Paleontological Resources Assessment for the Well No. 152 Drilling and Equipping Project, Highland, San Bernardino County, California

OCTOBER 2026

PREPARED FOR

Albert A. Webb Associates

PREPARED BY

SWCA Environmental Consultants

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE WELL NO. 152 DRILLING AND EQUIPPING PROJECT, HIGHLAND, SAN BERNARDINO COUNTY, CALIFORNIA

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EXECUTIVE SUMMARY

Purpose and Scope: SWCA Environmental Consultants (SWCA) was retained by Albert A. Webb Associates, to conduct a paleontological resources assessment for the Well No. 152 Drilling and Equipping Project (project) in Highland, California. The project involves the drilling, construction, operation, and maintenance of a new potable water production well at the East Valley Water District (EVWD) headquarters. The project is subject to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The EVWD is the CEQA lead agency for the project, and the U.S. Bureau of Reclamation is the federal lead for NEPA. As this project is subject to both state and federal regulations through a local agency and is receiving federal funding through a Bureau of Reclamation WaterSmart Grant, this assessment was performed in compliance with the CEQA-Plus Environmental Review Process as set out in the California State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund regulations.

This assessment was conducted to analyze the potential for the project to impact paleontological resources and provide mitigation recommendations, as appropriate, pursuant to CEQA and NEPA. The methods used to conduct this assessment included a review of geologic maps, scientific literature, confidential fossil locality records from the San Bernardino County Museum (SBCM), project design, and other information related to existing conditions. This assessment follows the guidelines of the Society of Vertebrate Paleontology (SVP) and best practices in mitigation paleontology.

Dates of Investigation: SWCA reviewed the relevant maps, literature, and project information in November 2025 and received the results of a museum records search from the SBCM on December 11, 2025.

Summary of Findings: Geologic mapping indicates the project site contains late Holocene very young alluvial fan deposits as well as middle Holocene young axial channel deposits, Unit 3. Artificial fill is likely also present from previous nearby development. The SBCM has one record of a fossil locality near the project site from Pleistocene sediments similar to those that may be present at depth within the project site.

Impact Analysis: Whereas artificial fill may contain fossils, these fossils are out of stratigraphic context and not important for scientific study. Thus, artificial fill has no paleontological potential. Only the remains of plants and animals from the middle to early Holocene are considered scientifically important, and remains of this age do not appear to be common across San Bernardino County. Therefore, the very young alluvial fan deposits and young axial channel deposits, Unit 3 both have low paleontological potential (Potential Fossil Yield Classification system ranking 2). The SBCM notes that sediments of Pleistocene age may be shallowly present at depth below the young axial channel deposits, Unit 3 and similar Pleistocene deposits have produced scientifically important fossils elsewhere in Southern California. Most site preparation is expected to result in ground disturbance up to 5 feet below ground surface (bgs) with a depth of 15 feet bgs for the booster station equipment. The well would be installed with a maximum 42-inch diameter casing and drilled to a depth of approximately 800 feet bgs. While drilling of the well would extend into naturally deposited, in situ, Pleistocene-age deposits at depth, this activity 1) precludes the ability to observe excavation or any resources at depth, 2) produces spoils that are highly disturbed and any resources present would be destroyed, and 3) affects a relatively small volume of sediment given the 42-inch-diameter casing of the drill. As such, this activity is not likely to result in a potentially significant impact. However, excavation for the booster station equipment could result in a potentially significant impact to Pleistocene sediments and any scientifically significant paleontological resources they may contain.

Recommendations: To address the potential for significant impacts to unique paleontological resources during ground-disturbing activities for the booster station, SWCA recommends implementing mitigation measure MM Paleo-1, presented below. This measure has been developed in accordance with and incorporates the performance standards of the SVP and best practices in mitigation paleontology, and meets the requirements of CEQA-Plus.

MM Paleo-1

a) Conduct Worker Environmental Awareness Training. A Qualified Paleontologist shall 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 training program shall be presented by the Qualified Paleontologist (or their representative) to the crew prior to any ground-disturbing activities.

b) Monitor for Paleontological Resources. A single paleontological monitoring spot-check shall occur once excavation for the booster station reaches a greater depth than 5 feet to evaluate the absence or presence of Pleistocene sediments. If Pleistocene age sediments are encountered, monitoring should transition to full-time during ground disturbing activities for the booster station below a depth of 5 feet. Monitoring shall not be required when ground-disturbing activities would occur only within previously disturbed sediments and/or artificial fill, regardless of depth, or for drilling of the well. Monitoring shall be conducted by a qualified paleontological monitor who meets the standards of the SVP and who shall be supervised by the Qualified Paleontologist. The Qualified Paleontologist may periodically inspect construction activities and increase, decrease, or cease monitoring in response to subsurface conditions, as appropriate.

c) Prepare a Paleontological Resources Monitoring Report. At the conclusion of ground-disturbing activities, the Qualified Paleontologist shall prepare a final monitoring report that documents the methods and results of the monitoring efforts, treatment of paleontological resources, results of specimen processing, analysis, and research, and final curation arrangements, as applicable. The report shall be completed after the completion of paleontological monitoring for 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. A copy of the final monitoring report shall be filed with EVWD.

d) Treat Fossil Discoveries. In the event of a fossil discovery, whether by the qualified paleontological monitor or a member of the construction crew, the qualified paleontological monitor shall have the authority to temporarily divert construction activity, and all work shall cease in a 50-foot radius of the discovery. The Qualified Paleontologist will evaluate the scientific significance of the find and, if appropriate, collect the fossil specimen(s) and all associated data. Paleontological monitors shall record pertinent geological information and collect sediment from the fossil localities. Recovered fossils shall be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility. The Qualified Paleontologist shall obtain a curatorial arrangement with an accredited repository and scientifically significant fossils may be donated to this institution.

