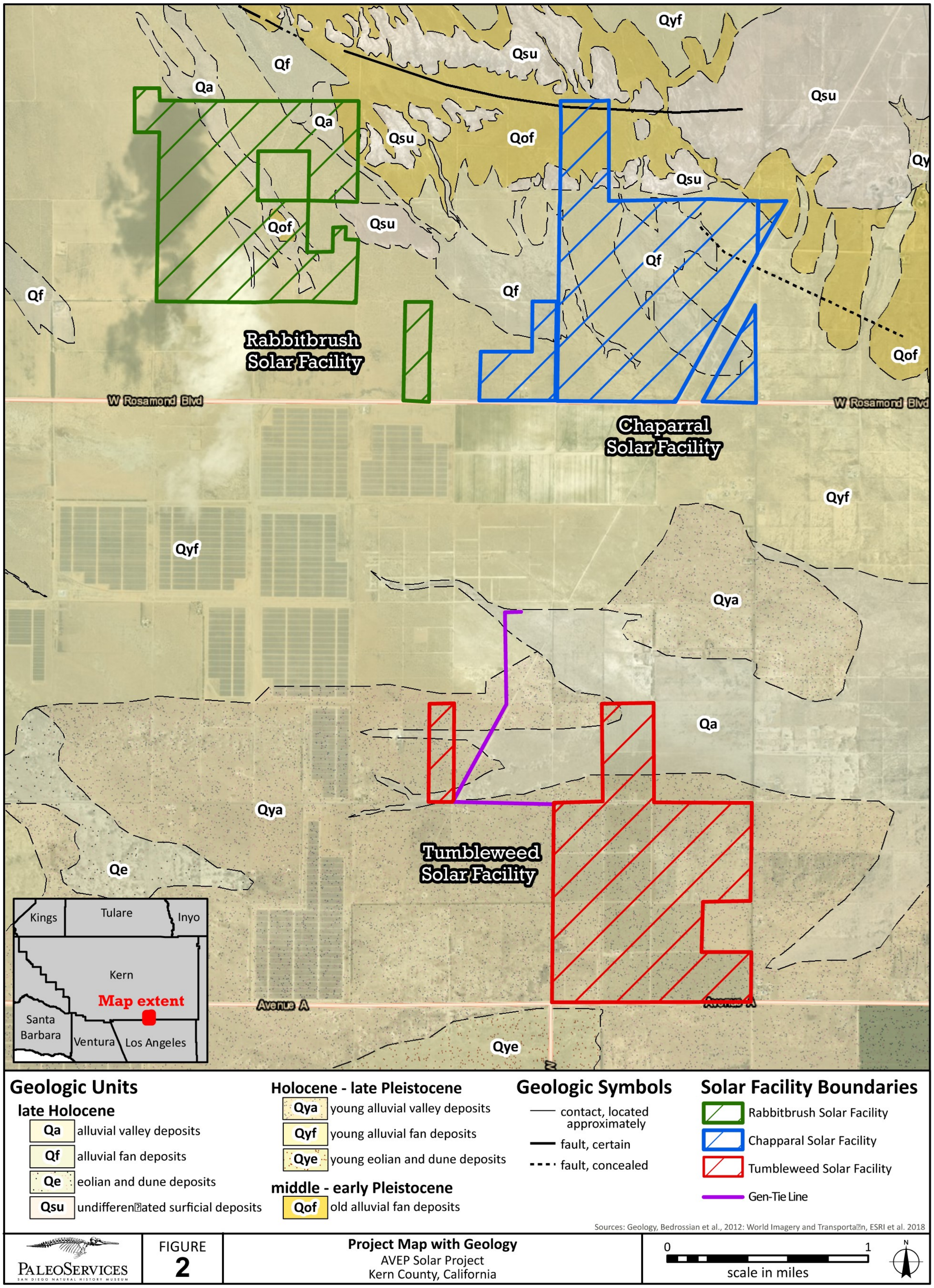
SHEET TITLE

Figure 1c - Project Map LADWP Interconnection Option 2B

SHEET 1 OF 1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Rabbitbrush Solar Facility
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Qe
Tumbleweed Solar Facility
Kings
Tulare
Inyo
Kern
Map extent
Santa Barbara
Ventura
Los Angeles
Avenue A
Avenue A
Qye
Geologic Units
late Holocene
Qa alluvial valley deposits
Qf alluvial fan deposits
Qe eolian and dune deposits
Qsu undifferen?ated surficial deposits
Holocene - late Pleistocene
Qya young alluvial valley deposits
Qyf young alluvial fan deposits
Qye young eolian and dune deposits
middle - early Pleistocene
Qof old alluvial fan deposits
Geologic Symbols
contact, located approximately
fault, certain
fault, concealed
Solar Facility Boundaries
Rabbitbrush Solar Facility
Chapparal Solar Facility
Tumbleweed Solar Facility
Gen-Tie Line
Sources: Geology, Bedrossian et al., 2012: World Imagery and Transporta?n, ESRI et al. 2018
PALEOSERVICES
FIGURE 2
Project Map with Geology
AVEP Solar Project
Kern County, California
0
1
scale in miles
N

2.0 Methods

2.1 Paleontological Records Searches and Literature Review

Paleontological records searches were requested from the SDNHM and SBCM in October 2017 in order to identify known fossil collection localities within an approximately 1-mile radius of the Project site (Appendix 1). A paleontological records search of the collections at the LACM was previously conducted in 2010 as part of the paleontological resource assessment for the Solar Star Project, located immediately west and southwest of the Project site (Appendix 1). This record search summarized paleontological resources from the Antelope Valley as a whole, and thus is deemed appropriate for identifying known fossil collection localities in the vicinity of the Project site.

In addition, a literature review was conducted to gain a greater understanding of the geologic history of the area surrounding the Project site, as well as to determine the types of fossils that specific geologic units underlying the Project site have produced. The review included examination of relevant published geologic maps and reports, peer-reviewed papers, and other relevant literature (e.g., field trip guidebooks, unpublished theses and dissertations, archived paleontological mitigation reports). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic units within which they are entombed. Knowing the geologic history of a particular area and the fossil productivity of geologic units that occur in that area, it is possible to predict where fossils may or may not be encountered. Understanding the fossil content of a geologic unit everywhere it occurs is important for outlining the types of fossils that may occur within the unit, and confidently assigning a paleontological potential rating.

2.2 Paleontological Resource Assessment Criteria

The Society of Vertebrate Paleontology (SVP, 2010) has developed mitigation guidelines for paleontological resources that conform with industry standards and were developed with input from a variety of federal and state land management agencies (Murphey et al., 2014). As described in Section 1.4.1, use of the SVP (2010) guidelines is common practice by CEQA lead agencies.

The SVP (2010) guidelines recognize that significant paleontological resources are considered to include not only actual fossil remains and traces, but also the fossil collecting localities and the geologic units containing those fossils and localities, and thus evaluate paleontological potential (or paleontological sensitivity) of individual geologic units within a project area. Paleontological potential is determined based on the existence of known fossil localities within a given geologic unit, and/or the potential for future fossil discoveries, given the age and depositional environment of a particular geologic unit. The SVP guidelines include four classes of paleontological potential: High Potential, Low Potential, No Potential, or Undetermined Potential (SVP, 2010). A summary of the criteria for each paleontological potential ranking is outlined below.

