

PALEONTOLOGICAL ASSESSMENT FOR THE APPLE VALLEY 84 PROJECT

**TOWN OF APPLE VALLEY,
SAN BERNARDINO COUNTY, CALIFORNIA**

APNs 472-211-01 to -03, -09 to -11, -17 to -21, and 472-301-01

Prepared on Behalf of:

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Prepared for:

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December 11, 2025



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Paleontological Database Information

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Report Date: December 11, 2025

Report Title: Paleontological Assessment for the Apple Valley 84 Project,
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Prepared on Behalf of: T&B Planning
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Assessor's Parcel Numbers: 472-21101 to -03, -09 to -11, -17 to -21, and 472-301-01

USGS Quadrangle: Section 19, Township 6 North, Range 3 West and Section 24,
Township 6 North, Range 4 West of the USGS *Apple Valley
North, California* (7.5-minute) Quadrangle

Study Area: Approximately 92.73 acres

Key Words: Paleontological assessment; Town of Apple Valley; Pleistocene
alluvial deposits; high sensitivity; monitoring recommended.

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I. INTRODUCTION AND LOCATION

This paleontological resource assessment has been completed for the Apple Valley 84 Project to comply with the California Environmental Quality Act (CEQA) and Town of Apple Valley environmental requirements. The approximately 92.73-acre project consists of 12 parcels (Assessor's Parcel Numbers [APNs] 472-211-01 to -03, -09 to -11, -17 to -21, and 472-301-01), located just east of Interstate 15, between Stoddard Wells and the unpaved Johnson roads, in the northern portion of the town of Apple Valley, San Bernardino County, California (Figures 1 and 2). The project is situated within Section 19, Township 6 North, Range 3 West and Section 24, Township 6 North, Range 4 West of the *Apple Valley North, California* topographic quadrangle map (see Figure 2). The project plans include the construction of an approximately 1,366,000-square-foot industrial warehouse facility. The parcels are currently vacant.

As the lead agency, the Town of Apple Valley has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area, a review of the underlying geology, and recommendations to mitigate impacts to potential paleontological resources, if necessary.

II. REGULATORY SETTING

CEQA, which is patterned after the National Environmental Policy Act, is the overriding regulation that sets the requirement for protecting California's cultural and paleontological resources. CEQA does not establish specific rules that must be followed but mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact on the environment, assess whether the impacts are significant, and provide recommendations, if necessary.