Based on these findings and recommendations presented in this assessment, SWCA finds the potential for project impacts to a unique paleontological resource under CEQA-Plus is less than significant with implementation of MM Paleo-1.

Disposition of Data: This report has been submitted to EVWD, and a copy will remain on file at SWCA's Pasadena, California, office.

CONTENTS

Introduction **1**
Project Location 1
Project Description 1
Regulatory Setting **5**
Federal Regulations 5
National Environmental Protection Act 5
State Regulations 5
California Environmental Quality Act 5
Public Resources Code Section 5097.5 5
CEQA-Plus 6
Professional Standards **6**
Paleontological Potential 7
Potential Fossil Yield Classification 8
Methods **9**
Literature Review 9
Museum Records Search 9
Results **9**
Literature Review 9
Regional Geology 9
Local Geology and Paleontology 9
Museum Records Search 12
Recommended Mitigation Measures and Conclusions **12**
Literature Cited **14**

Figures

Figure 1. Project vicinity 2
Figure 2. Project site plotted on a USGS topographic map. 3
Figure 3. Project site plotted on an aerial photograph. 4
Figure 4. Geologic units in the project site and vicinity. 11

Tables

Table 1. Potential Fossil Yield Classification Rankings and SVP Categories of Potential 8
Table 2. San Bernardino County Museum Fossil Localities Within and Near the Project Site 12

INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained by Albert A. Webb Associates to conduct a paleontological resources assessment for the Well No. 152 Drilling and Equipping Project (project) in Highland, San Bernardino County, California (Figure 1). The project involves the drilling, construction, operation, and maintenance of a new potable water production well at the East Valley Water District (EVWD) headquarters. The project is subject to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). The EVWD is the CEQA lead agency for the project, and the U.S. Bureau of Reclamation (Reclamation) is the federal lead for NEPA. As this project is subject to both state and federal regulations through a local agency and is receiving federal funding through a Bureau of Reclamation WaterSmart Grant, this assessment was performed in compliance with the CEQA-Plus Environmental Review Process as set out in the California State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund (CWSRF) regulations.

SWCA has prepared this paleontological resources technical report to summarize the results of this assessment, which includes a review of geologic maps, scientific literature, confidential fossil locality records from the San Bernardino County Museum (SBCM), and other relevant information. This technical report also includes a discussion of the potential for the project to impact scientifically significant paleontological resources and provides recommendations for mitigation to reduce any potential impacts to less-than-significant levels pursuant to CEQA-Plus, covering both CEQA and NEPA requirements. This assessment follows the guidelines of the Society of Vertebrate Paleontology (SVP) and *Best Practices in Mitigation Paleontology* (Murphey et al. 2019; SVP 2010).

This report was prepared by SWCA Assistant Project Paleontologist Jake Biewer, M.Sc., and quality assurance/quality control was provided by SWCA Lead Paleontologist Jason Adams, M.S. Copies of the report and research materials are on file with SWCA's office in Pasadena, California.

Project Location

The project site is located within the existing EVWD headquarters facility at 31111 Greenspot Road in Highland, California (Figure 2). Specifically, the project site is on an approximately 1.13-acre portion of assessor parcel number (APN) 029-705-124 on the south side of the EVWD headquarters site within Greenspot Road (Figure 3). The project site is in Section 7, Township 1 South, Range 2 West (San Bernardino Baseline and Meridian), as depicted on the U.S. Geological Survey (USGS) Yucaipa, California, and Redlands, California, 7.5-minute quadrangles (USGS 1988a, 1988b) (see Figure 2).

Project Description

EVWD proposes the drilling, construction, operations, and maintenance of a new potable groundwater supply well designated Well No. 152. The proposed project would include the installation of a wellhead, booster station, aboveground storage tank and chemical building, and storm drain pipeline. Demolition, relocation and reconstruction of a portion of the south side parking stalls and storage areas would be required. The storage containers would be relocated on-site to allow for the well building, and a new underground 18-inch diameter storm drain and 24-inch diameter storm drain pipeline would be constructed to connect to the existing 18-inch diameter storm drain and 24-inch diameter storm drain conveyance route between the parking lot and the Water Quality Management Basin and drainage channel to the south, respectively. The project also proposes to pave the area surrounding the chemical building, well building, water storage tank, and booster station.

