Paleontological Resources Assessment for the Fort Amethyst Self-Storage Project, City of Victorville, California

JUNE 2023

PREPARED FOR

Westgate Plaza LLC

PREPARED BY

SWCA Environmental Consultants

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE FORT AMETHYST SELF-STORAGE PROJECT, CITY OF VICTORVILLE, CALIFORNIA

Prepared for

Westgate Plaza LLC
1006 Straightaway Court
Oceanside, California 92057
Attn: Chad McKillop

Prepared by

Kristina Akesson, B.S., Staff Paleontologist
Mathew Carson, M.S., Paleontology Team Lead
Russell Shapiro, Ph.D., Principal Investigator

SWCA Environmental Consultants
320 North Halstead Street, Suite 120
Pasadena, California 91107
(626) 240-0587
www.swca.com

SWCA Project No. 0079246-000-PAS

June 2023

EXECUTIVE SUMMARY

Purpose and Scope: Westgate Plaza LLC (applicant) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment for the proposed Fort Amethyst Self-Storage Project (project) in the City of Victorville, County of San Bernardino, California. As the Lead Agency under the California Environmental Quality Act (CEQA), the City of Victorville (City) requires the assessment of potentially significant impacts to the environment caused by construction or implementation of the project. SWCA has prepared this report to summarize the results of this assessment that included a review of geologic maps, scientific literature, confidential fossil locality records from both the Natural History Museum of Los Angeles County (NHMLA) and the San Bernardino County Museum (SBCM), pedestrian reconnaissance survey, and other relevant site information. This assessment includes a discussion of potential impacts to scientifically significant paleontological resources and mitigation recommendations to reduce potential impacts to less-than-significant levels, pursuant to the CEQA.

Date of Investigation: SWCA conducted the assessment in March and April 2023. SWCA received the NHMLA and SBCM records search results on March 19, 2023, and on April 25, 2023, respectively, and conducted the pedestrian reconnaissance survey on March 30, 2023.

Summary of Findings: According to published geologic mapping, the surface of the project site is mapped as Pleistocene older alluvial fan deposits, unit 2 (Qof_2). Additionally, Pleistocene Shoemaker Gravel may be present in the subsurface at unknown but possibly shallow depths. Both units have a high paleontological sensitivity. No previously known paleontological resources or fossil sites are present within the bounds of the project site; however, several fossil localities have been recorded in the Victorville Fan area from equivalent geologic units or sedimentary deposits. Although no new paleontological resources or fossil localities were identified during the survey, geologic units or sediments capable of preserving significant paleontological resources were observed. Therefore, the project site has a high paleontological sensitivity at the surface and at depth. The maximum depth of ground-disturbing activities for the project is anticipated to reach approximately 10 feet bgs. Based on the results of this assessment, ground-disturbing activities associated with the project may impact geologic units of relatively high paleontological sensitivity. Any fossils encountered during ground disturbances in previously undisturbed sediments of high paleontological sensitivity would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA.

Recommendations: SWCA recommends the following mitigation measures to reduce potential significant impacts to less-than-significant levels, pursuant to CEQA. These recommended mitigation measures have been developed in accordance with and incorporate the performance standards of the Society of Vertebrate Paleontology (SVP), state and local regulations, and best practices in mitigation paleontology: 1) retain an SVP Qualified Paleontologist to oversee implementation of paleontological mitigation and to obtain a curation agreement with an accredited repository prior to the start of construction activities; 2) conduct a worker training to educate the construction crew on the legal requirements and procedures to follow in the event of a fossil discovery; 3) have an SVP-qualified paleontological monitor conduct full-time paleontological monitoring during ground-disturbing activities that have the potential to impact previously undisturbed sediments (earthwork impacting only previously disturbed sediments should not be monitored regardless of depth); and 4) prepare a paleontological resources monitoring report upon the conclusion of ground-disturbing activities to document the paleontological monitoring efforts for the project and to describe any discoveries observed and/or recorded. If paleontological resources are curated, the final monitoring report and any associated data pertinent to the curated specimen(s) should be submitted to the designated repository.

Disposition of Data: This report will remain on file with the applicant, the City, and SWCA's Pasadena office.

CONTENTS

Appendices

Figures

Tables

INTRODUCTION

Westgate Plaza LLC (applicant) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment in support of the proposed Fort Amethyst Self-Storage Project (project) in the City of Victorville, San Bernardino County, California (Figure 1). The applicant proposes to construct a new self-service storage facility. As the Lead Agency under the California Environmental Quality Act (CEQA), the City of Victorville (City) requires the assessment of potentially significant impacts to the environment caused by construction or implementation of the project. Therefore, SWCA has prepared this report to summarize the results of this assessment that included a review of geologic maps, scientific literature, confidential fossil locality records from both the Natural History Museum of Los Angeles County (NHMLA) and the San Bernardino County Museum (SBCM), pedestrian reconnaissance survey, other relevant site information. This report specifically addresses questions in Appendix G (Environmental Checklist Form) of the State CEQA Guidelines and includes a discussion of potential impacts to scientifically significant paleontological resources and mitigation recommendations to reduce potential impacts to less-than-significant levels, pursuant to the CEQA. This study also follows the guidelines of the Society of Vertebrate Paleontology (SVP) and best practices in mitigation paleontology (Murphey et al. 2019; SVP 2010).

SWCA Paleontology Team Lead Mathew Carson, M.S., and SWCA Staff Paleontologist Kristina Akesson, B.S., researched and authored this paleontological resources assessment. Mathew Carson served as the overall technical lead and SVP Qualified Paleontologist. SWCA Principal Investigator Russell Shapiro, Ph.D., and Natural Resources Project Manager Jacqueline Bowland Worden, B.S., peer reviewed this report and provided additional quality assurance/quality control. Figures were generated by SWCA geographic information system (GIS) Specialist Marty Kooistra, M.A.

PROJECT DESCRIPTION AND LOCATION

The applicant proposes to construct a new self-service storage facility on an approximately 8.14-acre (122,350-square-foot) site (project site). The project would include 24 new one-story buildings with a total of seven parking spaces. The maximum depth of excavation for the subterranean parking is expected to be approximately 10 feet below ground surface (bgs). The project site is currently vacant, with evidence of previous site disturbance including several two-track vehicle “roads” transecting the parcel. The project site consists of one parcel (Assessor Parcel Number 310-529-101), located east of Amethyst Road, about 630 feet south of Palmdale Road and bordered along the eastern side by Los Angeles Bureau of Power and Light Road, west of their high-tension power lines (Figure 2). The project site is in Section 24, Township 5 North, Range 5 West, as depicted on the U.S. Geological Survey (USGS) Victorville, California, 7.5-minute topographic quadrangle (Figure 3).