2.2.1 High Potential

Geologic units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Geologic units classified as having high potential include, but are not limited to, some volcaniclastic formations (e. g., ashes or tephras), some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., deposits aged middle Holocene and older consisting of fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential includes both the potential for yielding abundant or significant vertebrate fossils or for yielding significant invertebrate, plant, or trace fossils, as well as the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Geologic units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and geologic units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

2.2.2 Undetermined Potential

The definition for undetermined potential provided by SVP (2010) has been expanded for the purposes of this report in order to add more information related specifically to the management of paleontological resources in the context of mitigation paleontology. Geologic units are assigned an undetermined potential if there is little information available concerning their paleontological content, geologic age, and depositional environment. Further field study of the specific formation is necessary to determine if these geologic units have high or low potential to contain significant paleontological resources. For planning purposes, this class of resource potential represents a conservative assessment that assumes an undetermined geologic unit is fossiliferous until proven otherwise.

In the context of mitigation paleontology, gaining additional information about a geologic unit assigned an undetermined potential in order to refine the resource potential ranking (e.g., to high potential or low potential) can be accomplished in several ways depending on the nature of the geologic unit and whether it is exposed at the surface. Field surveys (e.g., a pre-construction survey as part of a paleontological resource assessment) can be conducted when a geologic unit is well exposed at the ground surface, allowing paleontologists to physically search for fossils while also studying the stratigraphy of the unit. In cases where the geologic unit is not exposed at the surface (e.g., is covered by disturbed areas such as concrete or agricultural topsoil, or occurs in the subsurface underlying another geologic unit), strategically located excavations into subsurface stratigraphy may be conducted to gain additional information (e.g., geotechnical investigation boreholes or trenches). Paleontological monitoring of excavations into a geologic unit with an undetermined potential as part of a paleontological monitoring program may also allow for refinement of the resource potential ranking of the unit over the course of the monitoring program. In this case, the results of the monitoring program are used to routinely reevaluate the resource potential ranking of the geologic unit.

2.2.3 Low Potential

Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some geologic units have low potential for yielding significant fossils. Such geologic units will be poorly represented by fossil specimens in institutional collections, or, based on general scientific consensus, only preserve fossils in rare circumstances where the presence of fossils is an exception not the rule, e. g. basalt flows or Recent colluvium. Geologic units with low potential typically will not require impact mitigation measures to protect fossils.

2.2.4 No Potential

Geologic units with no potential are either entirely igneous in origin and therefore do not contain fossil remains, or are moderately to highly metamorphosed and thus any contained fossil remains have been destroyed. Artificial fill materials also have no potential, because the stratigraphic and geologic context of any contained organic remains (i.e., fossils) has been lost. For projects encountering only these types of geologic units, paleontological resources can generally be eliminated as a concern, and no further action taken.

2.3 Paleontological Impact Analysis

Direct impacts to paleontological resources occur when earthwork operations cut into the geologic units within which fossils are buried and physically destroy the fossil remains. As such, only those excavations that will disturb potentially fossiliferous geologic units have the potential to significantly impact paleontological resources. As described above, potentially fossiliferous geologic units are those rated with a high potential. Taking a conservative approach, geologic units with an undetermined potential are also considered to be potentially fossiliferous, until proven otherwise. Although impact avoidance is possible through relocation of a proposed action, paleontological monitoring during construction is typically recommended to reduce any negative impacts to paleontological resources to less than significant levels.

The purpose of the impact analysis is to determine which (if any) of the proposed Project-related earthwork activities may disturb potentially fossiliferous sedimentary rocks, and where and at what depths these potential impacts will occur. The paleontological impact analysis involved analysis of available Project documents and comparison with geological and paleontological data gathered during the records search and literature review.

3.0 Existing Conditions: Geologic Setting

The Project site is located in southeastern Kern County, California, about 50 miles southeast of the City of Bakersfield and about 10 miles west of the unincorporated community of Rosamond, in the western portion of the Antelope Valley. The Antelope Valley forms the western corner of the Mojave Desert and is bounded by the Tehachapi Mountains to the northwest, and the San Gabriel Mountains to the southwest. These two mountain ranges were formed by the development of two major strike slip faults, the northwest trending right-lateral San Andreas Fault (adjacent to the San Gabriel Mountains) and the southwest trending left-lateral Garlock Fault (adjacent to the Tehachapi Mountains). These two faults intersect to the northwest of the Project site near Frazier Park, California. Structural compression in this tectonically complex region (known as the “structural knot of California”) is responsible for the formation and continued uplift of the adjacent mountain ranges (e.g., Dibblee, 1961; 1967; Norris and Webb, 1990).

The Project site is generally underlain by Holocene- and Pleistocene-age alluvial deposits derived from regional erosion of the surrounding highlands (Figure 2). Extensive alluvial fan complexes originating from the mouths of numerous deeply incised canyons on the southeastern flanks of the Tehachapi Mountains and northeastern flanks of the San Gabriel Mountains extend out into Antelope Valley. These alluvial fan complexes have been depositing sediment since at least the early Pleistocene, with younger, Holocene-age alluvial fan complexes building on top of older, Pleistocene-age complexes (Dibblee, 1963). Alluvial fan complexes generally consist of coarser-grained fan deposits, originating as overland sheetwash flows from the flanks of the uplands, and finer-grained alluvial valley deposits originating in alluvial channels on the distal fringes of the fans (e.g., Bedrossian et al., 2012; Dibblee, 1963; Lancaster and Holland, 2012).

4.0 Results

4.1 Results of the Records Search and Literature Review

4.1.1 Project Geology

As mapped by Bedrossian et al. (2012) and Lancaster and Holland (2012), the Rabbitbrush and Chaparral solar facility sites are specifically underlain by alluvial fan deposits (Qf), and undifferentiated surficial deposits (Qsu) of late Holocene-age, alluvial fan deposits (Qyf) of Holocene to late Pleistocene-age, and old alluvial fan deposits (Qof) of middle to early Pleistocene-age, with the Rabbitbrush facility additionally being underlain by late Holocene-age alluvial valley deposits (Qa) (Figure 2, Table 2). The Tumbleweed Solar Facility site is underlain by Qa and young alluvial valley deposits (Qya) of late Holocene and Holocene to late Pleistocene-age, respectively (Figure 2, Table 2). Dibblee (1963) maps the entirety of the Project site as undifferentiated Quaternary alluvium. As described above, these alluvial deposits are generally derived from erosion of the surrounding highlands (e.g., Tehachapi Mountains, San Gabriel Mountains). Presumably, the Holocene-age deposits transition downsection (i.e., at depth) into older, Pleistocene-age deposits (Dibblee, 1963).

Results of the paleontological mitigation program for the Solar Star Project, located immediately west of the Tumbleweed Solar Facility and south of the Rabbitbrush Solar Facility, can offer insight into the subsurface geology within the Project site. The Solar Star Project site is underlain by Qya and Qyf deposits. Both units were observed to be lithologically similar, and consist of dark to moderate yellow brown, micaceous, massive, poorly sorted, unconsolidated silts and sands with varying concentrations of pebbles and cobbles. The sediments consisted of subangular to subrounded weathered granitic and metamorphic detritus derived from the surrounding highlands, with many of the pebbles consisting of large, weathered mineral clasts of quartz and plagioclase. The majority of the observed alluvial deposits were massive and poorly sorted in nature, but occasional horizons of moderately sorted to well sorted sands were observed, as well as horizons with crude bedding (PaleoServices, 2014).