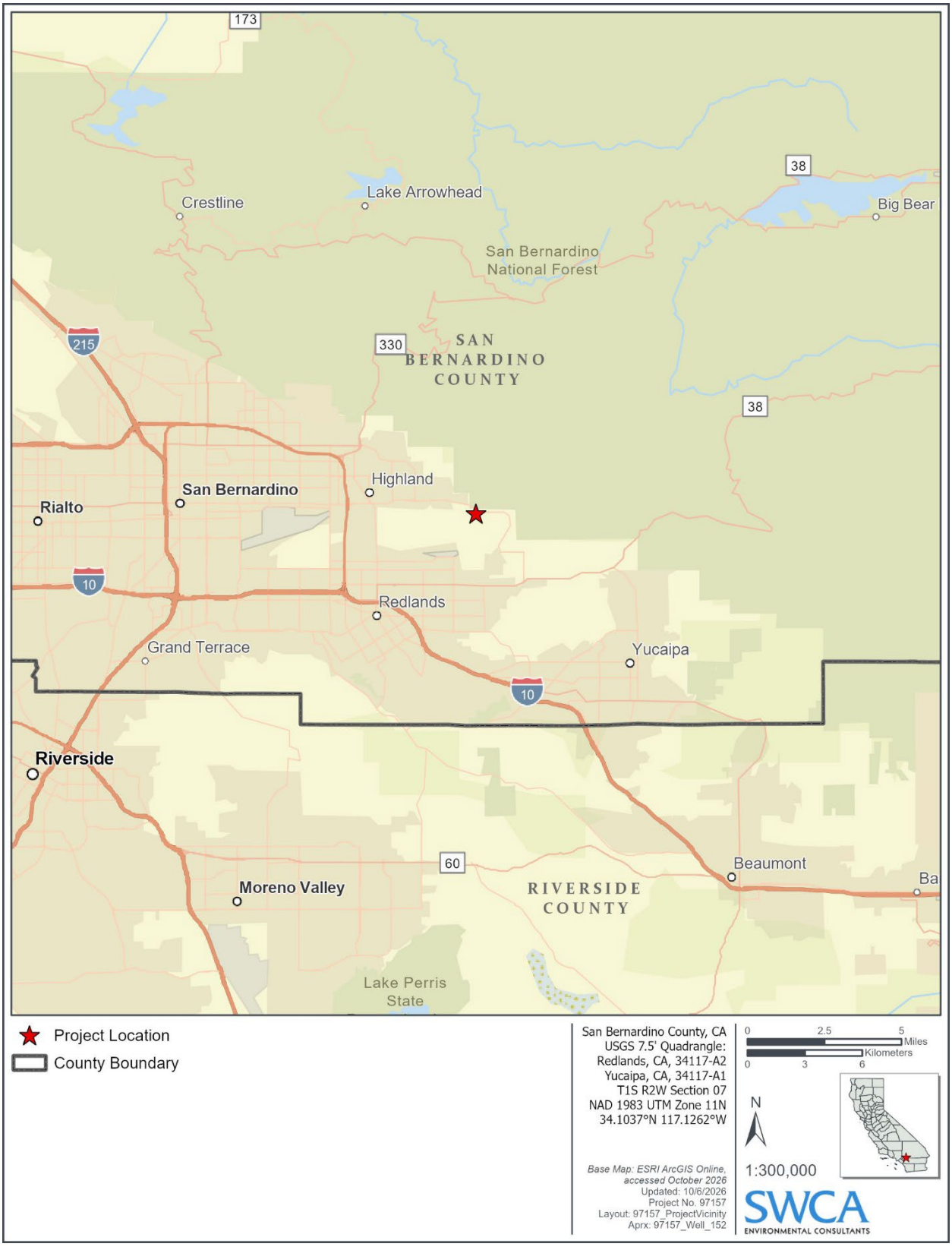


Figure 1. Project vicinity.