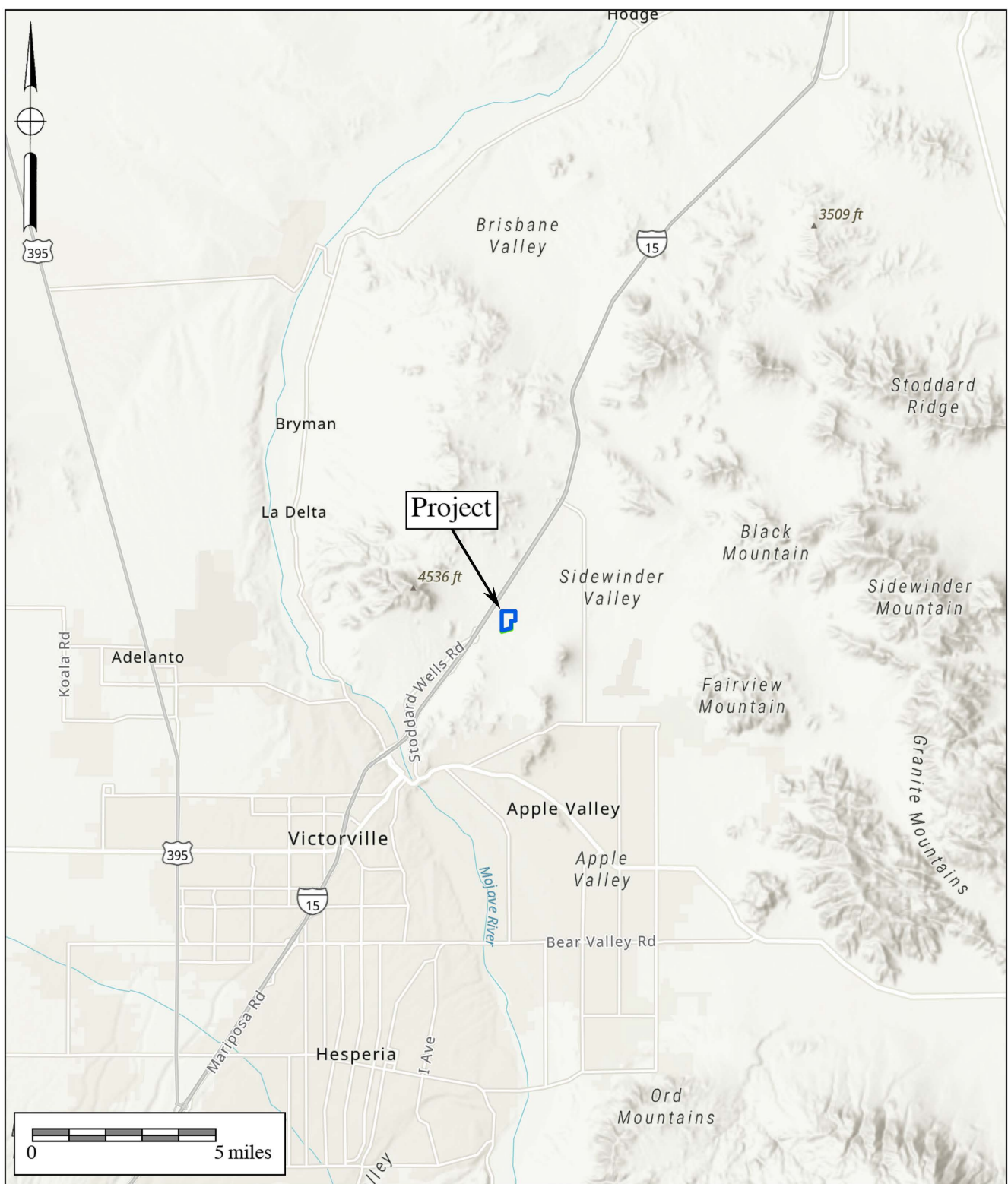


Figure 1
General Location Map
The Apple Valley 84 Project
Esri World Topographic Map

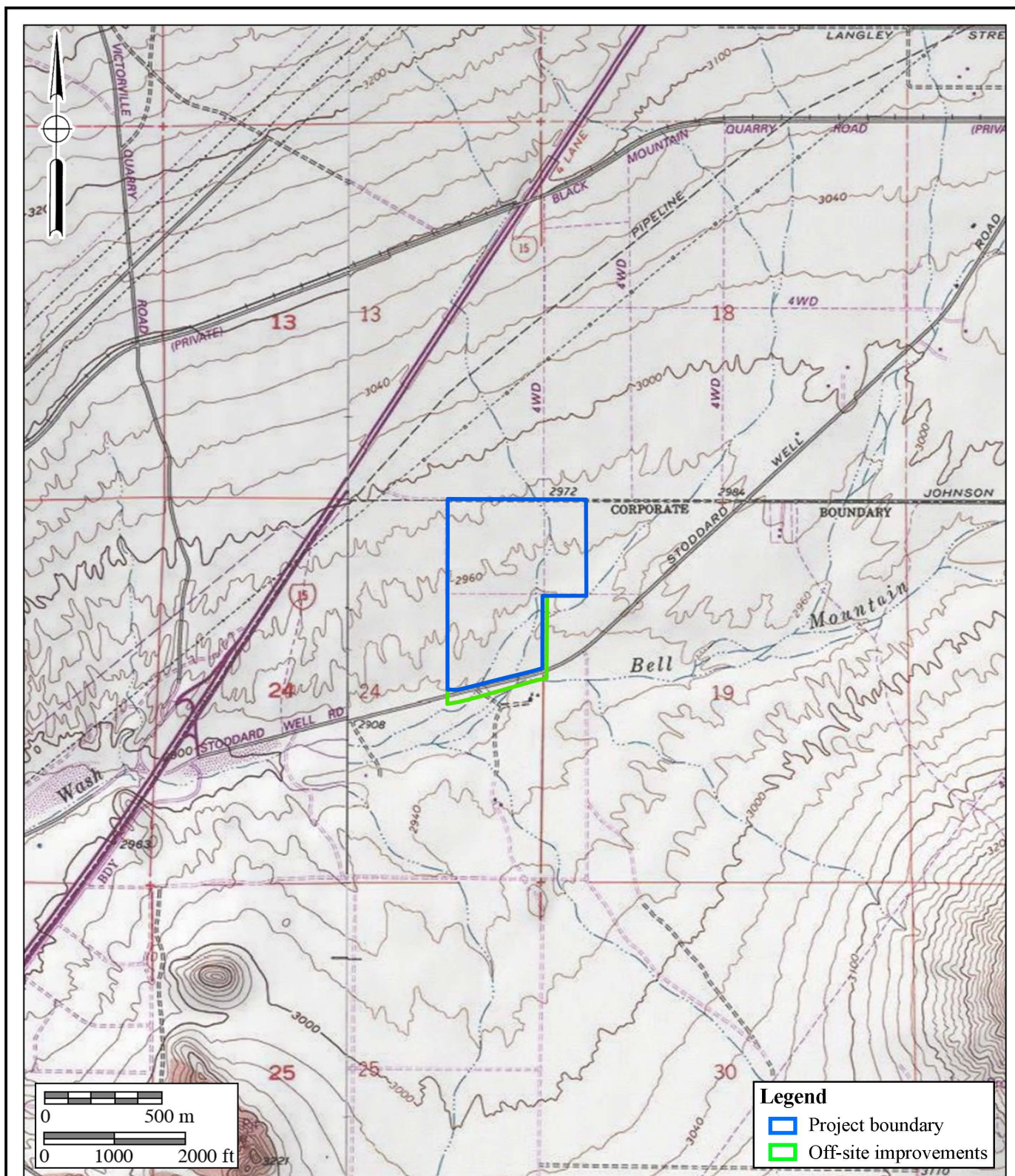


Figure 2
Project Location Map
 The Apple Valley 84 Project

USGS *Apple Valley North* and *Victorville* Quadrangles (7.5-minute series)