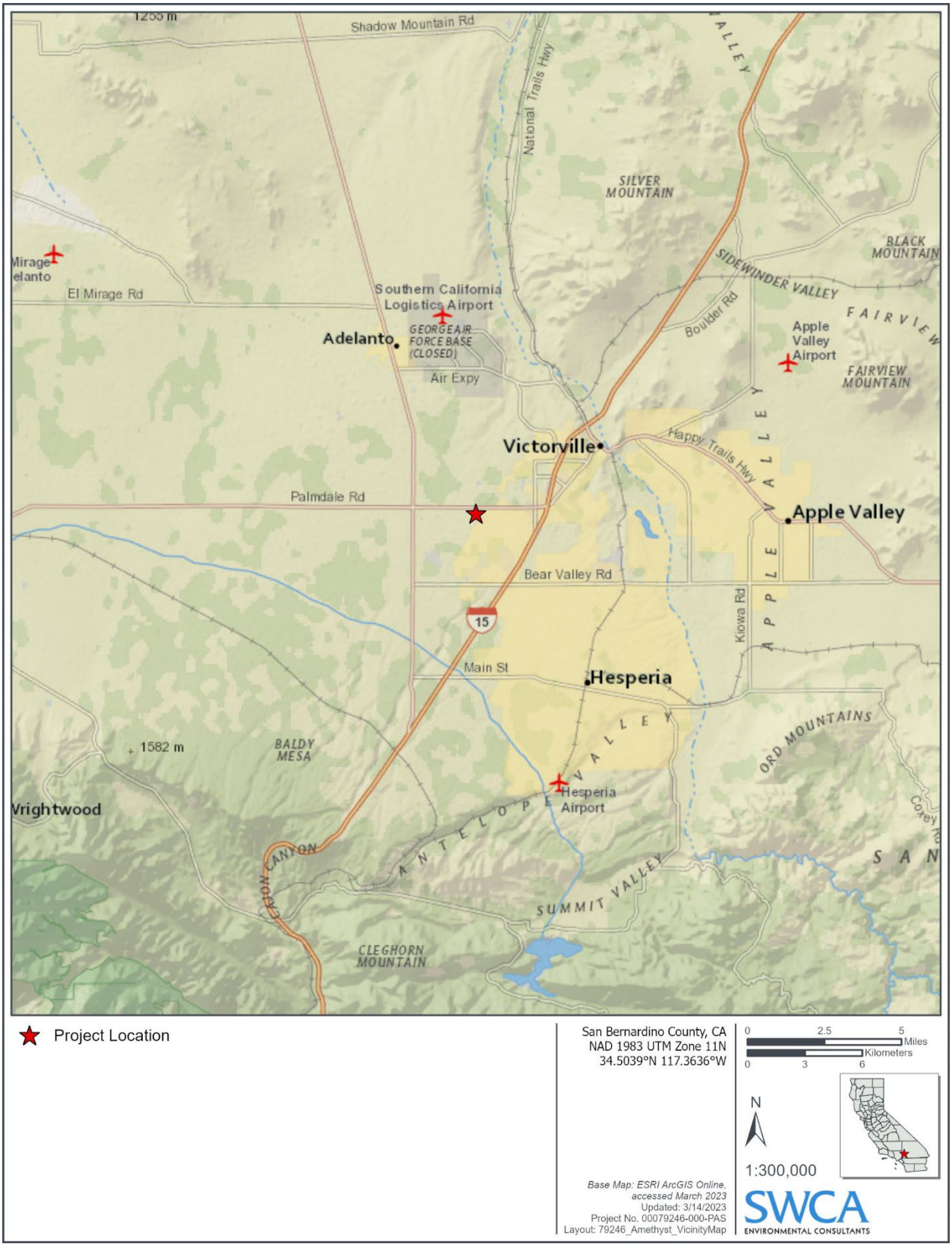

Figure 1. Project site location vicinity.

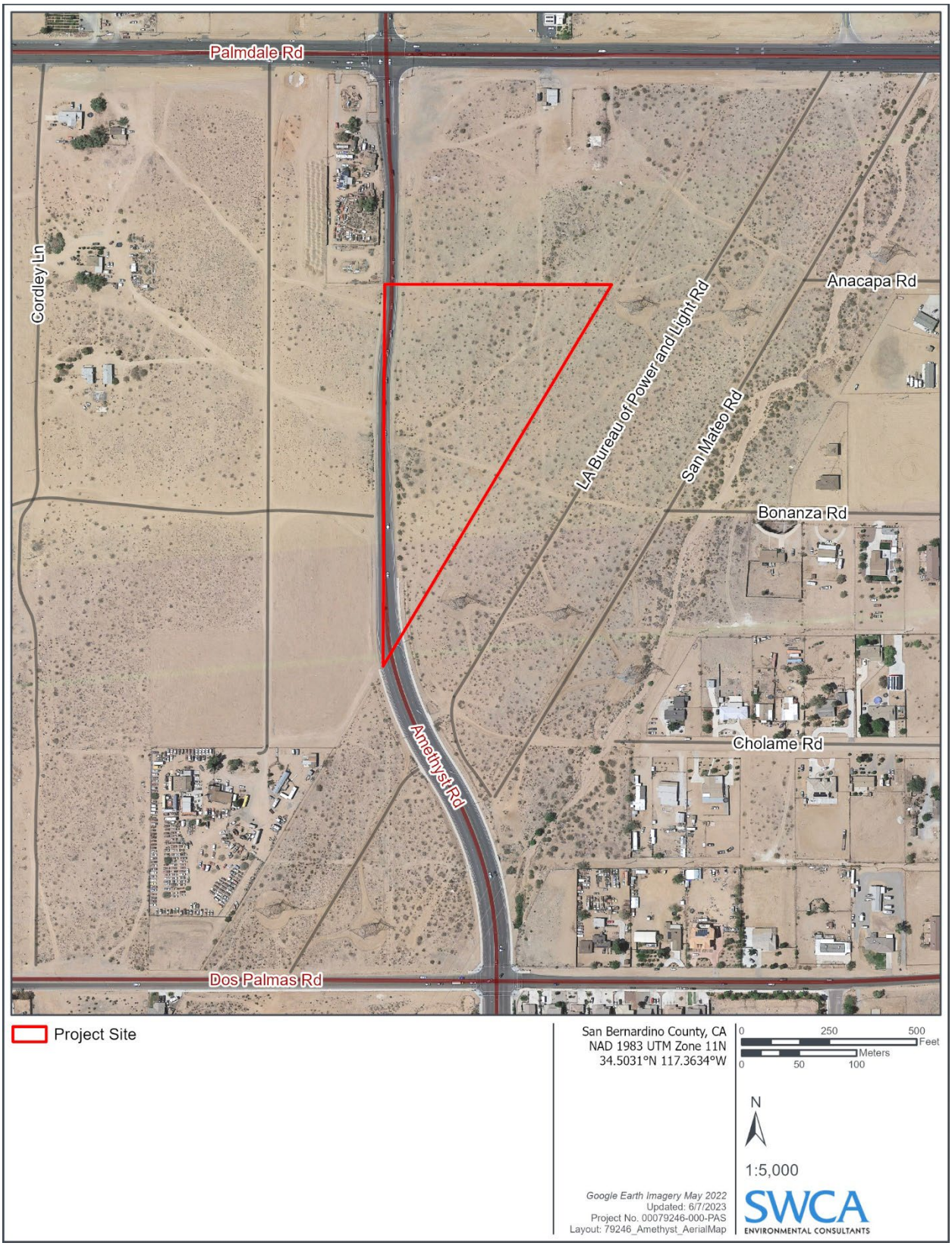

Figure 2. Project site plotted on an aerial photograph.

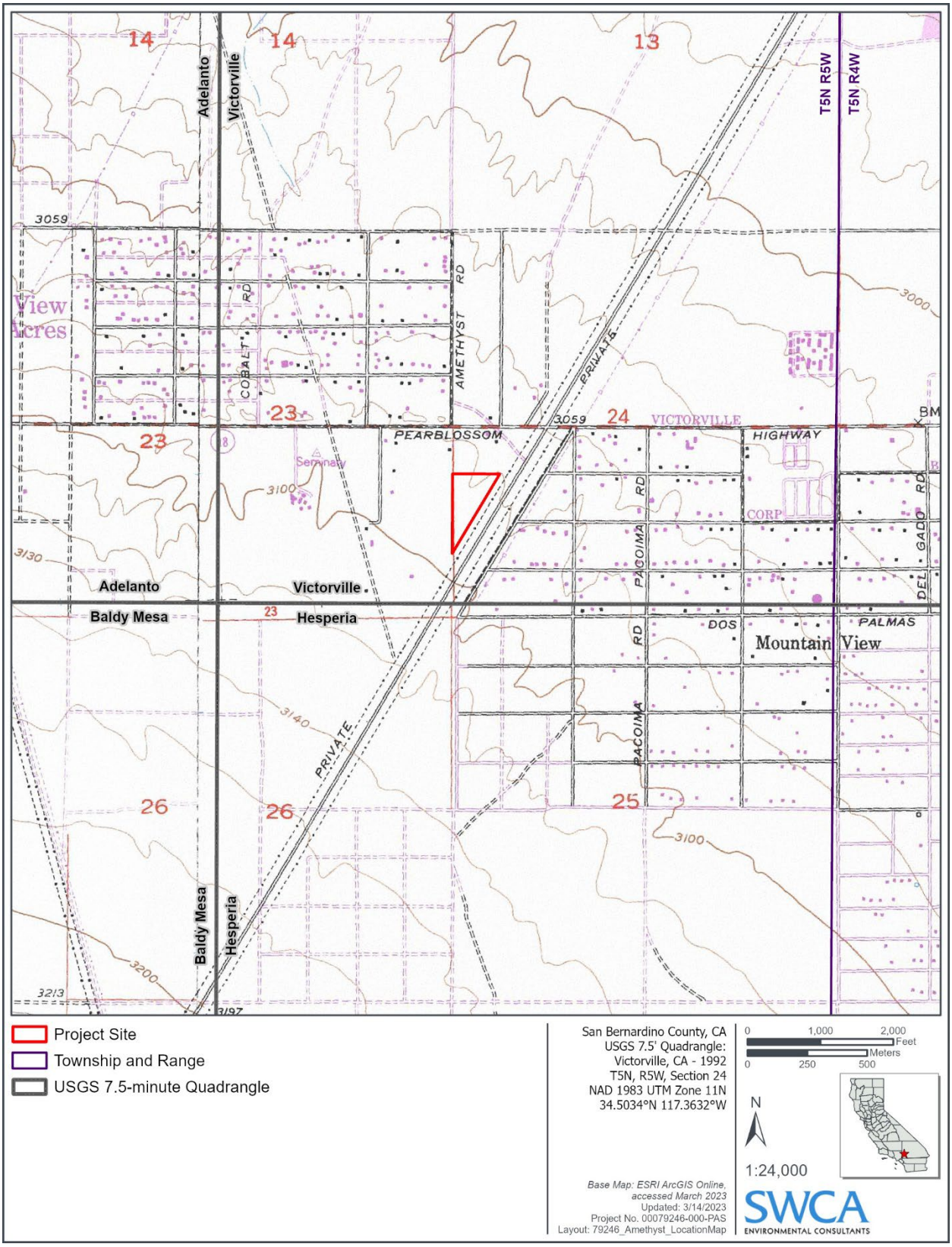

Figure 3. Project site location plotted on the USGS Victorville, California, 7.5-minute topographic quadrangle.