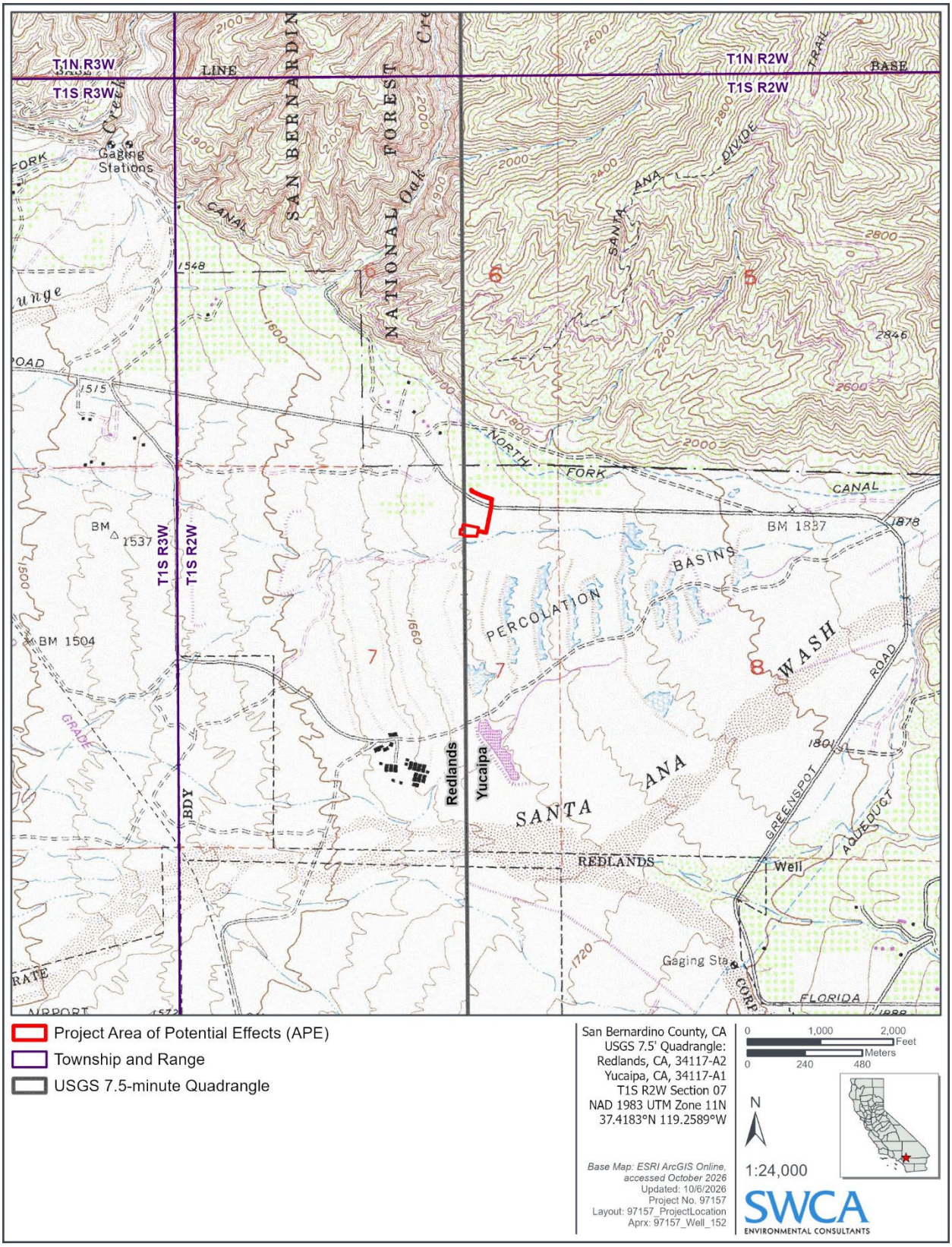


Figure 2. Project site plotted on a USGS topographic map.



Figure 3. Project site plotted on an aerial photograph.

Most site preparation is expected to result in ground disturbance up to 5 feet below ground surface (bgs) with a depth of 15 feet bgs for the booster station equipment. The well would be installed with a maximum 42-inch diameter casing and drilled to a depth of approximately 800 feet bgs.

REGULATORY SETTING

Federal Regulations

National Environmental Protection Act

NEPA (42 United States Code [USC] 4321 et seq.) requires the consideration of important natural aspects of our national heritage during the assessment of environmental consequences of proposed projects that involve federal land—or in some cases—federal oversight. In addition, the Federal Land Policy and Management Act of 1976 (43 USC 1701–1787) requires the management of public lands in a manner that will protect the quality of their scientific value. NEPA requires the consideration of potential environmental effects in the evaluation of any proposed federal agency action. With the passage of the Paleontological Resources Preservation Act of 2009 (16 USC 470aaa 1-11), paleontological resources are considered significant resources; therefore, it is standard practice to include paleontological resources in NEPA evaluations (40 Code of Federal Regulations 1500–1508). As the EVWD received a Reclamation SmartWater grant for this project, it is considered an undertaking under federal law and thus subject to NEPA. However, compliance with the CEQA-Plus Environmental Review Process would also meet NEPA requirements.

State Regulations

California Environmental Quality Act

CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including effects on paleontological resources. The California State CEQA Guidelines for the implementation of CEQA (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 protection are included in California Public Resources Code (PRC) 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.

This statute prohibits 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.

CEQA-Plus

A CEQA-Plus study addresses compliance with state and federal regulations when a federal nexus is established during project execution, triggering federal cross-cutting regulations (also referred to as federal cross-cutters or CEQA-Plus). A federal nexus has been established for this project with the receipt of federal funding and/or permitting. Compliance with both state and federal regulations allows the lead agency to apply the results of this technical study to both levels of regulation should a nexus be established. Compliance with cross-cutting federal authorities is set out in the SWRCB CWSRF regulations (40 Code of Federal Regulations [CFR] 35.3145) and the U.S. Department of Agriculture Environmental Policies and Procedures (7 CFR 1970).

PROFESSIONAL STANDARDS

For the purposes of CEQA, 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 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, and most state regulatory agencies accept and use the professional standards set forth by the SVP. As defined by the SVP in *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010:11), scientifically 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 4,200 years ago [Cohen et al. 2024]).

The following criteria (as modified from Scott and Springer 2003) provide assistance in determining scientific significance (or, scientific importance) of paleontological resources:

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

Paleontological resources that may not have paleontological significance or are considered not scientifically important are those that lack provenience or context, that lack physical integrity because of

decay or natural erosion, or that are overly redundant or are otherwise not useful for research (Murphey et al. 2019).