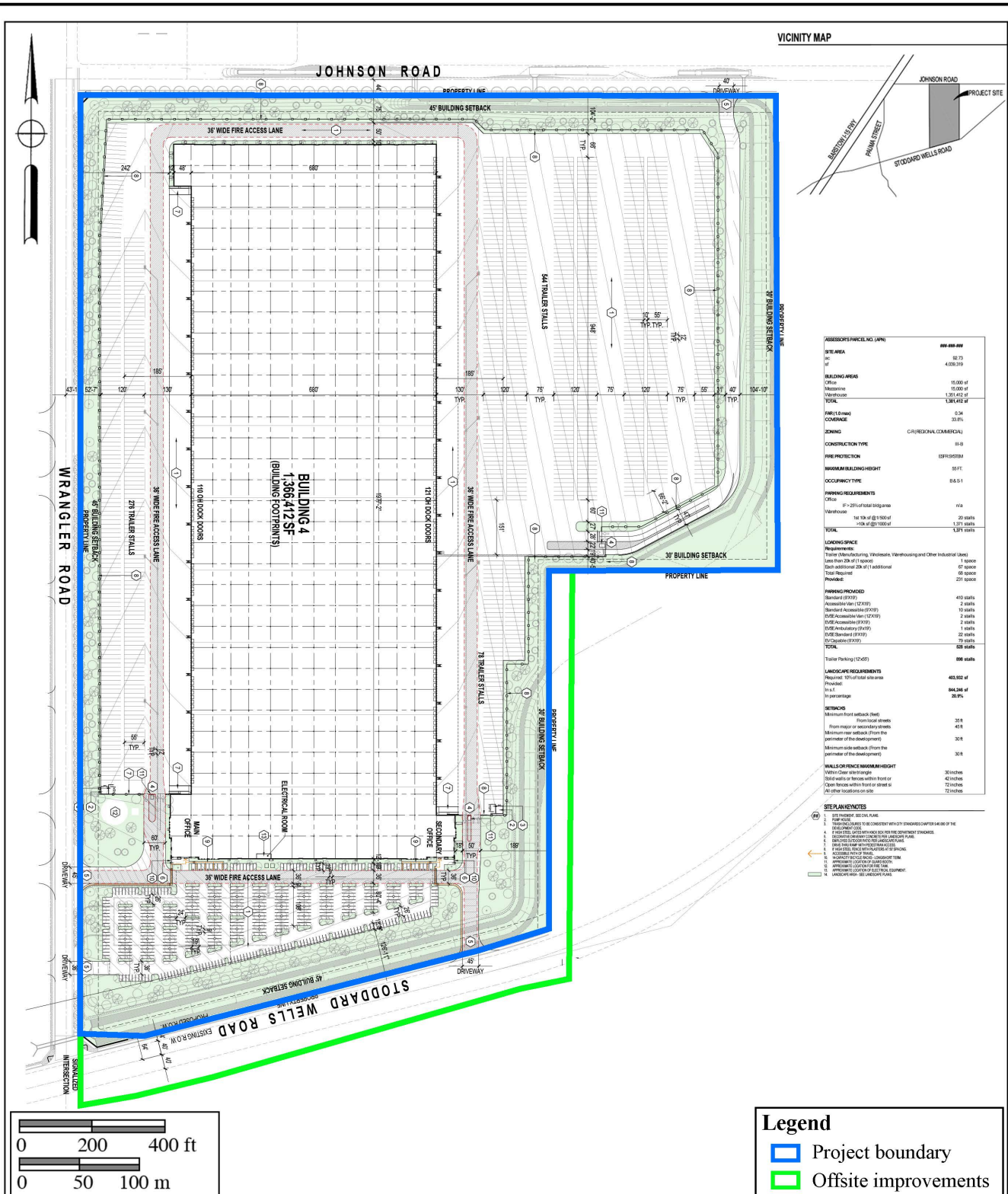


Figure 3
Site Plan
The Apple Valley 84 Project

In CEQA's Environmental Checklist Form, a question to respond to is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources, including fossils, which is paraphrased below:

- a) A person shall not 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, rock art, 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.
- b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
- c) A violation of this section is a misdemeanor.