Results of the mitigation program for the Solar Star Project are particularly important for determining the thickness of the Holocene deposits that overlie Pleistocene deposits across the proposed Project site. For the Solar Star Project, paleontological monitoring was recommended for all excavations that extended greater than 5 feet below existing grade. This recommendation was made primarily due to the lack of knowledge concerning the depth of the transition from Holocene-age to Pleistocene-age alluvial deposits in Antelope Valley (PaleoServices, 2014). However, during paleontological monitoring at the Solar Star Project site, potentially Pleistocene-age deposits were observed to occur more than 15 feet below the ground surface (Figure 3). Differentiating between Holocene and Pleistocene-age deposits was difficult because deposition was mostly continuous throughout the Pleistocene and Holocene, and the contact is gradational. However, deposits tentatively identified as Pleistocene in age differed from Holocene-age deposits in their heavily oxidized nature, appearing as rusty, reddish brown in color, and were more heavily consolidated. In addition, certain horizons in the Pleistocene-age deposits were caliche-rich with abundant root impressions, suggesting they represented paleosols (fossil soils) (Figure 3). Test samples of the paleosol horizons encountered by large-diameter augering at the Solar Star Project were wet-screened, but did not produce any microvertebrate fossils.

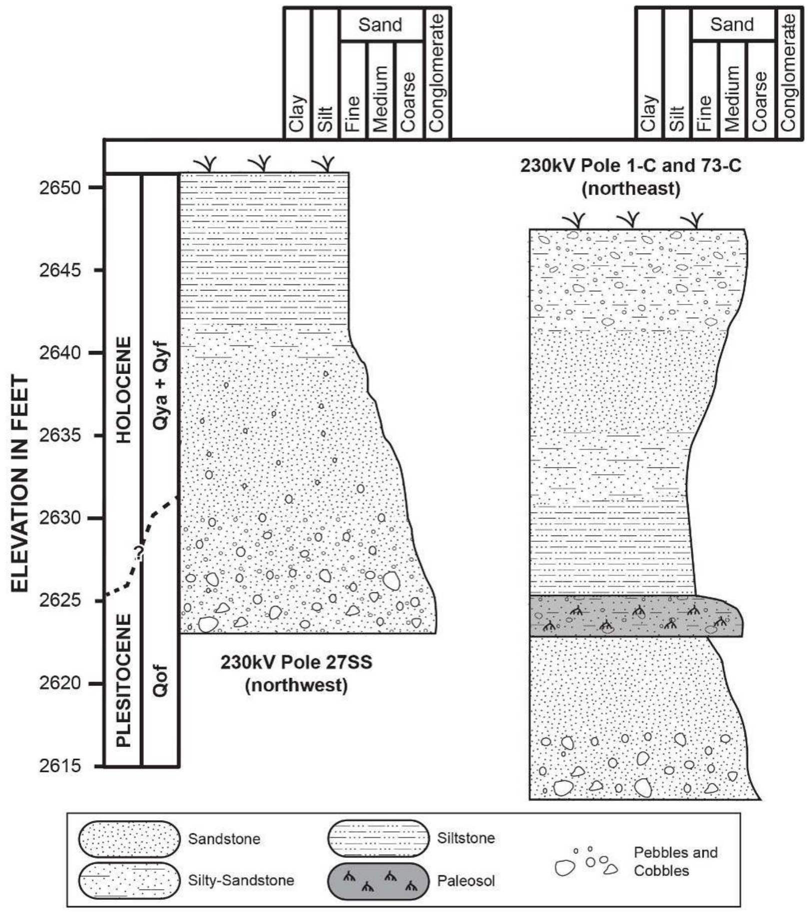


Figure 3. Observed stratigraphy at the Kern County portion of the Solar Star Project site, located immediately west of the Tumbleweed Solar Facility and south of the Rabbitbrush Solar Facility (PaleoServices, 2014).

4.1.2 Project Paleontology

Records searches of the paleontological collections at the SDNHM, SBCM, and LACM indicate that there are no known fossil collection localities within a 1-mile radius of the Project site (Appendix 1). However, fossil localities are known from Pleistocene-age alluvial and lacustrine deposits elsewhere in the Antelope Valley and the greater western Mojave Desert. The SDNHM does not have any fossil localities in this region (unpublished SDNHM paleontological collections data), nor did they discover fossils during paleontological mitigation of the adjacent Solar Star project (PaleoServices, 2014). However, the SBCM and LACM both report several localities discovered in Quaternary alluvial and lacustrine deposits of the western Mojave Desert (LACM, 2010; SBCM, 2017), and additional fossil localities are documented in the paleontological literature. Within alluvial deposits in desert settings, some paleosol horizons have been found to yield fossilized remains (e.g., Stewart et al., 2012; Stewart and Hakel, 2016). Indeed, wind deflation of fossil-bearing paleosols has resulted in the discovery of fossils from desert pavements near Hinkley and the Palo Verde Mesa (e.g., Stewart et al., 2012; Stewart and Hakel, 2016). Localities discovered in Quaternary alluvial and lacustrine deposits yielded fossil remains of large-bodied mammals (e.g., mammoth, horse, antilocaprid antelope, camel, bison, dog), small mammals (e.g., rodents, bats, shrews, rabbits), and other terrestrial vertebrates (e.g., snakes, lizards, tortoises, birds) (e.g., Whistler, 1990; Whistler et al., 1991; Jefferson 1991a; 1991b; Woodburne, 1991; LACM, 2010; Stewart et al., 2012; Stewart and Hakel, 2016; SBCM, 2017).

Some of the most significant Pleistocene-age fossil assemblages from the greater Antelope Valley have been discovered in ancient lake deposits. While there are no lake deposits mapped at the surface within the Project site, it is possible that lake deposits may be present at depth. The most notable ancient lake in the proximity of the Project site is Pleistocene Lake Thompson, a once extensive pluvial lake that periodically occupied portions of the Antelope Valley from at least 36,000 years ago to 12,600 years ago, and is today represented by the Rogers, Rosamond, and Buckhorn dry lakes (Orme, 2008). At its greatest extent, Lake Thompson spanned over 350 square miles, with its high stand shoreline occurring approximately 6 – 8 miles east of the Project site (Dibblee, 1963; Orme, 2008). During the time of lake occupation, the Antelope Valley experienced climatic conditions that were wetter and more humid than today, with numerous tributaries flowing from the surrounding San Gabriel and Tehachapi mountains into Lake Thompson (Orme, 2008). Though the high shoreline was located to the east of the Project site, it is possible that fine-grained paleosol horizons and overbank deposits from the lake or its tributaries may be present at depth below the Project site.

Lake Thompson has produced a wealth of fossils of terrestrial vertebrates, especially large-bodied mammals (e.g., mammoth, horse, bison, deer, camel, saber-toothed cat, dog), as well as small mammals, freshwater fish, amphibians, reptiles, and birds (Jefferson, 1991a; Scott and Cox, 2008; Wilkerson et al., 2011). The SBCM reports specifically on four Lake Thompson fossil localities located about 7 miles east of the Project site that were discovered during mass grading excavations for a new housing development in Rosamond and produced remains of mammoth, ground sloth, camel, and bison (Wilkerson et al., 2011; SBCM, 2017). Similarly, paleontological mitigation of a landfill expansion in Lancaster, about 12 miles southeast of the Project site, resulted in the discovery of vertebrate fossils in deposits of Lake Thompson. Here, the lake deposits were discovered 7.5 feet below the ground surface, and were overlain by dune sand, and yielded fossil remains of extinct camel, lizards, and a variety of rodents (Paleo Environmental Associates, Inc., 2012).

4.2 Results of the Paleontological Potential Analysis

4.3.1 Holocene & Holocene to late Pleistocene-age alluvial deposits (Qa, Qf, Qsu, Qya, Qyf)

Following the SVP (2010) impact mitigation guidelines, as outlined in Section 2.2, late Holocene-age and Holocene to late Pleistocene-age alluvial deposits (i.e., Qa, Qf, Qsu, Qya, Qyf) are assigned a low paleontological potential based on their relatively young Holocene-age (less than about 10,000 years old), and the lack of known, scientifically significant paleontological resources from Holocene-age deposits in the western Mojave Desert (Figure 4).