Paleontological Potential

The SVP defines paleontological potential as the potential for a geologic unit to produce scientifically significant fossils, determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological potential is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. The potential ranking provides the basis for determining which mitigation measures or recommendations, if any, are appropriate for a given project.

The SVP (2010:1–2) defines the following four categories of paleontological potential for rock units—high, undetermined, low, 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.
>
> **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.
>
> **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.

Potential Fossil Yield Classification

The Potential Fossil Yield Classification (PFYC) system was developed by the Bureau of Land Management (BLM) to provide baseline guidance for the agency and specialists to determine the presence of and potential for paleontological resources across its jurisdiction and guide the appropriate corresponding management considerations (BLM 2022). Using this system, the BLM has assigned a PFYC ranking (PFYC 1–PFYC 5) to each geologic unit (formation, member, or other distinguishable units) at the most detailed, mappable level available based on the taxonomic diversity and abundance of previously recorded scientifically significant paleontological resources associated with the unit and the potential for future discoveries, with a higher ranking indicating higher potential (BLM 2023). Additional rankings are provided for geologic units of unknown potential (PFYC U), water (PFYC W), and ice (PFYC I).

As this project is considered an undertaking under federal law, the PFYC system will be used for federal compliance in addition to the SVP standards for paleontological sensitivity being used for CEQA. PFYC rankings and their corresponding SVP-defined categories of paleontological potential are provided in Table 1.

Table 1. Potential Fossil Yield Classification Rankings and SVP Categories of Potential

PFYC*	SVP†	Description	Management Concern
PFYC 1 – Very Low	No Potential	Geologic units that are not likely to contain recognizable paleontological resources, such as igneous, metamorphic, or Precambrian rocks.	Negligible or not applicable
PFYC 2 – Low	Low Potential	Sedimentary geologic units that are not likely to contain paleontological resources, such as those younger than 10,000 years, recent eolian deposits, and those that have undergone physical or chemical changes.	Generally low
PFYC 3 – Moderate	Low to High Potential	Sedimentary units with variable fossil content and importance.	Moderate
PFYC 4 – High	High Potential	Geologic units with high occurrence of paleontological resources but with variable occurrence and predictability. Contained paleontological resources may be at risk from human disturbance.	Moderate to high
PFYC 5 – Very High	High Potential	Geologic units that consistently and predictably produce paleontological resources of important scientific value that may be at risk from human disturbance.	High to very high
PFYC U – Unknown	Unknown Potential	Geologic units that cannot receive an informed PFYC assignment due to the unit being poorly studied.	Moderate to high (until a provisional ranking is assigned)
PFYC W – Water	Low Potential	Most surface water bodies do not contain paleontological resources, but shorelines should be considered for uncovered paleontological resources. Reservoirs, karst area sinkholes, cenotes, and dredged river systems may contain paleontological resources.	Low
PFYC I – Ice	Low Potential	Includes any area that is mapped as ice or snow. Receding glaciers, including exposed lateral and terminal moraines, should be considered for their potential to reveal recently exposed paleontological resources. Other considerations include melting snow fields that may contain paleontological resources with possible soft-tissue preservation.	Low to moderate

* BLM (2022).
† SVP (2010).

METHODS

Literature Review

SWCA reviewed geologic maps and relevant geological and paleontological literature to determine which geologic units are present in the project site and whether fossils have been recovered from those geologic units elsewhere in the region. The geologic mapping for the project site used in this analysis is from Morton and Miller (2006) at a scale of 1:100,000. As geologic units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas beyond the project site. The results of this literature review include a discussion of the geology and paleontological potential of the geologic units in the project site.

Museum Records Search

The purpose of a museum records search is to establish the status and extent of previously recorded paleontological resources within and adjacent to the study area for a given project. This search provides another line of inquiry to assist in determining the paleontological potential of geologic units, as not all information regarding fossil collections has been documented and published. Generally, this search is conducted through the closest, regional institution that would have collections and information relevant to a project. As this project is in San Bernardino County, the museum records search request was submitted to the SBCM on October 28, 2025. The results were received on December 11, 2025, and have been incorporated into the Results section of this report.

RESULTS

Literature Review

Regional Geology

The project site is in the Peninsular Ranges Geomorphic Province, a 900-mile-long northwest-southeast-trending structural block that extends from the Transverse Ranges in the north to the tip of Baja California in the south and includes the Los Angeles Basin (California Geological Survey 2002). This province is characterized by mountains and valleys that trend in a northwest-southeast direction, roughly parallel to the San Andreas Fault Zone (Norris and Webb 1990; Sharp 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rocks covered by Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb 1990). Dates for the geologic periods and epochs used in this report are derived from the *International Chronostratigraphic Chart* prepared by the International Commission on Stratigraphy (Cohen et al. 2024).

Local Geology and Paleontology

According to geologic mapping by Morton and Miller (2006), the surface of the project site is mapped as late Holocene (present to 4,200 years ago) very young alluvial fan deposits and middle Holocene (4,200 to 8,200 years ago) young axial channel deposits, Unit 3 (Figure 4). Although not mapped within the

project by Morton and Miller (2006), artificial fill is likely present at the surface of the project site from prior development of the area. Geologic units and their paleontological sensitivities are described in more detail below.