PROFESSIONAL STANDARDS

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and curation (SVP 1995, 2010). Most practicing professional mitigation paleontologists in California adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

As defined by the SVP, significant paleontological resources are

> fossils and fossiliferous deposits, here defined as 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. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years). (SVP 2010:11)

Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003). In general, these studies assess fossils as significant if one or more of the following criteria apply:

1) The fossils provide information on the evolutionary relationships and developmental trends among organisms, living, or extinct.
2) The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein.
3) The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas.
4) The fossils demonstrate unusual or spectacular circumstances in the history of life.
5) The fossils are in short supply and/or are in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation and are not found in other geographic locations.

Geologic units known to preserve significant fossils or fossil localities are likely to contain additional undiscovered and potentially significant fossils and are generally considered sensitive for paleontological resources throughout their areal and stratigraphic extent. The extent of sensitivity differs from that defined for archaeological resource sites as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case. (SVP 1995:23)

Many archaeological sites contain features visually detectable on the surface. In contrast, fossils may be present at the surface or at depth within sediments or bedrock. Subsurficial fossils would not be observable or detectable unless exposed by erosion or human activity. In the case of human activity, such as project-related ground disturbances within geologic units with a high probability to yield significant fossils, direct or indirect adverse impacts to significant fossils may occur.

In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or anthropogenic exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of geologic units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area), a similar geologic unit, and whether the unit in question was deposited in a type of environment known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if such fossils are determined to be potentially significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

REGULATORY SETTING

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under state and local laws and regulations.

State Regulations

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at California Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including significant effects on paleontological resources. Guidelines for the Implementation of CEQA, as amended December 28, 2018 (Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section VII(f) of the Environmental Checklist (State CEQA Guidelines: Appendix G) asks whether a project would directly or indirectly destroy a unique paleontological resource and result in impacts to the environment.

Public Resources Code Section 5097.5

Requirements for paleontological resource management are included in PRC Division 5, Chapter 1.7, Section 5097.5, which states,

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

These statutes prohibit the removal, without permission, of any paleontological site or feature from land under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, local agencies are required to comply with PRC Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. PRC Section 5097.5 also establishes the removal of paleontological resources as a misdemeanor and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) land.

Local Regulations

City of Victorville General Plan

The Resource Element of the City of Victorville 2008 General Plan recognizes paleontological resources (pages R-2, R-13, and R-17) and contains a goal (Goal 5: pages R-28 and R-29) to "protect identified archaeological, paleontological, and historic resources within the planning area" of the city (City of Victorville 2008). The Resource Element includes the following policies and implementation measures to preserve paleontological resources:

> **Policy 5.1.1:** Determine presence/absence of and consider impacts to cultural resources in the review of public and private development and infrastructure projects. (City of Victorville 2008: R–28)
>
> > **Implementation Measure 5.1.1.4:** Complete a Planning Area-wide assessment of the paleontological sensitivity, based on a review of geologic formations and a review of paleontological records that identify those formations that have yielded or are expected to yield fossil materials of importance to the scientific community.
>
> **Policy 5.1.2:** Prohibit destruction of cultural and paleontological materials that contain information of importance to our knowledge of the evolution of life forms and history of human settlement in the Planning Area, unless sufficient documentation of that information is accomplished and distributed to the appropriate scientific community. Require mitigation of any significant impacts that may be identified in project or program-level cultural and paleontological assessments as a condition of project or program approval. (City of Victorville 2008: R–29)
>
> > **Implementation Measure 5.1.2.3:** Require paleontological monitoring of land alternation projects involving excavation into native geologic materials known to have a high sensitivity for the presence of paleontological resources.

METHODS

The following sections present an overview of the methodology used to analyze the potential for paleontological resources within the project site. This report conforms to industry standards as developed by the SVP (1995, 2010) and best practices in mitigation paleontology (Murphey et al. 2019). The purpose of this analysis is to 1) determine whether any previously recorded fossil localities occur in the project site at the surface or at depth; 2) if so, assess the potential for disturbance of these localities during construction; 3) evaluate the paleontological potential of the project site; and 4) evaluate the potential for adverse impacts to previously undiscovered significant paleontological resources that could be present within the project site and adversely impacted by implementation of the project.

Existing Data Analysis

SWCA conducted an analysis of available existing data pertinent to paleontological resources. This analysis included a review of geologic maps, scientific literature, museum records search results, and other relevant site-specific, subsurface geologic information. The geologic mapping used in this analysis is from Hernandez and others (2008) at a scale of 1:24,000. Museum records search requests were

submitted to the NHMLA on March 15, 2023, and to the SBCM on March 20, 2023. The results of the NHMLA museum records search were received on March 19, 2023, and the results of the SBCM museum records search were received on April 25, 2023. The museum records search results are incorporated into the Results section of this report. Appendix A (confidential) and Appendix B (confidential) provide a copy of the NHMLA and SBCM museum records search results, respectively.

Reconnaissance Survey

To supplement the results of the existing data analysis, SWCA Staff Paleontologist Kristina Akesson, B.S., conducted a pedestrian reconnaissance survey of the project site on March 30, 2023. The purpose of the reconnaissance survey was to 1) confirm the geologic mapping by Hernandez and others (2008); 2) inspect exposures of previously undisturbed sediments or bedrock outcrops within the project site, if any, to assess their potential to preserve paleontological resources; and 3) record newly identified or previously unrecorded paleontological localities that may be present within the project site, if any. The results of the reconnaissance survey are incorporated into the Results section of this report.

Paleontological Potential Classification

Paleontological potential ("sensitivity") is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010:1–2), the SVP defines four categories of paleontological sensitivity for rock units: high, low, undetermined, and no potential.

> **High Potential**. Rock 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. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ash or tephra), and 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., middle Holocene and older, fine-grained fluvial sandstone, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstone, fine-grained marine sandstone, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.
>
> **Low Potential**. Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g., basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

Undetermined Potential. Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

No Potential. Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources. (SVP 2010:1–2)

RESULTS

Regional Geology

The project area is located within the informally named Victorville Fan of the western Mojave Desert Geomorphic Province (Mojave), one of several geomorphic provinces situated within California with distinct geophysical characteristics, such as geologic history, topography, climate, vegetation, and other geomorphic attributes (Norris and Webb 1990). The Mojave occupies approximately 25,000 square miles of southern California and is bounded on the southwest by the San Andreas Fault and the Transverse Ranges Geomorphic Province; on the south by the Colorado Desert Geomorphic Province; and on the north and northeast by the Garlock Fault, Tehachapi Mountains, and the Basin and Range Geomorphic Province. The Mojave represents an elevated, wedge-shaped fault block-bounded plain formed during the Oligocene and Miocene because of tectonic movements related to the San Andreas and Garlock faults. The Mojave is characterized by scattered mountain blocks bounded by normal and strike-slip faults and the broad alluvial basins between such faults (Norris and Webb 1990).