However, the Holocene-age alluvial deposits transition to older, Pleistocene-age deposits in the subsurface, at a depth that may be as shallow as 15 feet below the current ground surface (see Section 4.1.1). Pleistocene-age alluvial deposits are assigned an undetermined paleontological potential (see Section 2.2.2), and therefore are considered to be potentially fossiliferous, as discussed in greater detail below.

Because the contact between the Holocene-age alluvial deposits and Pleistocene-age alluvial deposits may be as shallow as 15 feet below existing grade, Qa, Qf, Qsu, Qya, and Qyf deposits are specifically assigned a low paleontological potential from 0–15 feet below grade where they are assumed to be Holocene in age and an undetermined paleontological potential at depths greater than 15 feet where they may be Pleistocene in age.

4.3.2 Middle to early Pleistocene-age older alluvial fan deposits (Qof)

Middle to early Pleistocene-age older alluvial fan deposits (Qof) are assigned an undetermined paleontological potential based on: 1) the lack of fossils known specifically from within a 1-mile radius of the Project site and the lack of fossil discoveries during paleontological mitigation of the adjacent Solar Star Project; 2) the depositional environment of Pleistocene-age alluvial deposits that suggests the potential for preservation of terrestrial vertebrate fossils; and 3) the occurrence of fossils in similar deposits of Pleistocene-age exposed elsewhere in the western Mojave Desert.

Geologic units with an undetermined paleontological potential are considered to be potentially fossiliferous, until proven otherwise (see Section 2.2.2).

4.3 Results of the Paleontological Impact Analysis

As discussed above, the Project site is immediately underlain by Holocene to late Pleistocene-age alluvial deposits and middle to early Pleistocene-age older alluvial deposits at the surface. The Holocene portions of these deposits (i.e., Qa, Qf, Qsu, Qya, Qyf) are presumably underlain by Pleistocene-age alluvial deposits (undetermined potential and therefore assumed to be potentially fossiliferous) at a depth that may be as shallow as 15 feet below the ground surface. Impacts to paleontological resources may occur only during excavations that will disturb alluvial deposits of Pleistocene-age, which following a conservative approach, are considered to be potentially fossiliferous. Therefore, only excavations that will extend greater than about 15 feet below existing grade in areas underlain by Holocene-age alluvial deposits (Qa, Qf, Qsu, Qya, Qyf) have the potential to impact paleontological resources (Figure 2, Figure 4, Table 2). Excavations at all depths in areas underlain at the surface by Pleistocene-age Qof deposits have the potential to impact paleontological resources (Figure 2, Figure 4, Table 1).

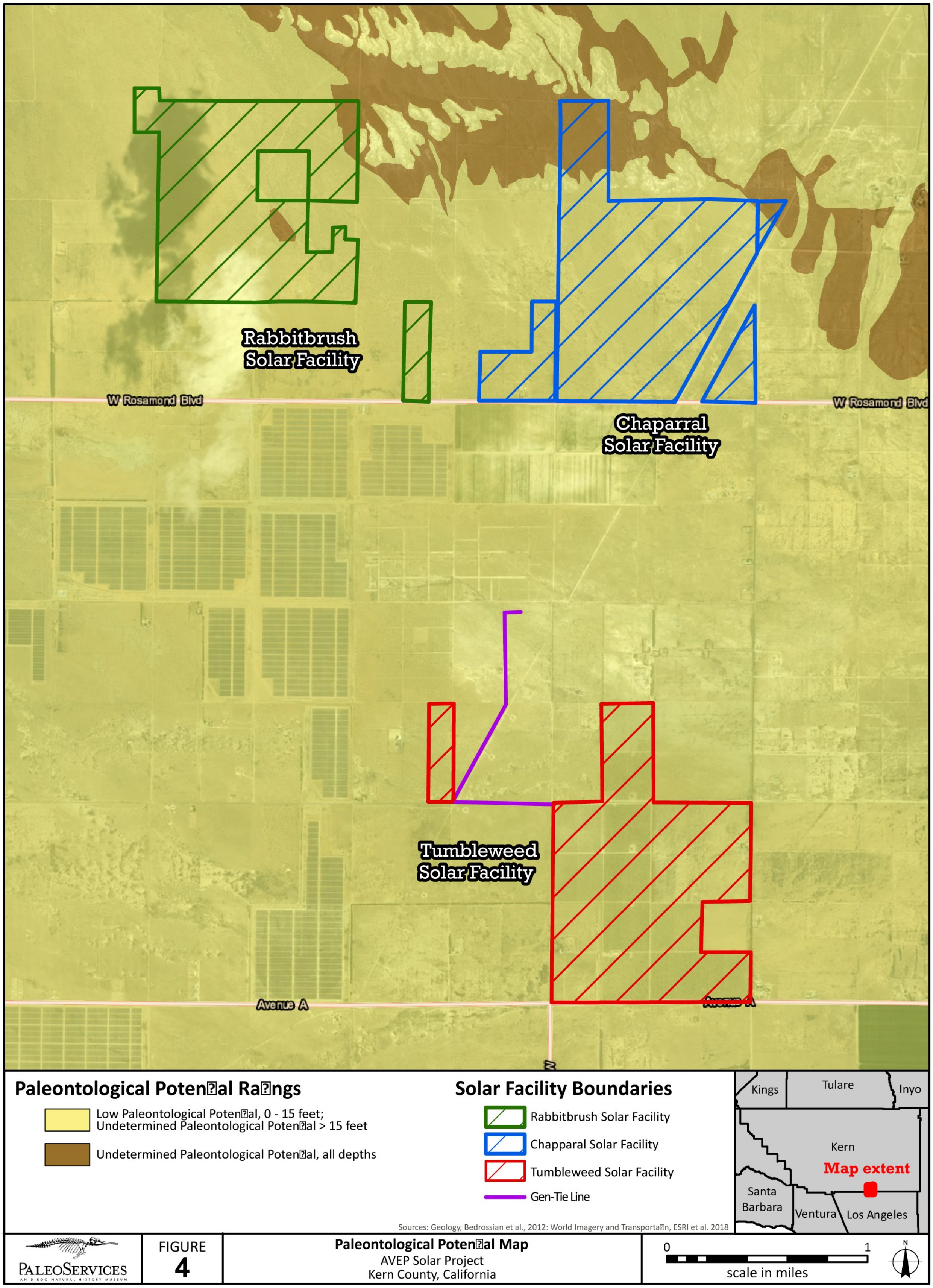
Notably, not all types of earthwork can be feasibly monitored for paleontological resources. Of relevance to the Project, it is not practical to monitor post-driving and drilling with a small-diameter auger (less than about 18 inches) for unearthed paleontological resources. Paleontological monitoring of boreholes is typically conducted by examining spoils brought up during the drilling process for any contained fossil remains. For post-driving, no spoils are produced, thus paleontological monitoring cannot occur. For small-diameter augering, though spoils are brought up, they are typically pulverized during the drilling process. Thus, any macrofossils that may be contained within borehole spoils are destroyed. Further, small-diameter augering yields spoils with poor stratigraphic control, with only a small volume of sediment recovered from any given targeted horizon. While it is possible that microvertebrate fossils may be recovered intact from spoils produced during small-diameter augering, the lack of stratigraphic control makes collecting test samples from a targeted horizon difficult to execute, and screenwashing of all matrix generated during small-diameter augering is not practicable for a project of this size and complexity.

Table 1. Summary of geologic units underlying the Project site and paleontological monitoring recommendations for the AVEP Solar Project.