ARTIFICIAL FILL

Artificial fill consists of sediments that have been removed from one location and transported to another location by human activity rather than by natural means. The transportation distance can vary from a few feet to many miles, and the composition is dependent on the source and purpose. Whereas artificial fill may contain fossils, these fossils are out of stratigraphic context and not important for scientific study; therefore, artificial fill is considered to have no paleontological potential.

VERY YOUNG ALLUVIAL FAN DEPOSITS (QA)

The very young alluvial fan deposits are late Holocene in age and consist of unconsolidated to slightly coherent, essentially undissected deposits of sand, gravel, and boulders that form active and recently active parts of alluvial fans (Morton and Miller 2006). According to the SVP (2010), only the remains of plants and animals from the middle to early Holocene (4,200–11,700 years ago) are considered scientifically important. As such, the very young alluvial fan deposits are considered to have low paleontological potential (PFYC 2).

YOUNG AXIAL CHANNEL DEPOSITS, UNIT 3 (QYA_3)

The young axial channel deposits, Unit 3 are middle Holocene in age and consist of pale brown and very pale brown fine- to coarse-grained sand and pebbly sand that coarsens upstream to poorly sorted fine- to coarse-grained sand and sandy pebble to small-cobble gravel (Morton and Miller 2006). As stated above, the SVP (2010) only considers the remains of plants and animals from the middle to early Holocene (4,200 to 11,700 years ago) to be significant. According to online fossil locality data from the Paleobiology Database (PBDB) and the University of California Museum of Paleontology (UCMP), fossils of Holocene age appear to be uncommon in San Bernardino County with only a single known locality far to the east at Kokoweef Peak (PBDB 2025; UCMP 2025). As such, the young axial channel deposits, Unit 3 are considered to have low paleontological potential (PFYC 2). According to the SBCM (2025), these Holocene age sediments likely shallowly overlie older, Pleistocene age sediments at depth. The museum notes that a Pleistocene age locality was found approximately 4 miles away from the project site only 2 feet below ground surface (see below). Pleistocene sediments have a rich fossil history in Southern California (Jefferson 1991a, 1991b; McDonald and Jefferson 2008; Miller 1971; Reynolds and Reynolds 1991, Springer et al. 2009).