More generally, rocks of the Mojave vary in age and include the Proterozoic, Paleozoic, early Mesozoic, and late Cenozoic (Sylvester and O'Black Gans 2016; Norris and Webb 1990). Jurassic and Cretaceous plutonic igneous rocks (batholiths) are widespread throughout the Mojave and comprise most of the basement rocks throughout the province (Sylvester and O'Black Gans 2016; Morton and Miller 2006; Norris and Webb 1990). Basement rocks of similar age are typically overlain by Miocene and younger sedimentary deposits. During the end of the Mesozoic, degradation of the Nevadan orogeny resulted in widespread erosion of the region resulting in low topographic relief followed by tectonic uplift ranging from 10,000 to 15,000 feet by the onset of the Miocene (Norris and Webb 1990). By the early Miocene, the Ivanpah erosional surface formed, rising eastward from the Garlock-San Andreas convergence (Sylvester and O'Black Gans 2016). During this time, volcanic activity peaked, resulting in volcanic basalt flows, cinder cones, plugs, domes, sheets, and dikes throughout the Mojave (Norris and Webb 1990). Thereafter, subsequent faulting resulted in regional depression, causing internal drainage within the Mojave, resulting in a thick accumulation of nonmarine sedimentary rocks and sediments within local basins during the Miocene, Pliocene, and Pleistocene, with sediment deposition continuing today (Norris and Webb 1990). Some basins have accumulated as much as 10,000 feet of nonmarine strata, overlying pre-Cretaceous basement plutonic rocks (Norris and Webb 1990).

Locally to the project site, thick accumulations of nonmarine sedimentary deposits or rocks are known within the Victorville Fan and along the Mojave River in the western Mojave. The Victorville Fan, which rests upon the basement rocks of the San Bernardino Mountain complex, formed during the Pleistocene

and consists of thick alluvial fan deposits originating from erosion of the San Gabriel Mountains (Morton and Miller 2006). It is the largest of the Mojave fan complexes, extending from the Inface Bluffs in the Hesperia-Victorville area and expanding westward to the fan emanating from Sheep Creek (Morton and Miller 2006). Since their original deposition, right-lateral displacement along the San Andreas Fault has separated alluvial deposits of the Victorville Fan from their source (Morton and Miller 2006). The Mojave River, flowing northeastward toward former Lake Manix (Sylvester and O'Black Gans 2016), is currently located 5 miles east of the project site. The river is a component of the largest drainage basin in the Mojave and was formed during the uplift of the Transverse Ranges (San Gabriel and San Bernardino mountains) during the Pliocene and Pleistocene (Cox et al. 2003; Hernandez et al. 2008; Morton and Miller 2006). Alluvial deposits of the ancestral Mojave River consist of thick fluvial deposits on the westside of the Mojave River. Both alluvial fan and fluvial deposits have yielded early Pleistocene to middle Holocene paleontological resources that have allowed scientists to better understand environmental and ecological changes that occurred at the end of the Ice Age in the Mojave (Cox and Hillhouse 2000).

Local Geology and Paleontology

According to geologic mapping by Hernandez and others (2008), the surface of the project site is mapped as Pleistocene older alluvial fan deposits, unit 2 (Qof_2) (Figure 4). Although not mapped at the surface of the project site by Hernandez and others (2008), the Pleistocene Shoemaker Gravel is mapped at the surface by Morton and Miller (2006) approximately 10 miles south of the project site and may underly the uppermost alluvial fan deposits of the Victorville Fan at shallow depth within the project site. Therefore, Pleistocene older alluvial fan deposits, unit 2 (Qof_2) and the Pleistocene Shoemaker Gravel are given consideration in this paleontological resources assessment.

Pleistocene Older Alluvial Fan Deposits, Unit 2 (Qof_2)

According to geologic mapping by Hernandez and others (2008), Pleistocene older alluvial fan deposits, unit 2 (Qof_2) are mapped at the surface of the project site (see Figure 4). These alluvial fan deposits consist of light-yellowish brown sand and gravel deposits that are loose to moderately consolidated and are moderately dissected at the surface. Moreover, the upper surfaces of these deposits exhibit moderately developed pavement and varnish. Locally, lenticular masses of soft, earthy calcium carbonate (caliche) may be abundant in the uppermost 5 feet of the deposits (Hernandez et al. 2008). Although very coarse-grained alluvial deposits are not known to preserve intact organic remains as fossils due to the higher-energy environment in which they represent, medium- to fine-grained alluvial deposits, such as the fine gravel, sand, silt, and clay, are typically deposited in a relatively lower energy environment that is conducive to the (nondestructive) burial and subsequent preservation of intact organic remains as fossils. The results of the NHMLA (2023) and SBCM (2023) records searches indicate that Pleistocene alluvial fan deposits (e.g., Qof_2) capable of preserving fossils are present at the surface (see section titled Museum Records Search below).

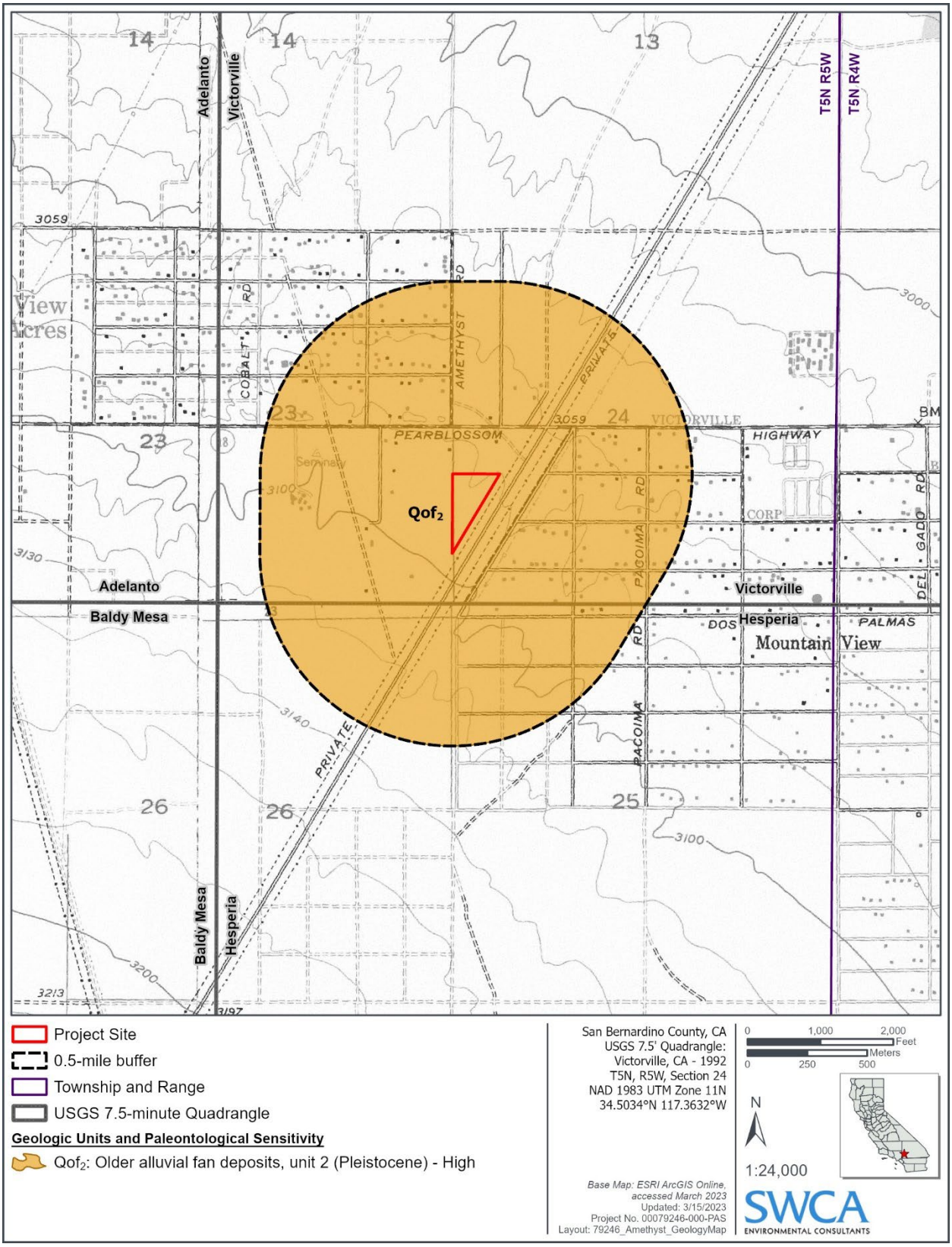

Figure 4. Geologic units and paleontological sensitivity within the project site and 0.5-mile buffer.