Geologic Unit	Age	Paleontological Potential	Solar Facility*	Monitoring recommended?‡
alluvial valley deposits (Qa)	late Holocene	low potential, 0 - 15 feet; undetermined potential, >15 feet	RB, TW	No, 0 - 15 feet; **Yes, >15 feet**
alluvial fan deposits (Qf)	late Holocene	low potential, 0 - 15 feet; undetermined potential, >15 feet	RB, CH	No, 0 - 15 feet; **Yes, >15 feet**
undifferentiated surficial deposits (Qsu)	late Holocene	low potential, 0 - 15 feet; undetermined potential, >15 feet	RB, CH	No, 0 - 15 feet; **Yes, >15 feet**
young alluvial valley deposits (Qya)	Holocene - late Pleistocene	low potential, 0 - 15 feet; undetermined potential, >15 feet	RB, CH, TW	No, 0 - 15 feet; **Yes, >15 feet**
young alluvial fan deposits (Qyf)	Holocene - late Pleistocene	low potential, 0 - 15 feet; undetermined potential, >15 feet	RB, CH	No, 0 - 15 feet; **Yes, >15 feet**
old alluvial fan deposits (Qof)	middle - early Pleistocene	undetermined potential, all depths	RB, CH	**Yes, all depths**

*RB=Rabbitbrush, CH=Chaparral, TW=Tumbleweed

‡excluding post-driving and small diameter (<18 inches) drilling, which cannot be feasibly mitigated for paleontological resources


Rabbitbrush Solar Facility
Chaparral Solar Facility
Tumbleweed Solar Facility
W Rosamond Blvd
W Rosamond Blvd
Avenue A
Avenue A
Paleontological Potential Ratings
Low Paleontological Potential, 0 - 15 feet; Undetermined Paleontological Potential > 15 feet
Undetermined Paleontological Potential, all depths
Solar Facility Boundaries
Rabbitbrush Solar Facility
Chapparal Solar Facility
Tumbleweed Solar Facility
Gen-Tie Line
Kings
Tulare
Inyo
Kern
Map extent
Santa Barbara
Ventura
Los Angeles
Sources: Geology, Bedrossian et al., 2012: World Imagery and Transportation, ESRI et al. 2018
PaleoServices
FIGURE 4
Paleontological Potential Map
AVEP Solar Project
Kern County, California
0
1
scale in miles
N

5.0 Recommendations

For the Project, surficial earthwork and deeper earthwork in areas underlain at the surface by Pleistocene-age Qof deposits, as well as deep earthwork that will extend greater than about 15 feet below existing grade in areas underlain at the surface by Holocene-age alluvial deposits (Qa, Qf, Qsu, Qya, Qyf) have the potential to impact paleontological resources (Table 1, Figure 4). Development and implementation of a project-specific Paleontological Resources Mitigation and Monitoring Plan (PRMMP), as outlined in Mitigation Measure (MM) PAL-1, below, is recommended to mitigate potentially adverse impacts to paleontological resources during construction through the recovery and conservation of any fossils that are unearthed during construction.

Standards elements of a PRMMP include a description of the project earthwork to be monitored for paleontological resources (e.g., specific areas, depths of excavation, and/or project components), proposed methods for paleontological monitoring, procedures for fossil discoveries and determining the significance of a discovery, proposed field and laboratory methods for fossil collection, preparation, and curation, reporting requirements, and a curatorial agreement with a regional repository.

5.1 Ongoing Evaluation of Paleontological Potential

Because the subsurface depth of the contact between Holocene and Pleistocene-age alluvial deposits is not precisely known and may vary across the Project site, and because the Pleistocene-age deposits are assigned an undetermined paleontological potential (and are therefore assumed to be potentially fossiliferous; see Section 2.2.2), the paleontological potential of the impacted deposits should be routinely evaluated during monitoring of earthwork.

If during the course of the mitigation program it is determined that the alluvial deposits should be locally downgraded to a low potential ranking (e.g., if the Holocene – Pleistocene contact occurs deeper than Project earthwork; if no fossils are discovered; if no deposits that suggest the potential for fossils are observed), monitoring may be reduced or suspended at the discretion of the Project Paleontologist. Conversely, if it is discovered that the Holocene – Pleistocene contact occurs less than 15 feet below the surface in areas mapped as Holocene-age alluvial deposits, paleontological monitoring may be increased to include more shallow excavations.

5.2 Recommended Mitigation Measures

The following mitigation measures are recommended to implementation at the AVEP Solar Project Facilities. Implementation of these measures will reduce potential adverse impacts to paleontological resources through the recovery and conservation of any fossils that are unearthed during construction.

MM PAL-1: Prior to the issuance of grading permits, a Qualified Paleontologist shall be retained and approved by the County to prepare a Paleontological Resources Mitigation and Monitoring Plan (PRMMP). The PRMMP should contain monitoring procedures, define areas and types of earthwork to be monitored, provide methods for determining the significance of fossil discoveries, and state that any fossils that are collected should be prepared to the point of curation, identified to the lowest reasonable taxonomic level, and curated into an accredited institutional repository.

The PRMMP should also direct that a qualified paleontological monitor (working under the supervision of the Qualified Paleontologist) shall monitor all excavations or grading in areas of undetermined paleontological potential (the northern and northeastern portions of the Chaparral Solar Facility and in the northeastern and central portions of the Rabbitbrush

Solar Facility), and only excavations or grading that occurs at a depth of 15 feet or deeper below the ground surface in areas of low paleontological potential. The use of pile-driving or small-diameter drilling (less than 18-inches) does not require monitoring. The duration and timing of monitoring, which shall be set forth in the PRMMP, shall be determined by the Qualified Paleontologist and based on the grading plans and construction schedule. Initially, all excavation or grading activities recommended for monitoring shall be monitored. However, during the course of monitoring, if the Qualified Paleontologist can demonstrate that the level of monitoring should be reduced, the Qualified Paleontologist, in consultation with the Kern County Planning and Natural Resources Department, may adjust the level of monitoring to fit circumstances as warranted. The PRMMP should emphasize screen washing of bulk matrix samples of potentially fossiliferous sediment (e.g., paleosol horizons) as a tool for evaluating paleontological potential, and provide appropriate methods.

If potentially significant fossils are found, the Qualified Paleontologist (or paleontological monitor) shall be allowed to temporarily divert or redirect grading and excavation activities in the vicinity of the discovery site, as needed, to facilitate evaluation of the fossil and, if necessary, salvage. Salvaged fossils shall be curated and donated to an accredited institutional repository with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the San Bernardino County Museum. Accompanying notes, maps, and photographs shall also be filed at the repository.

Following the completion of the above tasks, the Qualified Paleontologist shall prepare a final mitigation report documenting the absence or discovery of fossil resources on-site. The report shall summarize the results of the PRMMP, including a description of monitoring procedures, a summary of recovered data, and conclusions. If fossils are recovered. The report should include a description of the salvaged fossils and their significance, and the methods used to salvage, prepare, identify, and curate them. A copy of the report shall be provided to Kern County and to the accredited repository that receives the fossils (if fossils are discovered and salvaged).

MM PAL-2: If paleontological resources are encountered during project ground disturbing activities when a Qualified Paleontologist (or paleontological monitor) is not onsite (an inadvertent discovery), all excavation work in the immediate vicinity of the find shall halt until the Qualified Paleontologist can evaluate the find and make recommendations. If the Qualified Paleontologist determines that the discovery represents a potentially significant paleontological resource, additional measures such as fossil salvage may be required to mitigate adverse impacts from project implementation. Ground-disturbance in the vicinity of the discovery site shall not resume until the resource-appropriate measures are implemented or the materials are determined to be less than significant.