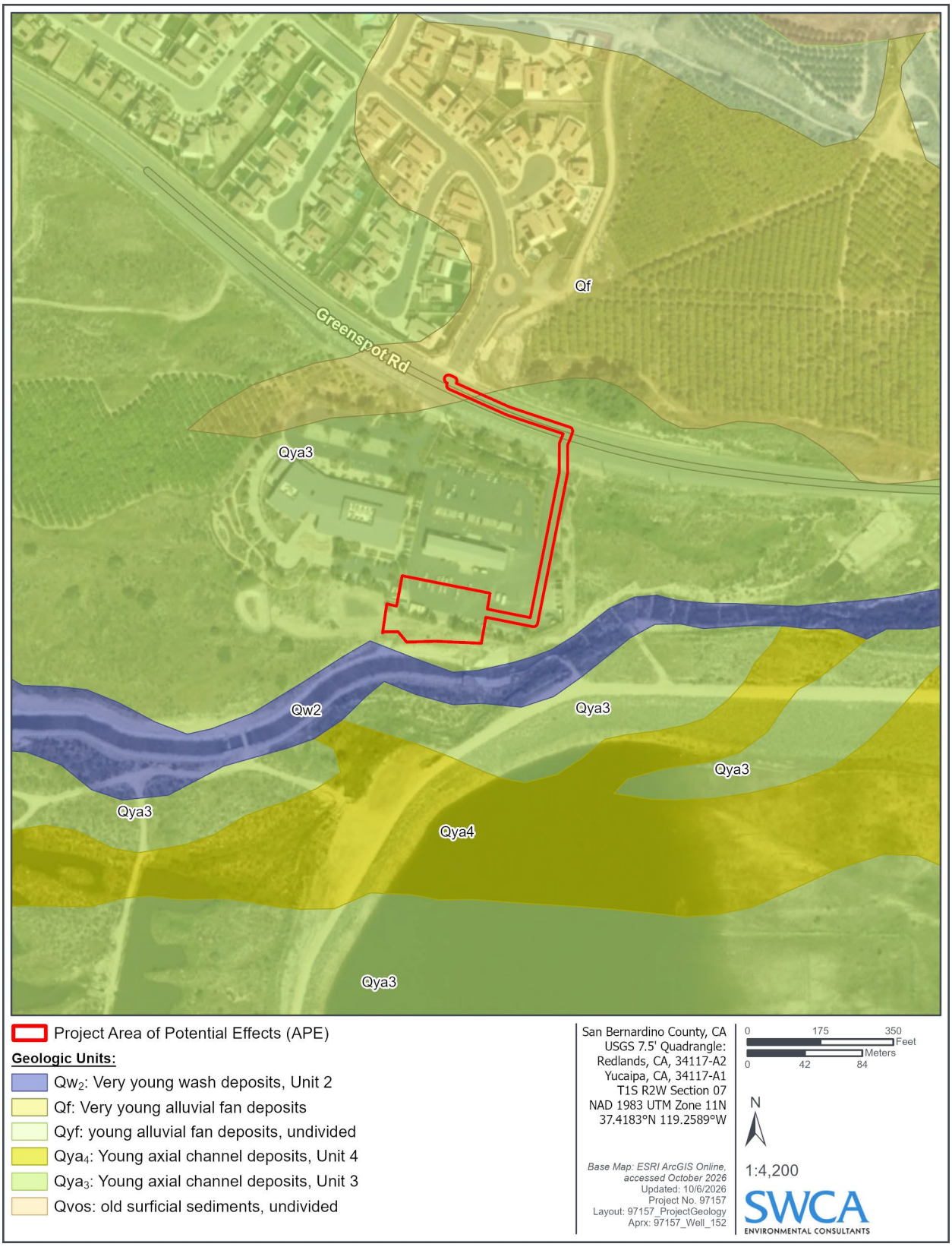


Figure 4. Geologic units in the project site and vicinity.

The most common Pleistocene terrestrial mammal fossils include the bones of mammoth, bison, deer, and small mammals, but other taxa, including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, and giant ground sloth, have been reported (Graham and Lundelius 1994), as well as reptiles, snakes, frogs, and salamanders (Hudson and Brattstrom 1977). In addition to illuminating the striking differences between the Pleistocene and today in Southern California, 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). There is a potential to find similar fossils in the older, Pleistocene sediments at depth below this geologic unit.

Museum Records Search

The SBCM (2025) does not possess records of paleontological resources from within the project site; however, the museum has one record of a fossil locality in its vicinity from Pleistocene age deposits similar to those that may exist at depth within the project site. Table 2 summarizes the relevant results of the SBCM records search (SBCM 2025).

Table 2. San Bernardino County Museum Fossil Localities Within and Near the Project Site

Locality Number	Approximate Distance from the Project Site	Formation	Taxa	Approximate Depth
SBCM 1.102.03	4.6 miles	Unnamed Pleistocene	Elephant order	2 feet

Source: SBCM (2025).

IMPACT ANALYSIS

Most site preparation is expected to result in ground disturbance up to 5 feet bgs with a depth of 15 feet bgs for the booster station equipment. The well would be installed with a maximum 42-inch diameter casing and drilled to a depth of approximately 800 feet bgs. Geologic mapping indicates the project site contains late Holocene (present to 4,200 years ago) very young alluvial fan deposits and middle Holocene (4,200 to 8,200 years ago) young axial channel deposits, Unit 3. The site likely also contains artificial fill, which has no paleontological potential. Both the very young alluvial fan deposits and young axial channel deposits, Unit 3 have low paleontological potential (PFYC 2). The SBCM notes that sediments of Pleistocene age may be shallowly present at depth below the young axial channel deposits, Unit 3 (SBCM 2025) and similar Pleistocene deposits have produced scientifically important fossils elsewhere in Southern California. While drilling of the well would extend into naturally deposited, in situ, Pleistocene-age deposits at depth, this activity 1) precludes the ability to observe excavation or any resources at depth, 2) produces spoils that are highly disturbed and any resources present would be destroyed, and 3) affects a relatively small volume of sediment given the 42-inch-diameter casing of the drill. As such, this activity is not likely to result in a potentially significant impact. However, excavation for the booster station equipment could result in a potentially significant impact to Pleistocene sediments and any scientifically significant paleontological resources they may contain.

RECOMMENDED MITIGATION MEASURES AND CONCLUSIONS

To address the potential for significant impacts to unique paleontological resources during ground-disturbing activities for the booster station, SWCA recommends the following mitigation measure should be implemented by a Qualified Professional Paleontologist (who meets the SVP [2010] qualifications for

Principal Investigator or Project Paleontologist) to reduce potential impacts to paleontological resources to a less-than-significant level. The measure below has been developed in accordance with and incorporates the performance standards of the SVP (2010) and best practices in mitigation paleontology (Murphey et al. 2019) and meets the requirements of CEQA-Plus:

MM Paleo-1

a) Conduct Worker Environmental Awareness Training. A Qualified Paleontologist shall 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 training program shall be presented by the Qualified Paleontologist (or their representative) to the crew prior to any ground-disturbing activities.

b) Monitor for Paleontological Resources. A single paleontological monitoring spot-check shall occur once excavation for the booster station reaches a greater depth than 5 feet to evaluate the absence or presence of Pleistocene sediments. If Pleistocene age sediments are encountered, monitoring should transition to full-time during ground disturbing activities for the booster station below a depth of 5 feet. Monitoring shall not be required when ground-disturbing activities would occur only within previously disturbed sediments and/or artificial fill, regardless of depth, or for drilling of the well. Monitoring shall be conducted by a qualified paleontological monitor who meets the standards of the SVP and who shall be supervised by the Qualified Paleontologist. The Qualified Paleontologist may periodically inspect construction activities and increase, decrease, or cease monitoring in response to subsurface conditions, as appropriate.