Town of Apple Valley

The General Plan of Apple Valley (Town of Apple Valley 2009a) considers sedimentary deposits of Pleistocene age and older as having the potential to yield significant paleontological resources and, as such, considers these deposits as having a high paleontological sensitivity. Holocene-aged deposits at the surface are deemed to have a low sensitivity, since these deposits generally do not contain significant paleontological resources. The General Plan indicates that "Shallow grading of younger Quaternary [i.e., Holocene] alluvium that occurs throughout most of the area is not likely to reveal significant fossil remains"

As stated in the Environmental Impact Report (EIR) for the Town of Apple Valley's General Plan:

Future development in the Planning area could also impact paleontological resources, should Pleistocene-age soils be disturbed by grading or excavation activities resulting from build out of the General Plan. Since the depth of Holocene-age soils in the planning area is not known, Pleistocene-age soils may be sufficiently close to the surface to be disturbed by grading activities. Monitoring of grading activities by a suitably qualified expert should occur in areas where there is potential for disturbance to Pleistocene-age soils, in areas identified as potentially sensitive for paleontologic resources in Exhibit III-5 to determine the presence and significance of such resources. (Town of Apple Valley 2009b)

The project's paleontological sensitivity is evaluated in Section V of this report.

III. GEOLOGY

As shown in Figure 4 (after Hernandez and Tan 2007; Hernandez et al. 2008), the parcel lies at the distal edge of a broad alluvial fan mapped as early Pleistocene to possibly late Miocene-aged, very old alluvial deposits, characterized as moderately consolidated, strong brown to yellowish-red sand and gravel deposits. The gravel clasts range from fine- to coarse-sized, with rare boulders, and consist of slightly metamorphosed sedimentary rocks, volcanic rocks of the Sidewinder Volcanic series, and minor plutonic clasts (medium brown areas labeled “Qvoa” in Figure 4). A veneer of late Holocene alluvial wash deposits (gray areas, “Qw”) crosses the project in places and is composed of unconsolidated fine- to coarse-grained sand and fine gravel.

West of the project, in Victorville, are deposits mapped as the Pleistocene- and Pliocene-aged “alluvium of the ancestral Mojave River” (Hernandez et al. 2008). The configuration of the Mojave River has gradually developed over a span of at least one million years. About 60 to 70 thousand years ago, the ancestral Mojave River began incising its modern canyon between Victorville and Barstow. The upper stratigraphic unit of the ancient Mojave River depositional sequence is approximately middle Pleistocene in age, based upon terrestrial vertebrate fossils (Cox et al. 2003).

A geotechnical investigative report detailing specific geologic conditions at the project was not available; however, a report from an investigation conducted for the neighboring proposed development to the west is utilized as a proxy (Leon and Mitchell 2021). The neighboring development proposed four commercial/industrial buildings ranging in size from approximately 372,000 to 1,022,000 square feet, extending to the eastern edge of the Interstate 15 right-of-way. Southern California Geotechnical, Inc. supervised the drilling of six borings ranging from 20 to 30 feet deep (Leon and Mitchell 2021). They indicated that most of that property consisted of older alluvial deposits composed of dense to very dense sands, clayey sands, silty sands, and gravelly sands, to the total depth explored. In three borings located in the middle and along the south of that project, the older alluvium was overlain at the surface by younger alluvial deposits, composed of medium dense sands with varying gravel content, ranging in thickness from two and a half to 12 feet. Based upon observations stated in the boring logs, soil density appeared to be a determining factor with regards to relative geologic age, although this characteristic was inconsistent from boring to boring. Leon and Mitchell (2021) recommended excavation below proposed building pads to depths of seven to nine feet, or to four to five feet below proposed pad levels, whichever is greater, although grading design depths of 10 to 15 feet below the existing surface were expected.