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Addendum A:

November 10, 2020 Technical Report Update for AVEP Solar Project Revisions

To: County of Kern Planning and Natural Resources Department

From: Thomas A. Deméré, Ph.D., Department of PaleoServices, SDNHM

Date: 10 November 2020

Re: Technical Report Update for AVEP Solar Project Revisions

I. INTRODUCTION

PaleoServices prepared the *Paleontological Resource Assessment, AVEP Solar Project, Kern County, California* for the AVEP Solar Project (Project) analyzing the paleontological resources (Report). Since preparing the Report, the Project has undergone modifications. The primary components of these modifications consist of (1) the removal of the approximate 721-acre Tumbleweed Solar Facility from the Project; (2) increasing the Chaparral Solar Facility from approximately 764 acres to approximately 774 acres to include an optional location (one of two potential locations on the Chaparral Solar Facility) for a proposed energy storage system (ESS), through the addition of an approximate-10 acre parcel to the Chaparral Solar Facility site; and (3) the addition of a collector line connecting the two non-contiguous east and west components of the Rabbitbrush Solar Facility.

The added Chaparral Solar Facility 10-acre parcel is located at the northwest corner of Holiday Avenue and 110th Street West, directly across Holiday Avenue from the existing Willow Springs Solar Project Substation. The proposed capacity of the ESS on both the Rabbitbrush and Chaparral Solar Facilities has been increased, to store up to 1,000 megawatt-hours (MWh) of energy on each facility (for a combined project total of up to 2,000 MWh), however, the proposed acreage of each ESS would remain at approximately five acres of land within each facility site. As shown on the attached Site Plan, a portion or the remainder of the added 10-acre parcel to the Chaparral Solar Facility would be occupied by access easements for electric collection and temporary water lines.

This memorandum updates the technical analysis and the evaluation of the potential environmental effects of the Project as presented in the Report. In summary, the Project modifications result in a reduction of the environmental effects as previously analyzed and presented in the above referenced Report.

II. MODIFIED PROJECT DESCRIPTION

The Project will construct, operate, and eventually decommission two solar photovoltaic (PV) power generating facilities that would be capable of delivering a total of up to approximately 250 megawatts of alternating current (MW-ac) electricity, along with associated facilities including ESS units. The Project consists of two non-contiguous solar generating facilities, the Rabbitbrush Solar Facility (125 MW-ac) and Chaparral Solar Facility (125 MW-ac) and ESS to store up to 1,000 megawatt-hours (MWh) for each facility, for a total of up to 2,000 (MWh).

III. MODIFICATIONS TO THE ANALYSIS

Potential environmental effects resulting from the Project modifications as compared to the Project previously analyzed in the Report are presented below. Implementing the Project modifications, either separately or as a whole, would not result in any new or more severe environmental effects than identified in the Report. The modifications would not affect the significance conclusions presented in the Report. Accordingly, the modifications would not require any new recommended mitigation measures compared to those recommended in the above referenced Report.

To reach these conclusions, this memorandum analyzes the individual effect that removing the Tumbleweed Solar Facility, the addition of an optional location for ESS at the Chaparral Solar Facility, and the addition of a collector line between the east and west components of the Rabbitbrush Solar Facility would have on paleontological resources. The memorandum then analyzes the combined effect of the three actions on the impacts to paleontological resources.

a. Removing the Tumbleweed Solar Facility

We analyzed the impact on paleontological resources due to the removal of the Tumbleweed Solar Facility. We determined that the modification would reduce the environmental effects and otherwise improve the environmental condition of the Project when compared to the Project analyzed in the Report, as a result of the reduced footprint of the Project.

The original records search and literature review did not identify any existing fossil collection localities within the proposed Tumbleweed Solar Facility footprint, but it was determined that geologic units assigned an undetermined paleontological potential are likely present at depths of approximately 15 feet or more below the ground surface (bgs) in this location, and that impacts to paleontological resources were therefore possible where excavations extending deeper than 15 feet bgs were to occur. Therefore, the removal of the Tumbleweed Solar Facility eliminates any potential impacts on paleontological resources at this location.

b. Adding optional location for the ESS for the Chaparral Solar Facility

We analyzed the impact on paleontological resources due to the addition of an optional location for the ESS for the Chaparral Solar Facility. This modification includes adding a 10-acre parcel to the Chaparral Solar Facility at a location at the northwest corner of Holiday Avenue and 110th Street West, directly across Holiday Avenue from the existing Willow Springs Solar Project Substation. We determined that this modification does not result in any new significant environmental effects or a significant increase in the severity of environmental effects that were previously analyzed in the Report. Therefore, the modification would not affect the environmental effects analysis or significance conclusions of the Report and no change to the proposed mitigation measures is applicable.

The 1-mile radius applied for the original records search and literature review encompasses the location of the proposed 10-acre ESS facility, and did not identify any existing fossil collection localities within this search area. The location of the 10-acre ESS facility is underlain between approximately 0 and 15 feet bgs by geologic units assigned a low paleontological potential, and at depths of approximately 15 feet or more bgs by geologic units assigned an undetermined paleontological potential. Impacts to paleontological resources are therefore possible where excavations extending deeper than 15 feet bgs occur, and monitoring recommendations are consistent with those for other Project components located in areas of low (0–15 feet bgs) to undetermined (>15 feet bgs) paleontological potential. As a result, the addition of an optional location for the ESS for the Chaparral Solar Facility by adding 10 acres to the Chaparral Solar Facility would not affect the significance conclusions of the above referenced Report.

c. Addition of Rabbitbrush Solar Facility Collector Line

We analyzed the impact on paleontological resources due to the addition of a collector line connecting the two non-contiguous east and west components of the Rabbitbrush Solar Facility. The proposed collector line extends south from the southeast corner of the Rabbitbrush Solar Facility West along 120th Street West to Rosamond Boulevard, and then east to the southwest corner of the Rabbitbrush Solar Facility East. We determined that this modification does not result in any new significant environmental effects or a significant increase in the severity of environmental effects that were previously analyzed in the Report. Therefore, the modification would not affect the environmental effects analysis or significance conclusions of the Report and no change to the proposed mitigation measures is applicable.

The 1-mile radius applied for the original records search and literature review encompasses the location of the proposed collector line, and did not identify any existing fossil collection localities within this search area. The location of the collector line is underlain between approximately 0 and 15 feet bgs by geologic units assigned a low paleontological potential, and at depths of approximately 15 feet or more bgs by geologic units assigned an undetermined paleontological potential. Impacts to paleontological resources are therefore possible where excavations extending deeper than 15 feet bgs occur, and monitoring recommendations are consistent with those for other Project components located in areas of low (0–15 feet bgs) to undetermined (>15 feet bgs) paleontological potential. As a result, the addition of a collector line connecting the two non-contiguous east and west components of the Rabbitbrush Solar Facility would not affect the significance conclusions of the above referenced Report.

d. Combined Effect of All Three Project Modifications

Finally, we analyzed the combined effect on paleontological resources due to removing the Tumbleweed Solar Facility, the addition of an optional location for the ESS for the Chaparral Solar Facility, and the addition of the Rabbitbrush Solar Facility collector line. We determined that the modifications, when considered together, do not result in any new or more severe significant effects compared to the effects previously identified in the above referenced Report. Therefore, there is no need to change the prior significance conclusions or to evaluate new proposed mitigation measures.