The City of Victorville's General Plan describes numerous paleontological resources of Pleistocene mammals including teeth, limb fragments, and phalanges from horses, camels, and other extinct mammals originating from nine ancient lakebed deposits within the city (City of Victorville 2008). The most common Pleistocene terrestrial mammal fossils include the bones of mammoth, camel, bison, deer, horse, rabbit, small mammals, and other taxa (Jefferson 1991a and 1991b). Other taxa, including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth, also have been reported (Graham and Lundelius 1994), as well as reptiles, snakes, frogs, salamanders, invertebrates, and plants (Cox and Hillhouse 2000; Hudson and Brattstrom 1977; University of California Museum of Paleontology [UCMP] 2023). In addition to illuminating the striking differences between southern California in the Pleistocene and southern California today, this abundant fossil record has been vital in studies of extinction (e.g., Barnosky et al. 2004; Sandom et al. 2014; Scott 2010), ecology (e.g., Connin et al. 1998), and climate change (e.g., Roy et al. 1996). Based on the potential to yield significant paleontological resources, Pleistocene older alluvial fan deposits, unit 2 (Qof_2) have a high paleontological sensitivity (SVP 2010).

Pleistocene Shoemaker Gravel

Although Pleistocene Shoemaker Gravel is not mapped at the surface by Hernandez and others (2008) within the vicinity of the project site, Morton and Miller (2006) map its presence at the surface approximately 10 miles south of the project site, possibly extending northward in the subsurface of the Victorville Fan. Also note that the NHMLA (2023) records search results indicate the presence of fossil localities from this unit from approximately 3.79 miles to 5.19 miles from the project site (see below), indicating that the Shoemaker Gravel may be present in the subsurface at unknown but shallow depth. Therefore, we have included discussion of the Shoemaker Gravel within this assessment.

Shoemaker Gravel consists of a pale-grayish brown, arkosic to lithic conglomerate and sandstone that is moderately well consolidated (Morton and Miller 2006). Clasts of the Shoemaker Gravel are subrounded to rounded in shape, are pebble to boulder in size, and vary in composition and origin (Morton and Miller 2006). Constituent clasts of the Shoemaker Gravel include Triassic granitic rocks from the Mount Lowe Intrusive Suite, Cretaceous metamorphic rocks of Pelona Schist, Tertiary nonmarine sedimentary rocks, and variably-aged volcanic rocks (Morton and Miller 2006). Where best developed north of Cajon Valley, the Shoemaker Gravel is approximately 197 feet thick, but locally it may be as much as approximately 328 feet thick (Morton and Miller 2006). Although coarse-grained conglomerates are unlikely to yield intact, well-preserved fossils, finer-grained deposits of the Shoemaker Gravel regionally has yielded significant fossils.

The most common fossils from various Victorville localities from the Shoemaker Gravel include horse, camel, antelope, deer, mammoth, rodent, hare, and tortoise (Jefferson 1991a and 1991b; NHMLA 2023; SBCM 2023). Based on the proximity of the fossil localities from the Shoemaker Gravel to the project site, Pleistocene Shoemaker Gravel may be present within the project site at unknown but shallow depth, underlying Pleistocene alluvial deposits. Based on its potential to yield significant paleontological resources, the Pleistocene Shoemaker Gravel has a high paleontological sensitivity (SVP 2010).

Museum Records Search

SWCA requested museum records search results for fossil localities located within or within the vicinity of the project site from both the NHMLA (Confidential Appendix A) and the SBCM (Confidential Appendix B). Based on the results of the museum records searches, neither the NHMLA (2023) nor the SBCM (2023) possess records of paleontological resources from within the project site; however, several fossil localities have been recorded in the vicinity of the project site from the Pleistocene older alluvial

fan deposits, unit 2 (Qof_2) of Hernandez and others (2008) or similar alluvial deposits. Additionally, several fossil localities were recorded in the project's vicinity from the Pleistocene Shoemaker Gravel from unrecorded depths. It should be noted that significant fossils were located at or near the surface. Table 1 summarizes the results of the NHMLA (2023) and SBCM (2023) museum records searches.

Table 1. NHMLA and SBCM Fossil Localities near the Project Site

Locality Number	Approximate Distance from the Project Site	Formation	Taxa	Approximate Depth (bgs)
SBCM 1.114.252 - 255	0.68 mile	Pleistocene older alluvium	Botta's pocket gopher (*Thomomys bottae*); pocket mouse (*Perognathus sp.*); tooth enamel fragments; indeterminate large mammal; unidentified gastropod	Unrecorded
SBCM 1.114.88	0.95 mile	Early Holocene to latest Pleistocene deposits	Mojave ground squirrel (*Xerospermophilus mohavensis*); kangaroo rat (*Dipodomys sp.*); pocket mouse (*Perognathus sp.*)	0-2 feet (Immediately underlying topsoil)
SBCM 1.114.67 – 73, collocated with SBCM 1.114.56 – 90; SBCM 1.114.93 – 97; SBCM 1.114.131 – 146; SBCM 1.114.160 – 165; SBCM 1.114.206 – 208; and SBCM 1.114.290 – 294.	0.85 – 1.8 mile	Pleistocene older alluvium and alluvial fan deposits	Indeterminate Plantae pollen; insect burrow traces; toad (*Bufo sp.* [= *Anaxyrus sp.*]); indeterminate frog or toad (Anura); western banded gecko (*Coleonyx variegatus*); western whiptail (*Cnemidophorus* cf. *tigris*); collared lizard (*Crotaphytus sp.*); leopard lizard (*Gambelia sp.*); zebra-tailed lizard (*Callisaurus draconoides*); horned lizard (*Phrynosoma sp.*); spiny lizard (*Sceloporus sp.*); common side-blotched lizard (*Uta stansburiana*); indeterminate Iguanidae; indeterminate lizard (Lacertilia); rattlesnake (*Crotalus sp.*); indeterminate snake (Colubridae); indeterminate bird (Aves); white-tailed antelope squirrel (*Ammospermophilus leucurus*); Mohave ground squirrel (cf. *Xerospermophilus mohavensis*); indeterminate squirrel (Sciuridae); kangaroo rat (*Dipodomys sp.*); pocket mouse (*Perognathus sp.*); Botta's pocket gopher (*Thomomys bottae*); pocket gopher (*Thomomys sp.*); vole (*Microtus sp.*); pack rat (*Neotoma sp.*); indeterminate rodent (Cricetidae); hare (*Lepus sp.*); cottontail rabbit (*Sylvilagus sp.*); indeterminate rabbit or hare (Leporidae); and various indeterminate vertebrate bone and enamel fragments	0-2 feet (Immediately underlying topsoil)
LACM VP 1224	3.79 miles	Pleistocene Shoemaker Gravel Formation	Camel family (Camelidae)	Unrecorded
LACM VP 3353	4.7 miles	Pleistocene Shoemaker Gravel Formation	Horse (*Equus*)	Unrecorded
LACM VP 3352	4.7 miles	Pleistocene Shoemaker Gravel Formation	Horse (*Equus*)	Unrecorded
LACM VP 3498	5.19 miles	Pleistocene Shoemaker Gravel Formation	Horse (*Equus*); deer (Cervidae); antelope (Antilocapridae)	Unrecorded
LACM VP 7786	5.46 miles	Pleistocene alluvium	Vole (*Microtus mexicanus*)	10-11 feet

Locality Number	Approximate Distance from the Project Site	Formation	Taxa	Approximate Depth (bgs)
LACM VP 59942-5950	32.6 miles	Unspecified Holocene deposits	Kingsnake (*Lampropeltis*); leopard lizard (*Gameblia*); snake (Ophidia); gopher snake (*Pituophis*); rabbit (Lagomorpha); rodent (Rodentia); Pocket gopher (*Thomomys*); pocket mouse (*Chaetodippus*); kangaroo rat (*Dipodomys*); birds (Aves)	0-9 feet

Source: NHMLA (2023) and SBCM (2023)

Reconnaissance Survey

SWCA Staff Paleontologist Kristina Akesson, B.S., conducted a pedestrian reconnaissance survey of the surface of the project site to verify the geologic mapping of Hernandez and others (2008), verify the status of existing paleontological resources identified in the museum records search results, and to determine if sediments observed at the surface are likely to yield new paleontological resources or fossil sites. No previously recorded paleontological resources were noted in the museum records search results; therefore, the survey focused on qualifying the potential of the "native" sediments within the project site to preserve new paleontological resources.

In general, the project site consists mostly flat topography with gentle slopes of less than 5% inclination and very shallow (less than 6 inches in depth) channels (Figure 5). With the exception of the earthen access road along the northern portion of the site, most of the project site is undeveloped but mostly covered in low-lying vegetation, precluding inspection of the surface sediments throughout most of the project site (Figure 6). Where scant exposures were visible at the surface, the Pleistocene older alluvial fan deposits, unit 2 (Qof_2) consist of pale brown silt and very fine- to coarse-grained sand, with pebbles and very sparse cobbles composed of primarily metamorphic and igneous rocks (Figure 7).