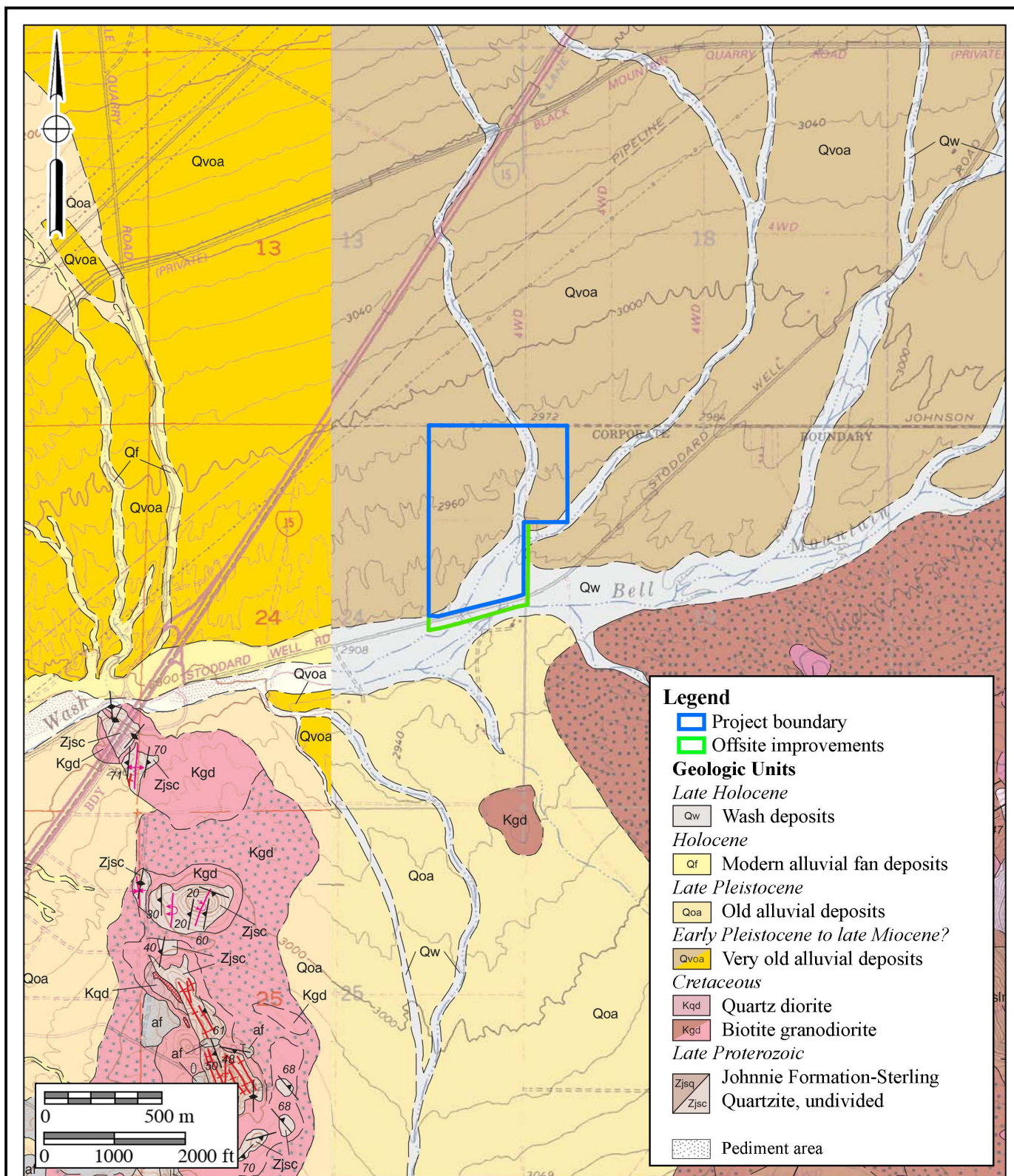


Figure 4
Geologic Map

The Apple Valley 84 Project

Geology after Hernandez and Tan (2007) and Hernandez et al. (2008)

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat. Fossils are considered a nonrenewable resource under state and local guidelines (see Section II of this report).

Paleontological Resource Records Search

A paleontological resource (fossil) records search was performed by the Natural History Museum of Los Angeles County (LACM) for the Apple Valley Stoddard Wells Warehouse Project (also known as the Apple Valley 143 Project), situated west and adjacent to the Apple Valley 84 Project (Bell 2022). Bell (2022) indicated the closest fossil localities held by the LACM are situated at least six miles west of the adjacent and current projects in Victorville, variably composed of Pleistocene horse, deer, and antelope fossils (LACM VP localities [locs.] 3352, 3353, 3498). More localities lie farther southwest and west (LACM VP locs. 1224, 7786). All these reported localities plot within the “alluvium of the ancestral Mojave River,” as mapped by Hernandez et al. (2008); however, Bell (2022) lists them as derived from the Shoemaker Gravel. The Shoemaker Gravel is a geologic formation that is roughly coeval with the alluvium of the ancestral Mojave River but is mapped much farther to the south toward Cajon Pass.

A paleontological resource records search was performed for a prior, nearby project by the Division of Earth Sciences at the San Bernardino County Museum (SBCM) (Kottkamp 2024). The prior project is located approximately three miles east of the current project. The records search indicated that the closest fossil sites are located approximately six miles west to southwest of the current project, in Victorville. These sites are derived from Holocene alluvial fan deposits and recent alluvial deposits of the Mojave River (Hernandez et al. 2008) and are located very close to the LACM localities reported by Bell (2022). The records search noted that surface collection during monitoring work “yielded a mix of unaltered Holocene bones and older permineralized bone fragments, suggesting the fossilized bone was reworked from older units” (SBCM locs. 1.114.51-54).

A review of published and unpublished literature was conducted for potential paleontological resources known in the vicinity of the project. The sources reviewed did not indicate the presence of any known fossil localities near the project. However, in the greater Victorville area, there are many recorded Pleistocene vertebrate fossil localities (Jefferson 1986, 1991, 2009; Cox et al. 2003; Romero and Hillburn 2006; Reynolds and Reynolds 1994; and several sources by R.E. Reynolds not available for review). Most of the specimens and records recovered from these localities are held by the SBCM. All the localities from these sources are derived from

the alluvium of the ancestral Mojave River as mapped by Hernandez et al. (2008) and Cox et al. (2003) and are several miles west of the project.