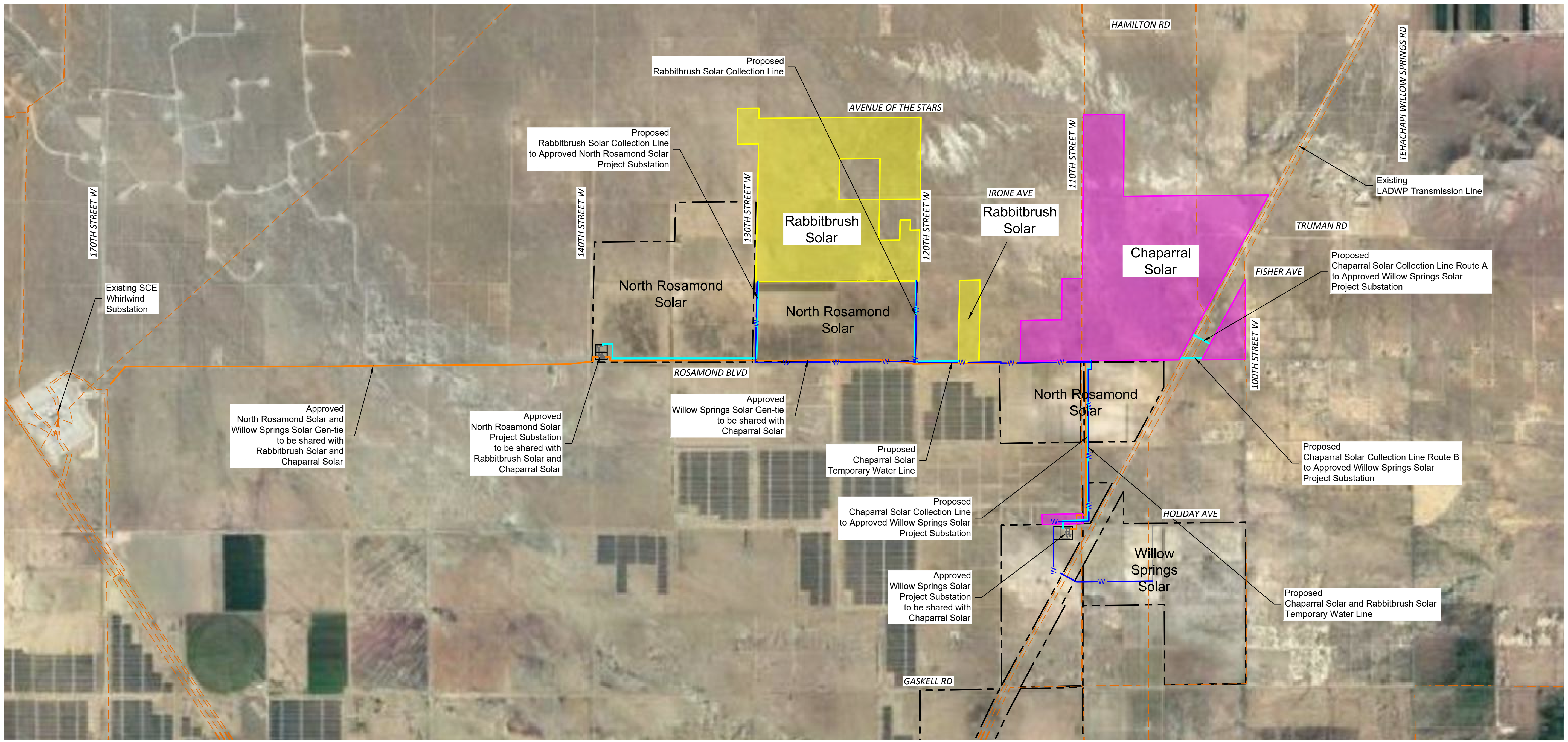
As a result, the Project modifications would not affect the significance conclusions of the above referenced Report.

IV. CONCLUSION

When considered both individually and together, the modifications to the Project would not result in any new or more severe significant effects to paleontological resources. Accordingly, the previous analysis and conclusions of the above referenced Report regarding impacts and recommended mitigation measures would not change.

LEGEND

- RABBITBRUSH SOLAR
- CHAPPARAL SOLAR
- APPROVED PROJECTS
- PROPOSED COLLECTION LINE
- PROPOSED CHAPARRAL SOLAR & RABBITBRUSH SOLAR TEMPORARY WATER LINE
- APPROVED GEN-TIE
- EXISTING TRANSMISSION LINE



NORTH

3400' 1700' 0 3400'

First Solar.

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AVEP SOLAR PROJECT
KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVT. ENGR: M. DOSHI
PROJ. MGR:
SCALE: 1"=3400' @ 11"x17" SHEET
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SHEET TITLE

Figure 1a -
Project Map
SCE Interconnection
Option 1

SHEET 1 OF 1

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C:\Users\FS104849\AVEP\AVEP Figure 1a - 091020.dwg FS104849 Sep 13, 2020 - 6:29pm

LEGEND

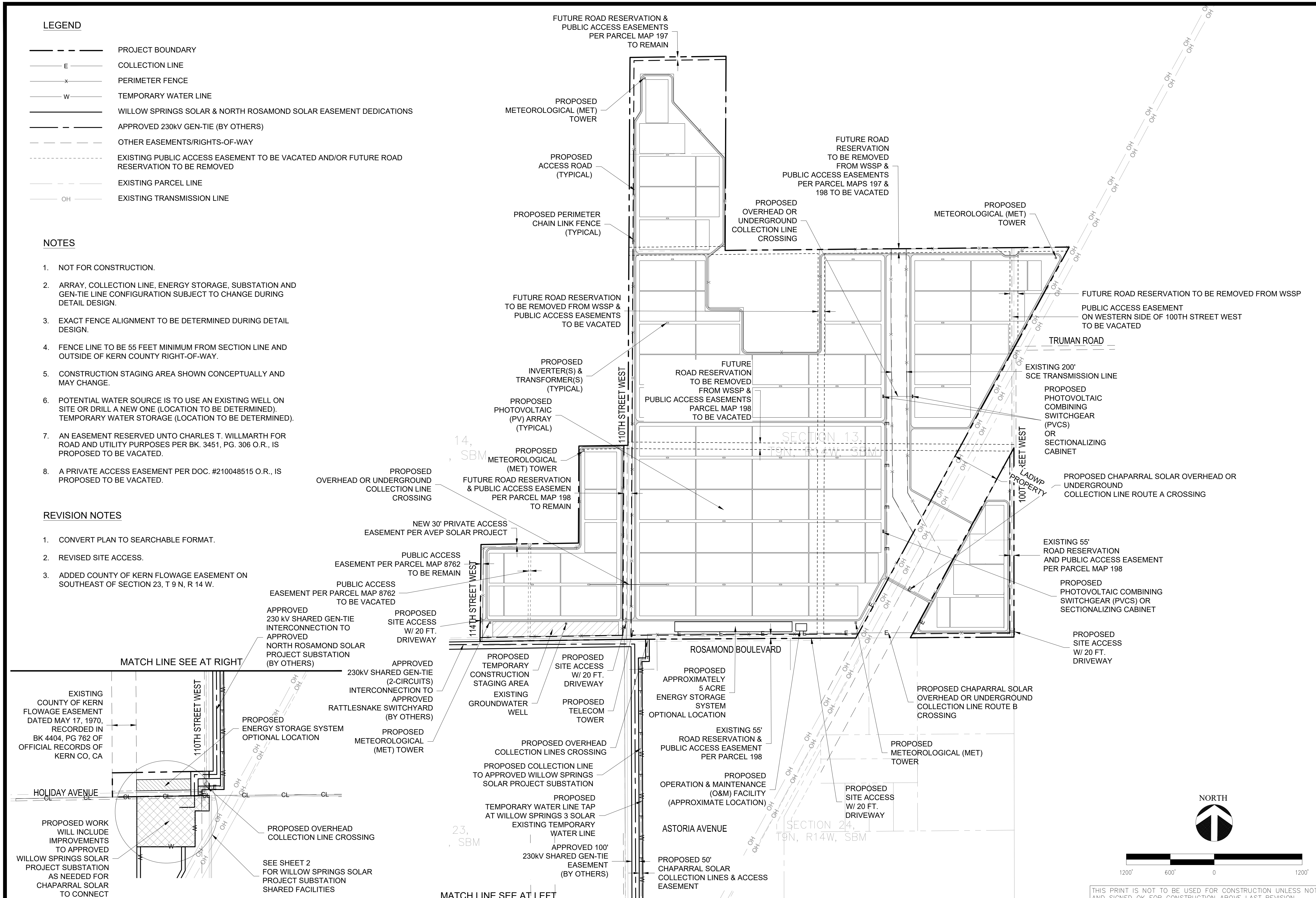
- PROJECT BOUNDARY
- COLLECTION LINE (E)
- PERIMETER FENCE (x)
- TEMPORARY WATER LINE (W)
- WILLOW SPRINGS SOLAR & NORTH ROSAMOND SOLAR EASEMENT DEDICATIONS
- APPROVED 230kV GEN-TIE (BY OTHERS)
- OTHER EASEMENTS/RIGHTS-OF-WAY
- EXISTING PUBLIC ACCESS EASEMENT TO BE VACATED AND/OR FUTURE ROAD RESERVATION TO BE REMOVED
- EXISTING PARCEL LINE
- EXISTING TRANSMISSION LINE (OH)