No newly identified paleontological resources were observed during the pedestrian reconnaissance survey; however, fine-grained sediments capable of preserving paleontological resources, such as those of Pleistocene older alluvial fan deposits, unit 2 (Qof_2) that have a high paleontological sensitivity, are present at the surface across the entirety of the project site.

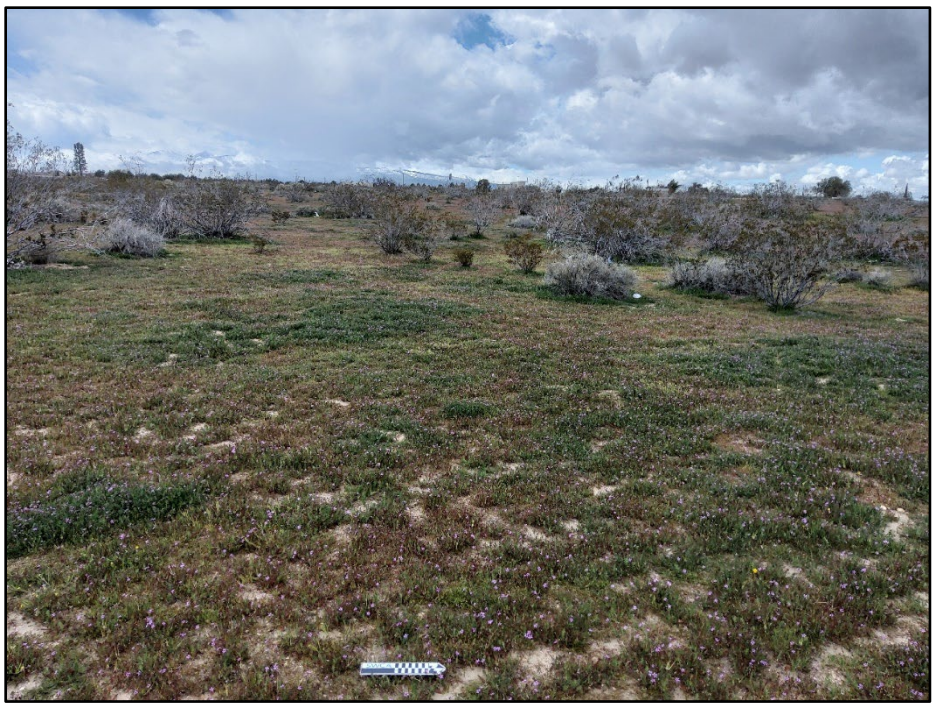

Figure 5. Overview of project area, showing land topography and ground cover in its northeastern portion. View facing west.

Figure 6. Overview of project area, showing land topography, ground cover, and Los Angeles Bureau of Power and Light high-tension power lines in the project site's southern portion. View facing south.

Figure 7. Plan view of Pleistocene older alluvium exposed at the surface of the project site, showing silty to coarse-grained sand and gravels.

IMPACT ASSESSMENT

SWCA conducted this assessment to analyze the potential for significant impacts to paleontological resources resulting from implementation or construction of the project. SWCA analyzed the existing data to determine the geologic units likely to be present at the surface or in the subsurface that may be impacted by the project. Geologic mapping by Hernandez and others (2008) indicates that the surface of the project site is mapped as Pleistocene older alluvial fan deposits, unit 2 (Qof_2) that was confirmed to be present at the surface during the pedestrian reconnaissance survey. Additionally, Pleistocene older alluvial fan deposits, unit 2 (Qof_2) may be underlain by Pleistocene Shoemaker Gravel at an unknown but possibly shallow depth. Both geologic units have a high paleontological sensitivity.

The maximum depth of ground-disturbing activities for the project is anticipated to reach approximately 10 feet bgs. Based on the results of this assessment, including the high paleontological sensitivity of both geologic units likely present at the surface and at depth, ground-disturbing activities associated with the project, regardless of depth, may result in potentially significant impacts to scientifically important or unique paleontological resources. Any fossils encountered during ground disturbances in previously undisturbed sediments of high paleontological sensitivity would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA. However, implementation of appropriate paleontological mitigation or management measures would result in less-than-significant impacts.

CONCLUSIONS AND RECOMMENDATIONS

SWCA conducted an analysis of existing data, including a review of geologic maps, scientific literature, museum records, and other relevant site-specific geologic information, to classify the paleontological sensitivity of the geologic units present at the surface and subsurface and to determine the potential for significant impacts to scientifically significant paleontological resources due to implementation or construction of the project. The results of this assessment indicate that Pleistocene older alluvial fan deposits, unit 2 (Qof_2) are present at the surface and have a high paleontological sensitivity. Although unmapped at the surface within the project site, the Pleistocene Shoemaker Gravel may be present in the subsurface at unknown but possibly shallow depths and also has a high paleontological sensitivity. The maximum depth of ground-disturbing activities for the project is anticipated to reach approximately 10 feet bgs.

Therefore, ground-disturbing activities associated with the project, regardless of depth, may result in potentially significant impacts to scientifically important or unique paleontological resources. Any fossils encountered during ground disturbances in previously undisturbed sediments of high paleontological sensitivity would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA. The implementation of appropriate mitigation or management measures will ensure that fossils, if encountered, are assessed for significance and, if deemed significant, are salvaged and curated with an accredited repository. These actions will reduce potential impacts to scientifically important or unique paleontological resources to less-than-significant levels, pursuant to CEQA.

Accordingly, SWCA recommends the following mitigation measures, which have been developed in accordance with and incorporate the performance standards of the SVP (1995, 2010), state and local regulations, and best practices in mitigation paleontology (Murphey et al. 2019).

1) **Retain a Qualified Professional Paleontologist:** The applicant should retain a Qualified Paleontologist (Project Paleontologist/Principal Paleontologist), who meets or exceeds the SVP definition, to carry out all regulatory compliance measures and protocols related to paleontological resources. The Qualified Paleontologist should obtain a curatorial arrangement with a qualified repository (e.g., SBCM or NHMLA) prior to construction in the event of significant paleontological resource discoveries during construction.
2) **Conduct Worker Training:** The Qualified Paleontologist should develop Worker Environmental Awareness Program (WEAP) training to educate the construction crew on the legal requirements for preserving fossil resources, as well as the procedures to follow in the event of a fossil discovery. This WEAP training should be given to the crew before ground-disturbing work commences and should include handouts to be given to new workers as needed.
3) **Monitor for Paleontological Resources:** Full-time paleontological monitoring should occur during ground-disturbing activities that impact previously undisturbed sediments that have high paleontological sensitivity, including Pleistocene older alluvial fan deposits, unit 2 (Qof_2) and/or Pleistocene Shoemaker Gravel. Monitoring should not be required when ground-disturbing activities impact only previously disturbed sediments regardless of depth. Monitoring should be conducted by a qualified paleontological monitor who meets the standards of the SVP (2010) and who should be supervised by the Qualified Paleontologist. The Qualified Paleontologist may periodically inspect construction activities to adjust the level of monitoring in response to subsurface conditions. Monitoring efforts can be increased, reduced, or ceased entirely if determined adequate by the Qualified Paleontologist. Paleontological monitoring should include inspection of exposed sedimentary units during active excavations within sensitive geologic sediments. The monitor should have authority to temporarily divert activity away from exposed fossils to evaluate the significance of the find and, should the fossils be determined significant,

professionally and efficiently recover the fossil specimens and collect associated data. The monitor should record pertinent geologic data and collect appropriate sediment samples from any fossil localities. Recovered fossils should be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological repository (e.g., SBCM or NHMLA).

4) **Prepare a Paleontological Resources Monitoring Report:** Upon conclusion of ground-disturbing activities, the Qualified Paleontologist overseeing paleontological monitoring should prepare a final monitoring report that documents the paleontological monitoring efforts for the project and describes any paleontological resources discoveries observed and/or recorded during the life of the project. If paleontological resources are curated, the final monitoring report and any associated data pertinent to the curated specimen(s) should be submitted to the designated repository (e.g., SBCM or NHMLA). A copy of the final monitoring report should be filed with the City.

LITERATURE CITED

Barnosky, A., C. Bell, S. Emslie, H.T. Goodwin, J. Mead, C. Repenning, E. Scott, and A. Shabel. 2004. Exceptional record of Mid-Pleistocene vertebrates helps differentiate climatic from anthropogenic ecosystem perturbations. *Proceedings of the National Academy of Sciences* 101:9297–9302.

City of Victorville. 2008. *City of Victorville General Plan*. Victorville, California. Available at: https://www.victorvilleca.gov/government/city-departments/development/planning/general-plan

Connin, S., J. Betancourt, and J. Quade. 1998. Late Pleistocene C4 plant dominance and summer rainfall in the southwestern United States from isotopic study of herbivore teeth. *Quaternary Research* 50:179–193.