c) Prepare a Paleontological Resources Monitoring Report. At the conclusion of ground-disturbing activities, the Qualified Paleontologist shall prepare a final monitoring report that documents the methods and results of the monitoring efforts, treatment of paleontological resources, results of specimen processing, analysis, and research, and final curation arrangements, as applicable. The report shall be completed after the completion of paleontological monitoring for 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. A copy of the final monitoring report shall be filed with EVWD.

d) Treat Fossil Discoveries. In the event of a fossil discovery, whether by the qualified paleontological monitor or a member of the construction crew, the qualified paleontological monitor shall have the authority to temporarily divert construction activity, and all work shall cease in a 50-foot radius of the discovery. The Qualified Paleontologist will evaluate the scientific significance of the find and, if appropriate, collect the fossil specimen(s) and all associated data. Paleontological monitors shall record pertinent geological information and collect sediment from the fossil localities. Recovered fossils shall be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility. The Qualified Paleontologist shall obtain a curatorial arrangement with an accredited repository and scientifically significant fossils may be donated to this institution.

Based on these findings and recommendations presented in this assessment, SWCA finds the potential for project impacts to a unique paleontological resource under CEQA-Plus is less than significant with the implementation of MM Paleo-1.

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.

Bureau of Land Management (BLM). 2022. *Implementing the Paleontological Resources Preservation Act of 2009 (PRPA)*. Permanent Instruction Memorandum No. 2022-009. Available at: https://www.blm.gov/policy/pim2022-009. Accessed November 2025.

———. 2023. BLM Natl PFYC Potential Fossil Yield Classification Geologic Formation Map Index 2022 Polygons. Updated April 7, 2023. Available at: https://gbp-blm-egis.hub.arcgis.com/datasets/813066f798704622ac8abf75d8786c69/about. Accessed November 2025.

California Geological Survey. 2002. California geomorphic provinces. *California Geological Survey Note* 36:3. Sacramento: California Department of Conservation, California Geological Survey,

Cohen, K.M., S.C. Finney, P.L. Gibbard, and J.-X. Fan. 2024. The ICS International Chronostratigraphic Chart. Originally published 2013. Revised December 2024. *Episodes* 36:199–204.

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.

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).

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.

McDonald, H.G., and G.T. Jefferson. 2008. Distribution of Pleistocene *Nothrotheriops* (Xenarthra, Nothrotheriidae) in North America. In *Geology and Vertebrate Paleontology of Western and Southern North America*, edited by X. Wang and L. Barnes, pp. 313–331. Science Series 41. Los Angeles, California: Natural History Museum of Los Angeles County.

Miller, W.E. 1971. Pleistocene vertebrates of the Los Angeles Basin and vicinity: exclusive of Rancho La Brea. *Bulletin of the Los Angeles County Museum of Natural History* 10.

Morton, D.M., and F.K. Miller. 2006. Geologic Map of the San Bernardino and Santa Ana 30-minute × 60-minute quadrangles, California. 1:100,000. Digital preparation by P.M. Cosette and K.R. Bovard. USGS Open File Report 2006-1217. Riverside, California: U.S. Geological Survey, in cooperation with the California Geological Survey, Spokane, Washington.

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.

Norris, R.M., and R.W. Webb. 1990. *Geology of California*. 2nd ed. Santa Barbara, California: John Wiley and Sons, Inc.

Paleobiology Database (PBDB). 2025. The Paleobiology Database. Available at: https://paleobiodb.org/#/. Accessed September 2025.

Reynolds, R.E., and R.L. Reynolds. 1991. The Pleistocene beneath our feet: near-surface Pleistocene fossils in inland Southern California basins. In *Inland Southern California: The Last 70 Million Years*, edited by M.O. Woodburne, R.E. Reynolds, and D.P. Whistler. *San Bernardino County Museum Special Publication* 38(3 and 4):41–43.

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 (SBCM). 2025. *Paleontology Records Review for proposed site of East Valley Water District Support Well No. 152 Project, Redlands, California*. Letter report. Redlands, California: San Bernardino County Museum.

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(1787):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. Association of Environmental Professionals, Sacramento, California. *Environmental Monitor* Fall:4–10.

Sharp, R.P. 1976. *Geology: Field Guide to Southern California*. 2nd ed. Dubuque, Iowa: Kendall/Hunt Publishing Company.

Society of Vertebrate Paleontology (SVP). 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 November 2025. Accessed November 2025.

Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray. 2009. The Diamond Valley Lake Local Fauna: Late Pleistocene Vertebrates from Inland Southern California. In *Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne, III,* edited by L.B. Albright. *Museum of Northern Arizona Bulletin* 65:217–236.

U.S. Geological Survey (USGS). 1988a. Yucaipa, California, 7.5-minute quadrangle. Published 1967. Photo revised 1988. Denver, Colorado: United States Geological Survey.

———. 1988b. Redlands, California, 7.5-minute quadrangle. Published 1967. Photo revised 1988. Denver, Colorado: United States Geological Survey.

University of California Museum of Paleontology (UCMP). 2025. Databases. Available at: https://ucmp.berkeley.edu/collections/databases/. Accessed September 2025.