Project Survey

BFSA Environmental Services, a Perennial Company (BFSA), staff under supervision of BFSA Paleontological Principal Investigator Todd A. Wirths M.S., P.G., conducted a site visit on September 24 and 25, 2025. The field methodology employed for the project included walking evenly spaced survey transects set approximately 10 meters apart while visually inspecting the ground surface. The entire property was accessible, with excellent ground surface visibility. The survey found the project to consist of native desert sage scrub vegetation (Plate 4.2–1). Noted impacts to the property consisted of erosion associated with multiple seasonal drainages throughout the property, dirt access roads, and the development associated with a former residence on the project. No paleontological resources, or evidence of paleontological resources, were identified as a result of the survey.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to an accumulation of organic remains that may have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.*, fossils) and is therefore typically assigned a low paleontological sensitivity. Pleistocene (greater than 11,700 years old) alluvial and alluvial fan deposits in the Inland Empire and Mojave Desert, however, often yield important Ice Age terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, and camel, saber-toothed cats, and others (Jefferson 1991). These Pleistocene sediments are accorded a high paleontological resource sensitivity.

Professional Standards

The Society of Vertebrate Paleontology (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as paraphrased below:

- High Potential: Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- Undetermined Potential: Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment,

and that further study is needed to determine the potential of the rock unit.

- Low Potential: Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that only preserve fossils in rare circumstances.
- No Potential: Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, an undetermined to high potential may be applied to the project parcels. This can be justified in that, although the nearest-known fossil localities are several miles away, sedimentary deposits similar to those at the project in the southeastern region of Antelope Valley have produced multiple fossil localities. The Holocene wash deposits, however, have a low potential.

Town of Apple Valley Assessment

Section III of the Town of Apple Valley's EIR for the General Plan (Town of Apple Valley 2009b) describes the paleontological resources within the city. As summarized in the EIR, "the likelihood of encountering paleontological resources during future development projects within the boundaries of the planning area ranges from low to high, depending on the location and sediments encountered." Figure 5 shows the project property with the Town's delineation of paleontologically sensitive areas (Town of Apple Valley 2009b: Exhibit III-5). Areas colored yellow represent a low paleontological sensitivity, orange indicates a moderate to high sensitivity, and red represents a high sensitivity. The areas tinted red generally correlate to surface exposures of Pleistocene deposits, and yellow correlates to formations with a variety of lithologies that have a low to no paleontological potential, ranging from Holocene surficial deposits to outcrops of crystalline bedrock. Orange areas appear to represent the extent of lacustrine deposits of Apple Valley Dry Lake when it was filled. As shown in Figure 5, the project property is situated within an area rated with a high paleontological sensitivity.

The Town of Apple Valley requires the implementation of mitigation measures to lessen potential adverse impacts to paleontological resources that may be present at future developments, if necessary. The implementation of these mitigation measures is based upon a project's position in the EIR's paleontological sensitivity map (Town of Apple Valley 2009b: III-80), as stated below:

Paleontological resource studies shall be required prior to development for all lands identified as having high potential for paleontological resources, as identified in Exhibit III-5. The studies shall be reviewed and approved by the Town Planning Division prior to the issuance of any ground disturbing permit. The recommendations of the studies shall be made conditions of approval of the ground disturbing permits.