Cox, B.F., and J.W. Hillhouse. 2000. Pliocene and Pleistocene evolution of the Mojave River, and associated tectonic development of the transverse ranges and Mojave Desert, based on borehole stratigraphy studies near Victorville, California. U.S. Geological Survey, Open-File Report OF 00-147, p. 1—69.

Cox, B.F., Hillhouse, J.W., and L.A. Owen. 2003 Pliocene and Pleistocene evolution of the Mojave River, and associated tectonic development of the Transverse Ranges and Mojave Desert, based on borehole stratigraphy studies and mapping of landforms and sediments near Victorville, California, *in* Enzel, Y., Wells, S.G., and Lancaster, N., eds., Paleoenvironments and paleohydrology of the Mojave and southern Great Basin Deserts: Boulder, Colorado, Geological Society of America Special Paper 368, p. 1–42. © 2003 Geological Society of America.

Eisentraut, P.J., and J.D. Cooper. 2002. *Development of a Model Curation Program for Orange County's Archaeological and Paleontological Collections – Final Report*. Submitted to the County of Orange, California.

Graham, R.W., and E.L. Lundelius. 1994. FAUNMAP: a database documenting the late Quaternary distributions of mammal species in the United States. *Illinois State Museum Scientific Papers* XXV(1).

Hernandez, J.L., H.J. Brown, and B.F. Cox. 2008. Geologic map of the Victorville 7.5-minute quadrangle, San Bernardino County, California. California Geological Survey, Preliminary Geologic Maps PGM-08-03. Scale 1:24,000.

Hudson, D., and B. Brattstrom. 1977. A small herpetofauna from the late Pleistocene of Newport Beach Mesa, Orange County, California. *Bulletin of the Southern California Academy of Sciences* 76:16–20.

Jefferson, G.T. 1991a. *A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa*. Technical Reports No. 5. Los Angeles, California: Natural History Museum of Los Angeles County.

———. 1991b. *A Catalogue of Late Quaternary Vertebrates from California: Part Two, Mammals*. Technical Reports No. 7. Los Angeles, California: Natural History Museum of Los Angeles County.

Morton, D. M. and F. K. Miller. 2006. Geologic Map of the San Bernardino and Santa Ana 30' × 60' quadrangles, California. Scale 1:100,000. Open-File Report 2006-1217. U.S. Geological Survey.

Murphey, P.C., G.E. Knauss, L.H. Fisk, T.A. Deméré, and R.E. Reynolds. 2019. Best practices in mitigation paleontology. *Proceedings of the San Diego Society of Natural History* 47.

Natural History Museum of Los Angeles County (NHMLA). 2023. Paleontological resources records search for the Fort Amethyst Self-Storage Project, Victorville, California (#00079246). Letter report received on March 19, 2023.

Norris, R.M., and R.W. Webb. 1990. *Geology of California*. Second Edition. Santa Barbara, California: John Wiley & Sons, Inc.

Roy, K., J. Valentine, D. Jablonski, and S. Kidwell. 1996. Scales of climatic variability and time averaging in Pleistocene biotas: Implications for ecology and evolution. *Trends in Ecology and Evolution* 11:458–463.

San Bernardino County Museum (SCBM). 2023. Paleontological resources records search for the Fort Amethyst Self-Storage Project, Victorville, California (#00079246). Letter report received on April 25, 2023.

Sandom, C., S. Faurby, B. Sandel, and J.-C. Svenning. 2014. Global late Quaternary megafauna extinctions linked to humans, not climate change. *Proceedings of the Royal Society* B 281:20133254.

Scott, E. 2010. Extinctions, Scenarios, and Assumptions: Changes in latest Pleistocene large herbivore abundance and distribution in western North America. *Quaternary International* 217:225–239.

Scott, E., and K. Springer. 2003. CEQA and fossil preservation in California. *Environmental Monitor* Fall:4–10. Sacramento, California: Association of Environmental Professionals.

Society of Vertebrate Paleontology (SVP). 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22–27.

———. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Available at: https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines.pdf. Accessed March 15, 2023.

Sylvester, A.G., and E. O'Black Gans. 2016. *Roadside Geology of Southern California*. Mountain Press Publishing Company, Missoula, Montana.

University of California Museum of Paleontology. 2022. Fossil Locality Database. Available at: https://ucmp.berkeley.edu/collections/databases/. Accessed March 21, 2023.

This page intentionally left blank.

APPENDIX A

Natural History Museum of Los Angeles County Paleontological Records Search

CONFIDENTIAL – NOT FOR PUBLIC RELEASE

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

March 19, 2023

SWCA Environmental Consultants
Attn: Kristina Akesson

re: Paleontological resources for the Fort Amethyst Self Storage Project (#00079246)

Dear Kristina:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Fort Amethyst Self Storage project area as outlined on the portion of the Victorville USGS topographic quadrangle map that you sent to me via e-mail on March 15, 2023. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP 1224	North of Hesperia, near Dean Ave. & Dean Place	Shoemaker Gravel Formation	Camel family (Camelidae)	Unknown
LACM VP 3353	Second Street at sand & gravel pit; near top of bluff, west bank of Mojave River	Shoemaker Gravel Formation	Horse (*Equus*)	unknown
LACM VP 3352	West bank of the Mojave River, north end of Victorville (more precise locality not available)	Shoemaker Gravel Formation	Horse (*Equus*)	Unknown
LACM VP 3498	West of Portland Cement Co. plant in bluffs on west side of Mojave River, midway between I-15 and Air Expressway Rd.	Shoemaker Gravel Formation	Horse (Equus); deer (Cervidae); antelope (Antilocapridae)	Unknown
LACM VP 7786	Southern California Logistics Airport	Alluvium (Pleistocene, moderately indurated fine to medium grained silty sandstone)	Vole (*Microtus mexicanus*)	10-11 feet bgs
LACM VP 5942-	Along Avenue S from	Unknown formation	Kingsnake (*Lampropeltis*), Lizard	0-9 feet

5950	Palmdale to Lake Los Angeles	(Holocene)	(Lacertilia), leopard lizard (*Gambelia*); snake (Ophidia), gopher snake (*Pituophis*); rabbit (*Lagomorpha*), rodent (Rodentia), Pocket gopher (*Thomomys*), pocket mouse (*Chaetodippus*), kangaroo rat (*Dipodomys*); birds (Aves)	bgs

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

APPENDIX B

San Bernardino County Museum Paleontological Records Search

CONFIDENTIAL – NOT FOR PUBLIC RELEASE

2024 Orange Tree Lane, Redlands, California 92374 | Phone: 909.798.8608
www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum
Division of Earth Science

Scott Kottkamp
Curator of Earth Science

April 18th, 2023

SWCA
Attn: Matthew Carson
320 North Halstead Street, Suite 120
Pasadena, CA 91107

PALEONTOLOGY RECORDS REVIEW for Fort Amethyst Self Storage Project, Victorville, San Bernardino County, California

Dear Mr. Carson,

The Division of Earth Science of the San Bernardino County Museum (SBCM) has completed a record search for the above-named project in San Bernardino County, California. The proposed project site (Fort Amethyst Self Storage) is in the city of Victorville, California as shown on the United States Geological Survey (USGS) 7.5-minute Victorville, California quadrangle.

According to geologic mapping of the area by Hernandez et al. (2008), the entire project area is located on top of Pleistocene age alluvial fan deposits (Qof_2). Qof_2 consists of moderately consolidated light-yellowish-brown sand and gravel, angular to subangular, derived more from the San Gabriel Mountains moving west and more from local sources moving east (Hernandez et al. 2008). The surface of Qof_2 forms a moderately developed and desert varnished pavement. Calcium carbonate masses are common in the uppermost 1.5 meters of Qof_2. Multiple SBCM paleontological localities are either located within Qof_2 or other Pleistocene sediments under- or overlying it.

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontological localities are situated within the project area. 12 localities are located within a one-mile radius of its perimeter

in the same or similar geological units. Please see Appendix A for an abbreviated listing of fossil and subfossil taxa.

The closest localities, SBCM 1.114.252 - 255, are situated approximately 0.68 miles to the west of the project site at 34.503 latitude and -117.376 longitude. These localities were uncovered via paleontological mitigation monitoring during the construction of Silverado High School. Fossils were uncovered during construction grading and excavation of the school's foundation. No description of the sediment or the depth at which fossils were found was provided in the records, though a geological map of the area shows the school as being built over Pleistocene age older alluvium (Qoa; Dibblee and Minch 2008). Taxa collected from these localities include: an unidentified planispiral gastropod shell; *Thomomys bottae; Perognathus* sp.; enamel fragments; and bone fragments of an indeterminate large mammal. The gastropod shell is unaltered, while the enamel and bone fragments are lightly permineralized. Taphonomy indicates light signs of fluvial transport.