NOTES

1. NOT FOR CONSTRUCTION.
2. ARRAY, COLLECTION LINE, ENERGY STORAGE, SUBSTATION AND GEN-TIE LINE CONFIGURATION SUBJECT TO CHANGE DURING DETAIL DESIGN.
3. EXACT FENCE ALIGNMENT TO BE DETERMINED DURING DETAIL DESIGN.
4. FENCE LINE TO BE 55 FEET MINIMUM FROM SECTION LINE AND OUTSIDE OF KERN COUNTY RIGHT-OF-WAY.
5. CONSTRUCTION STAGING AREA SHOWN CONCEPTUALLY AND MAY CHANGE.
6. POTENTIAL WATER SOURCE IS TO USE AN EXISTING WELL ON SITE OR DRILL A NEW ONE (LOCATION TO BE DETERMINED). TEMPORARY WATER STORAGE (LOCATION TO BE DETERMINED).
7. AN EASEMENT RESERVED UNTO CHARLES T. WILLMARTH FOR ROAD AND UTILITY PURPOSES PER BK. 3451, PG. 306 O.R., IS PROPOSED TO BE VACATED.
8. A PRIVATE ACCESS EASEMENT PER DOC. #210048515 O.R., IS PROPOSED TO BE VACATED.

REVISION NOTES

1. CONVERT PLAN TO SEARCHABLE FORMAT.
2. REVISED SITE ACCESS.
3. ADDED COUNTY OF KERN FLOWAGE EASEMENT ON SOUTHEAST OF SECTION 23, T 9 N, R 14 W.



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AVEP SOLAR PROJECT

KERN COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP
1	06/17/20	SEE REVISION NOTES			
2	10/28/20	SEE REVISION NOTES			
3	11/06/20	SEE REVISION NOTES			

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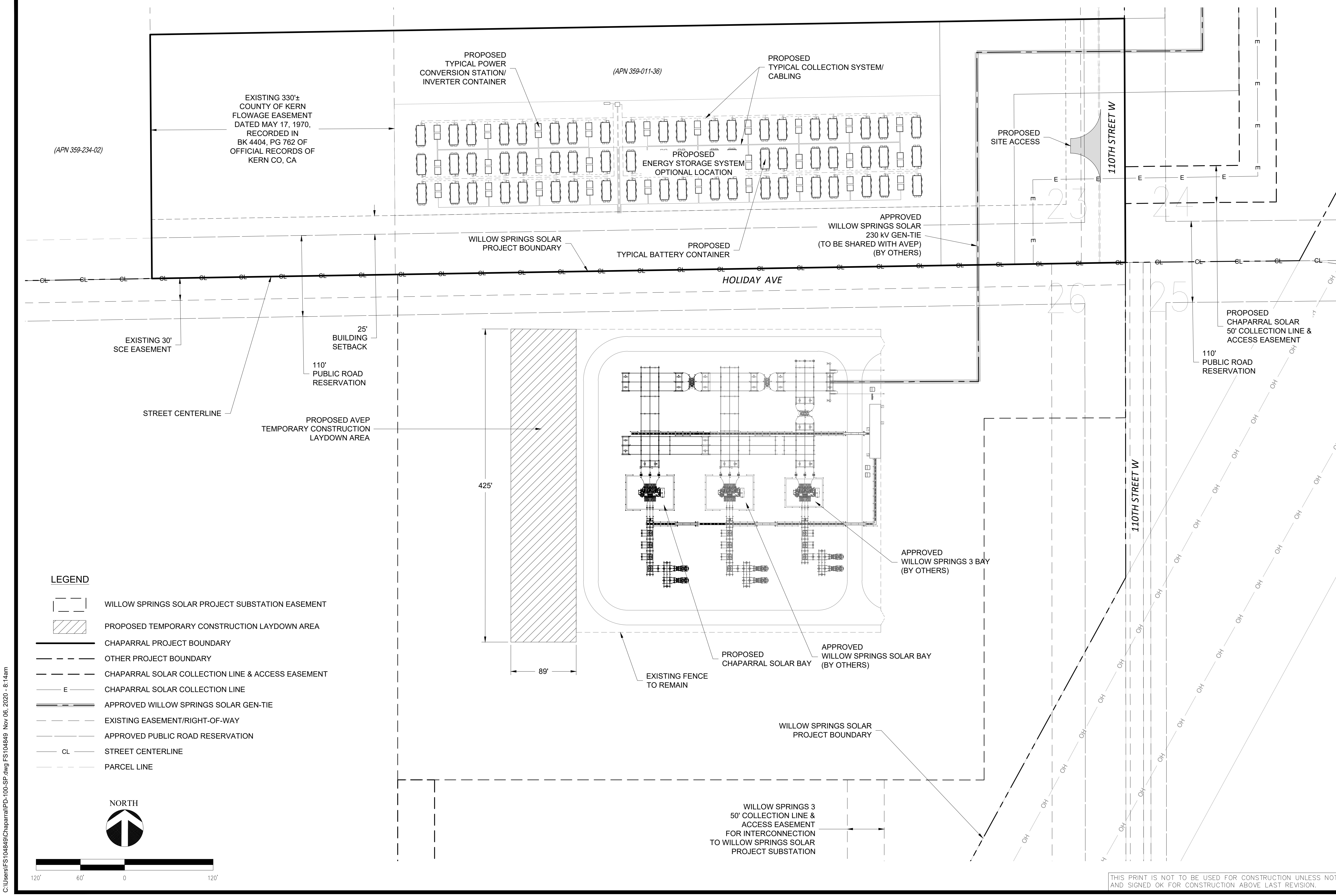
SHEET TITLE

Figure 2c - Chaparral Solar Facility Layout

SHEET 1 OF 2



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AVEP SOLAR PROJECT

KERN COUNTY CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP
1	06/17/20	SEE REVISION NOTES			
2	10/28/20	SEE REVISION NOTES			
3	11/06/20	SEE REVISION NOTES			

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SHEET TITLE
Chaparral Solar Willow Springs Solar Project Substation Shared Facilities

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SHEET 2 OF 2

Appendix 1 (Confidential):

Paleontological Records Search Results, Natural History Museum of Los Angeles County and San Bernardino County Museum