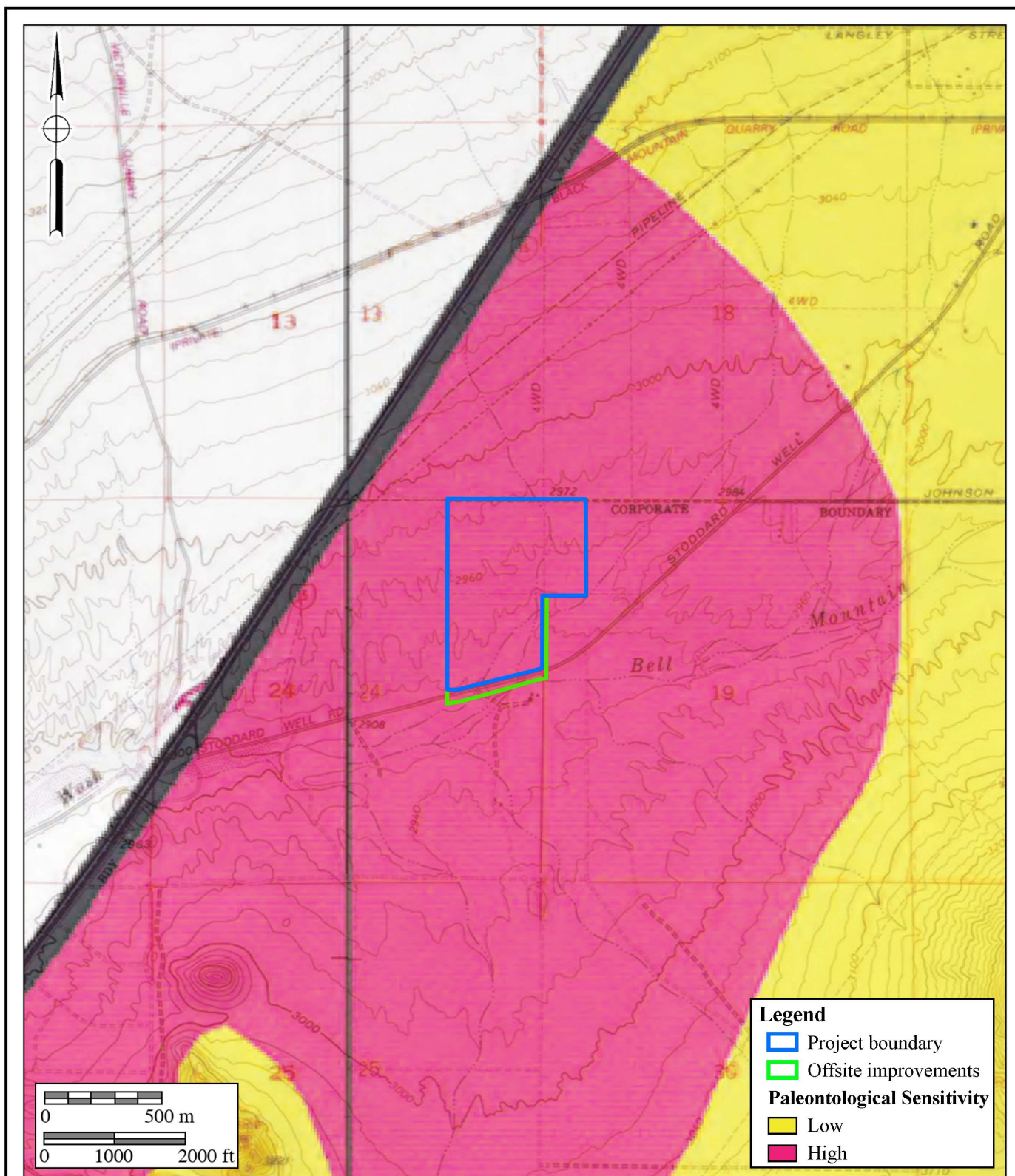


Figure 5
Paleontological Sensitivity Map

The Apple Valley 84 Project

After Town of Apple Valley (2009)

Under the heading “Mitigation Monitoring/Reporting Program,” it states:

Site specific historic, pre-historic and paleontological surveys shall be prepared for new development projects in sensitive areas, and their results compiled in an inventory available only to qualified professionals. Responsible Party: Planning Division; Developer; Consulting Archaeologist/Paleontologist.

VI. CONCLUSIONS AND RECOMMENDATIONS

Research has confirmed the existence of potentially fossiliferous Pleistocene-aged very old alluvial deposits that are present at the project. These alluvial deposits are known to produce significant terrestrial vertebrate fossils at shallow depths in the region. These conclusions support the recommendation that paleontological monitoring be implemented during mass grading and excavation activities in undisturbed alluvial deposits in order to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Full-time monitoring of undisturbed alluvial deposits is warranted starting at the surface of the project. Monitoring is not recommended for Holocene-aged alluvium/wash deposits, since they are too young to contain fossils. However, these deposits are expected to be relatively thin and will likely be graded away quickly, uncovering the older Pleistocene deposits.

According to the Town’s mitigation measures concerning paleontological resources, “The recommendations of the studies shall be made [as] conditions of approval of the ground disturbing permits.” Accordingly, a Paleontological Resource Impact Mitigation Program (PRIMP) with the recommended mitigation monitoring procedures at the project is outlined below. Should the Town of Apple Valley approve this report’s recommendation to monitor for paleontological resources at the project, the following PRIMP is suggested:

Suggested PRIMP

1. All mitigation programs should be performed by a qualified professional (project) paleontologist, defined as an individual with a master’s or a doctorate in paleontology or geology who has proven experience in San Bernardino County paleontology and is knowledgeable in professional paleontological procedures and techniques. Fieldwork may be conducted by a qualified paleontological monitor, defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor shall always work under the direction of a qualified paleontologist.
2. Monitoring of mass grading and excavation activities shall be performed by a qualified paleontologist or paleontological monitor. Full-time monitoring for paleontological resources starting from the surface will be conducted in areas where grading, excavation, or drilling activities occur in undisturbed Pleistocene alluvium to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources.

3. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediment that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow for the removal of abundant or large specimens in a timely manner. The monitor shall notify the project paleontologist, who will then notify the concerned parties of the discovery. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface or, if they are present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
4. In accordance with the “Microfossil Salvage” section of the Society of Vertebrate Paleontology guidelines (2010:7), bulk sampling and screening of fine-grained sedimentary deposits (including carbonate-rich paleosols) must be performed if the deposits are identified to possess indications of producing fossil “microvertebrates” to test the feasibility of the deposit to yield fossil bones and teeth.
5. Preparation of recovered specimens to a point of identification and permanent preservation will be conducted, including screen washing sediments to recover small vertebrates and invertebrates if indicated by the results of test sampling. Preparation of any individual vertebrate fossils is often more time-consuming than preparation for accumulations of invertebrate fossils.
5. All fossils must be deposited in an accredited institution (university or museum) that maintains collections of paleontological materials. The SBCM in Redlands, California, is the preferred institution for fossils recovered within the County of San Bernardino. All costs of the paleontological monitoring and mitigation program, including any one-time charges by the receiving institution, are the responsibility of the developer.
6. Preparation of a final monitoring and mitigation report of findings and significance will be completed, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). A letter documenting receipt and acceptance of all fossil collections by the receiving institution must be included in the final report. The report, when submitted to and accepted by the appropriate lead agency (e.g., the Town of Apple Valley), will signify satisfactory completion of the project program to mitigate impacts to any nonrenewable paleontological resources.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief and have been compiled in accordance with CEQA criteria.



December 11, 2025

Todd A. Wirths, M.S., P.G.
Principal Paleontologist
California Professional Geologist No. 7588

Date

VIII. REFERENCES

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APPENDIX A

Qualifications of Key Personnel

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Education

Master of Science, Geological Sciences, San Diego State University, California 1995

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz 1992

Professional Certifications

California Professional Geologist #7588, 2003

Riverside County Approved Paleontologist

San Diego County Qualified Paleontologist

Orange County Certified Paleontologist

OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board Director, San Diego Geological Society

San Diego Association of Geologists; past President (2012) and Vice President (2011)

South Coast Geological Society

Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2025 *Paleontological Monitoring Report for the Ontario Ranch Business Park Project, City of Ontario, San Bernardino County, California.* Prepared for Real Estate Developmental Associates, LLC.

2025 *Paleontological Assessment for the Irwindale Aggregates Project, 13550 Live Oak Avenue, Irwindale, Los Angeles County, California.* Prepared for Lilburn Corporation, Inc.

- 2025 *Paleontological Resource Impact Mitigation Program for the Canterwood 53 Project (BGR2400072; TTM 38332), Riverside County, California.* Prepared for KB Home Inland Empire Division.
- 2025 *Paleontological Monitoring Report for the Alberhill Tract 28214-9 Project, city of Lake Elsinore, Riverside County, California.* Prepared for Pulte Group.
- 2025 *Paleontological Assessment for the Quail Valley Nature Park Project, City of Menifee, Riverside County, California.* Prepared for EPD Solutions, Inc.
- 2025 *Paleontological Assessment for the Hesperia Gateway Project, City of Hesperia, San Bernardino County, California.* Prepared for T&B Planning.
- 2024 *Paleontological Resource Impact Mitigation Program for the 450 The Promenade North Project, City of Long Beach, Los Angeles County, California.* Prepared for JPI-West Region.
- 2024 *Paleontological Assessment for the Noble Creek Vistas SPA Project, Beaumont, Riverside County, California.* Prepared for EPD Solutions, Inc.
- 2024 *Paleontological Assessment for the High Desert Gas Station Project, Yucca Grove, San Bernardino County, California.* Prepared for Lilburn Corporation, Inc.
- 2024 *Paleontological Resource Impact Mitigation Program for the 424 Berry Way Project, Brea, Orange County, California.* Prepared for EPD Solutions, Inc.
- 2024 *Paleontological Monitoring Report for the Manchester Pacific Gateway/IQHQ RaDD Project, San Diego, California.* Prepared for Manchester Financial Group LP.
- 2024 *Paleontological Resource Impact Mitigation Program for the Vernola Ranch Project, Jurupa Valley, Riverside County, California.* Prepared for Lennar Homes of California.
- 2023 *Paleontological Assessment for the Kramer Junction Solar Project, Kramer Junction, San Bernardino County, California.* Prepared for San Bernardino CSG 3 LLC.
- 2023 *Paleontological Monitoring and Mitigation Plan for the Moss Street Beach Access Improvements Project, Moss Street Beach, City of Laguna Beach, California.* Prepared for the City of Laguna Beach.
- 2023 *Paleontological Monitoring Report for the 11th and Broadway Residential Towers Project, San Diego, California.* Prepared for Pinnacle International Development.
- 2023 *Paleontological Assessment for the Willow Street and Orange Avenue Project, City of Signal Hill, Los Angeles County, California.* Prepared for CenterPoint Properties.
- 2023 *Paleontological Resource Assessment Update for the Summerwind Ranch Specific Plan Amendment, Phases 2-5, Calimesa.* Prepared for Jen So Cal 2, LLC.
- 2023 *Paleontological Resource Impact Mitigation Program for the Palisade Temescal Canyon Project, Riverside County, California, PPT220036, BGR2300031, BGR2300032.* Prepared for North Palisade Partners, LLC.