The next closest localities, SBCM 1.114.67 – 73, are situated between 0.85 miles – 1 mile north-northeast to northeast of the project site between 34.516 – 34.519 latitude and -117.352 – -117.359 longitude. These localities are part of a larger set of 70 uncovered during subdivision construction, encompassing: SBCM 1.114.56 – 90, SBCM 1.114.93 – 97, SBCM 1.114.131 – 146, SBCM 1.114.160 – 165, SBCM 1.114.206 – 208, and SBCM 1.114.290 – 294. Most of these localities occur further north and northeast than the 1-mile perimeter (up to 1.8 miles away), but correspond to geologic subunits that may be present at SBCM 1.114.67 – 73. Localities occur in Qoa of variable composition, including Qof_2, varying from wet dark yellow clay, to red sandy silt, to green silt with clasts of clay and caliche, to grey sand and gravel lenses dispersed within the other units. This Qoa is buried shallowly below a thin veneer of soil and Holocene age alluvium (Qa; Dibblee and Minch 2008). The fossil assemblage consists of microfossils, bone fragments, and insect burrow traces; mode of preservation is permineralization for bone and casts for burrow traces. Bones are only lightly permineralized.

Taxa found at these localities include: indeterminate Plantae pollen; insect burrow traces; *Bufo* sp. (= *Anaxyrus* sp.); indeterminate Anura; *Coleonyx variegatus*; *Cnemidophorus* cf. *tigris*; *Crotaphytus* sp.; *Gambelia* sp.; *Callisaurus draconoides*; *Phrynosoma* sp.; *Sceloporus* sp.; *Uta stansburiana*; indeterminate Iguanidae; indeterminate Lacertilia; *Crotalus* sp.; indeterminate Colubridae; indeterminate Aves; *Ammospermophilus leucurus*; cf. *Xerospermophilus mohavensis*; indeterminate Sciuridae; *Dipodomys* sp.; *Perognathus* sp.; *Thomomys bottae*; *Thomomys* sp.; *Microtus* sp.; *Neotoma* sp.; indeterminate Cricetidae; *Lepus* sp.; *Sylvilagus* sp.; indeterminate Leporidae; and various indeterminate vertebrate bone and enamel fragments. The vertebrate assemblage mostly consists of extant species capable of surviving in xeric environments, and so

is likely of latest Pleistocene or Holocene age (some specimens were probably taken from Qa). Fossils are disarticulated and disassociated, showing minor surface abrasions and other signs of fluvial transport, and are most abundant in Qoa units comprised of fine sand or finer grained clasts.

Finally, SBCM 1.114.88 is located 0.95 miles north of the project site at 34.52 latitude and -117.36 longitude. Subfossil remains of cf. *Xerospermophilus mohavensis*, *Dipodomys* sp., and *Perognathus* sp., as well as fragments of indeterminate small mammals, were collected near to the surface at this locality from a green sandy silt below surface soil. This locality is probably early Holocene in age, though it could potentially be from the latest Pleistocene.

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

Please do not hesitate to contact us with any further questions that you may have.

Sincerely,

Scott Kottkamp, Curator of Earth Science
Division of Earth Science
San Bernardino County Museum

Literature Cited

Dibblee, T.W., and J.A. Minch. 2008. Geologic map of the Shadow Mountains and Victorville 15 minute quadrangles, San Bernardino and Los Angeles Counties, California. Dibblee Geological Foundation. Dibblee Foundation Map DF-387. Scale 1:62,500.
Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_84197.htm (accessed 26 April 2022).

Hernandez, J.L., H.J. Brown, and B.F. Cox. 2008. Geologic map of the Victorville 7.5-minute quadrangle, San Bernardino County, California: A digital database. California Geological Survey. Preliminary Geologic Maps PGM-08-03. Scale 1:24,000. Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_84275.htm (accessed 14 April 2023).

Wilson, D.E., and D.M. Reeder, editors. 2005. Mammal species of the World: a taxonomical and geographic reference, Third Edition. Baltimore. The John Hopkins University Press.

Appendix A: Table of Fossil and Subfossil Taxa Found at Nearby SBCM Localities

Specific localities only given for taxa found at localities within 1 mile of project site. Taxa only found at additional localities associated with the same series as SBCM 1.114.67 – 73 are listed as "Other Nearby." These are provided to better capture the full assemblage of fossil taxa known to be present near the project site. The orders and families of mammals follow Wilson and Reeder (2005).

Group	**Taxon**	**Common Name**	**Family**	**SBCM Locality (1.114.#)**
Plantae	Indeterminate (Pollen)	Plant	Indeterminate	71
Gastropoda	Indeterminate	Snail	Indeterminate	254
Insecta Ichnotaxon	Indeterminate	Insect Burrow Trace	Indeterminate	Other Nearby
Amphibia: Anura	*Bufo* sp. (= *Anaxyrus* sp.)	North American Toad	Bufonidae	Other Nearby
Amphibia: Anura	Indeterminate	Frog or Toad	Indeterminate	Other Nearby
Reptilia: Lacertilia	*Coleonyx variegatus*	Western Banded Gecko	Eublepharidae	Other Nearby
Reptilia: Lacertilia	*Cnemidophorus* cf. *tigris*	Western Whiptail	Teiidae	Other Nearby
Reptilia: Lacertilia	*Crotaphytus* sp.	Collared Lizard	Crotaphytidae	Other Nearby
Reptilia: Lacertilia	*Gambelia* sp.	Leopard Lizard	Crotaphytidae	Other Nearby
Reptilia: Lacertilia	*Callisaurus draconoides*	Zebra-tailed Lizard	Phrynosomatidae	Other Nearby
Reptilia: Lacertilia	*Phrynosoma* sp.	Horned Lizard	Phrynosomatidae	Other Nearby
Reptilia: Lacertilia	*Sceloporus* sp.	Spiny Lizard	Phrynosomatidae	Other Nearby
Reptilia: Lacertilia	*Uta stansburiana*	Common Side-blotched Lizard	Phrynosomatidae	Other Nearby
Reptilia: Lacertilia	Iguanidae, indet. genus	Iguanid Lizard	Iguanidae	Other Nearby
Reptilia: Lacertilia	Indeterminate	Lizard	Indeterminate	67, 73
Reptilia: Serpentes	*Crotalus* sp.	Rattlesnake	Viperidae	68
Reptilia: Serpentes	Colubridae, indet. genus	Colubrid Snake	Colubridae	67, 73

Aves	Indeterminate	Bird	Indeterminate	Other Nearby
Mammalia: Rodentia	*Ammospermophilus leucurus*	Antelope Squirrel	Sciuridae	67
Mammalia: Rodentia	*cf. Xerospermophilus mohavensis*	Mohave Ground Squirrel	Sciuridae	88
Mammalia: Rodentia	Sciuridae, indet. genus	Squirrel	Sciuridae	Other Nearby
Mammalia: Rodentia	*Dipodomys* sp.	Kangaroo Rat	Heteromyidae	71, 73, 88
Mammalia: Rodentia	*Perognathus* sp.	Silky Pocket Mouse	Heteromyidae	67, 73. 88, 255
Mammalia: Rodentia	*Thomomys bottae*	Botta's Pocket Gopher	Geomyidae	73, 253
Mammalia: Rodentia	*Thomomys* sp.	Smooth-toothed Pocket Gopher	Geomyidae	Other Nearby
Mammalia: Rodentia	*Microtus* sp.	Vole	Cricetidae	Other Nearby
Mammalia: Rodentia	*Neotoma* sp.	Woodrat	Cricetidae	Other Nearby
Mammalia: Rodentia	Cricetidae, indet. genus	Cricetid Rodent	Cricetidae	67, 72
Mammalia: Rodentiia	Indeterminate	Rodent	Indeterminate	73
Mammalia: Lagomorpha	*Lepus* sp.	Jackrabbit	Leporidae	73
Mammalia: Lagomorpha	*Sylvilagus* sp.	Cottontail	Leporidae	67
Mammalia: Lagomorpha	Leporidae, indet. genus	Rabbit	Leporidae	Other Nearby
Mammalia	Indeterminate (Small)	Mammal	Indeterminate	All
Mammalia	Indeterminate (Large)	Mammal	Indeterminate	Other Nearby