

# **PALEONTOLOGICAL ASSESSMENT FOR THE WATSON APPLE VALLEY PROJECT**

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

**APNs 0463-231-62, 0463-232-02 through -06, -55 through -56, and -73**

**Prepared on Behalf of:**

**T&B Planning, Inc.  
3200 El Camino Real, Suite 100  
Irvine, California 92602**

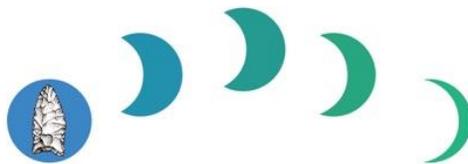
**Prepared for:**

**Town of Apple Valley  
14955 Dale Evans Parkway  
Apple Valley, California 92307**

**Prepared by:**

**BFSA Environmental Services,  
a Perennial Company  
14010 Poway Road, Suite A  
Poway, California 92064**

*May 10, 2024*



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**BFSA Environmental Services**  
A Perennial Company

## **Paleontological Database Information**

***Author:*** Todd A. Wirths, M.S., Senior Paleontologist, California  
Professional Geologist No. 7588

***Prepared by:*** BFSA Environmental Services, a Perennial Company  
14010 Poway Road, Suite A  
Poway, California 92064  
(858) 484-0915

***Report Date:*** May 10, 2024

***Report Title:*** Paleontological Assessment for the Watson Apple Valley  
Project, Town of Apple Valley,  
San Bernardino County, California

***Prepared on Behalf of:*** T&B Planning, Inc.  
3200 El Camino Real, Suite 100  
Irvine, California 92602

***Prepared for:*** Town of Apple Valley  
14955 Dale Evans Parkway  
Apple Valley, California 92307

***Assessor's Parcel Number:*** 0463-231-62, 0463-232-02 through -06, -55, -56, and -73

***USGS Quadrangle:*** Sections 22 and 23, Township 6 North, Range 3 West of the  
*Apple Valley North, California* (7.5-minute) USGS Quadrangle

***Study Area:*** Approximately 200 acres

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

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## **I. INTRODUCTION AND LOCATION**

A paleontological resource assessment has been completed for the Watson Apple Valley Project to comply with California Environmental Quality Act (CEQA) and Town of Apple Valley environmental requirements. The project includes two proposed, non-contiguous development locations (East Property and West Property), collectively measuring approximately 200 acres, within the Town of Apple Valley, San Bernardino County, California (Figure 1). The approximately 48-acre West Property (Assessor's Parcel Number [APN] 0463-231-62) is located northwest of the intersection of Navajo and Los Padres roads and the larger, approximately 153-acre East Property (APNs 0463-232-02 through -06, -55, -56, and -73) is situated between Navajo Road, Johnson Road, Central Road, and Kensington Street. The project is in the Sidewinder Valley area of northern Apple Valley and can be found within Sections 21 and 22, Township 6 North, Range 3 West, as shown on the USGS *Apple Valley North, California* topographic quadrangle map (Figure 2). The project proposes to construct industrial warehouse developments, along with infrastructure associated with the subject property.

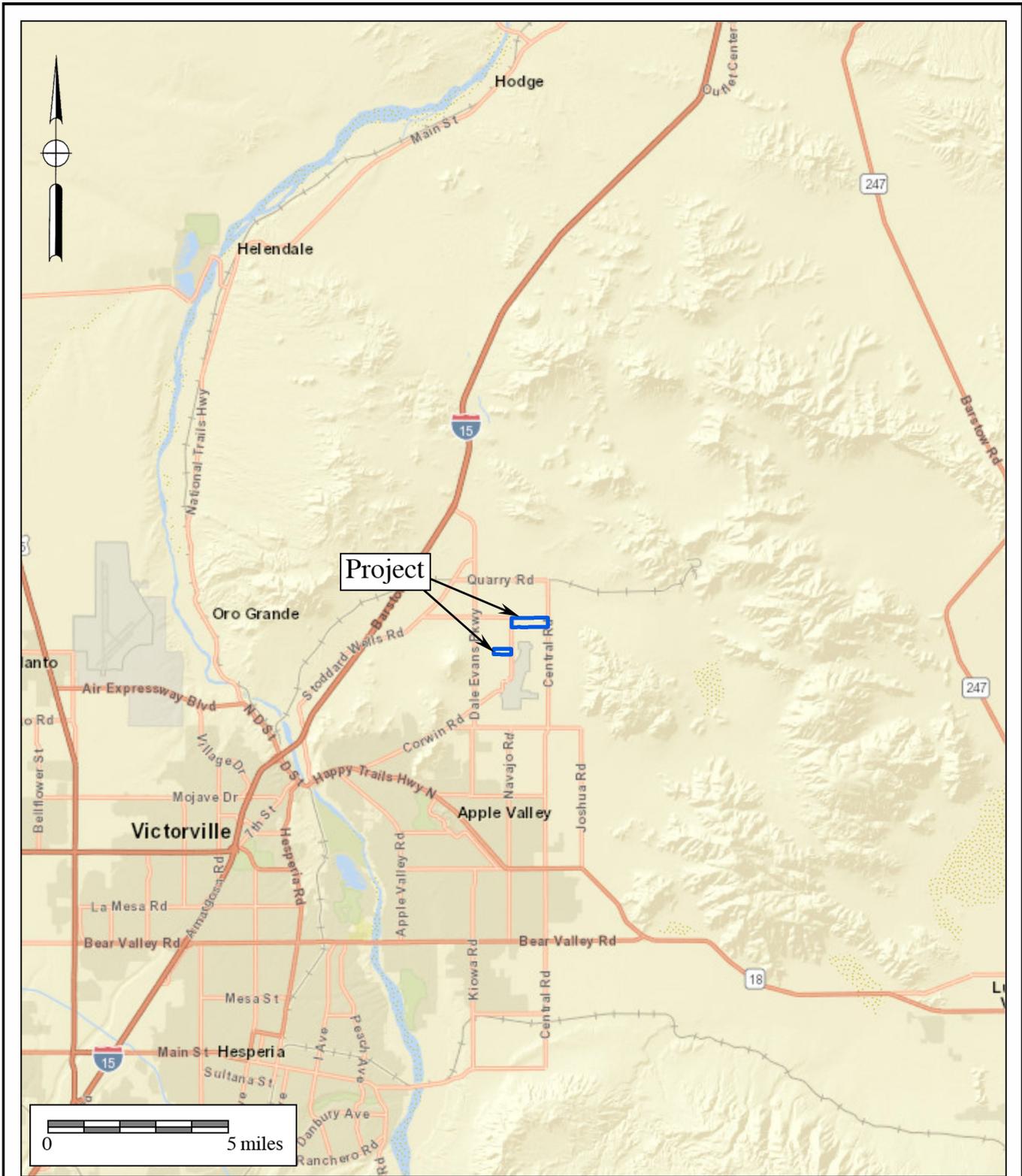
As the lead agency, the Town of Apple Valley has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in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

## **II. REGULATORY SETTING**

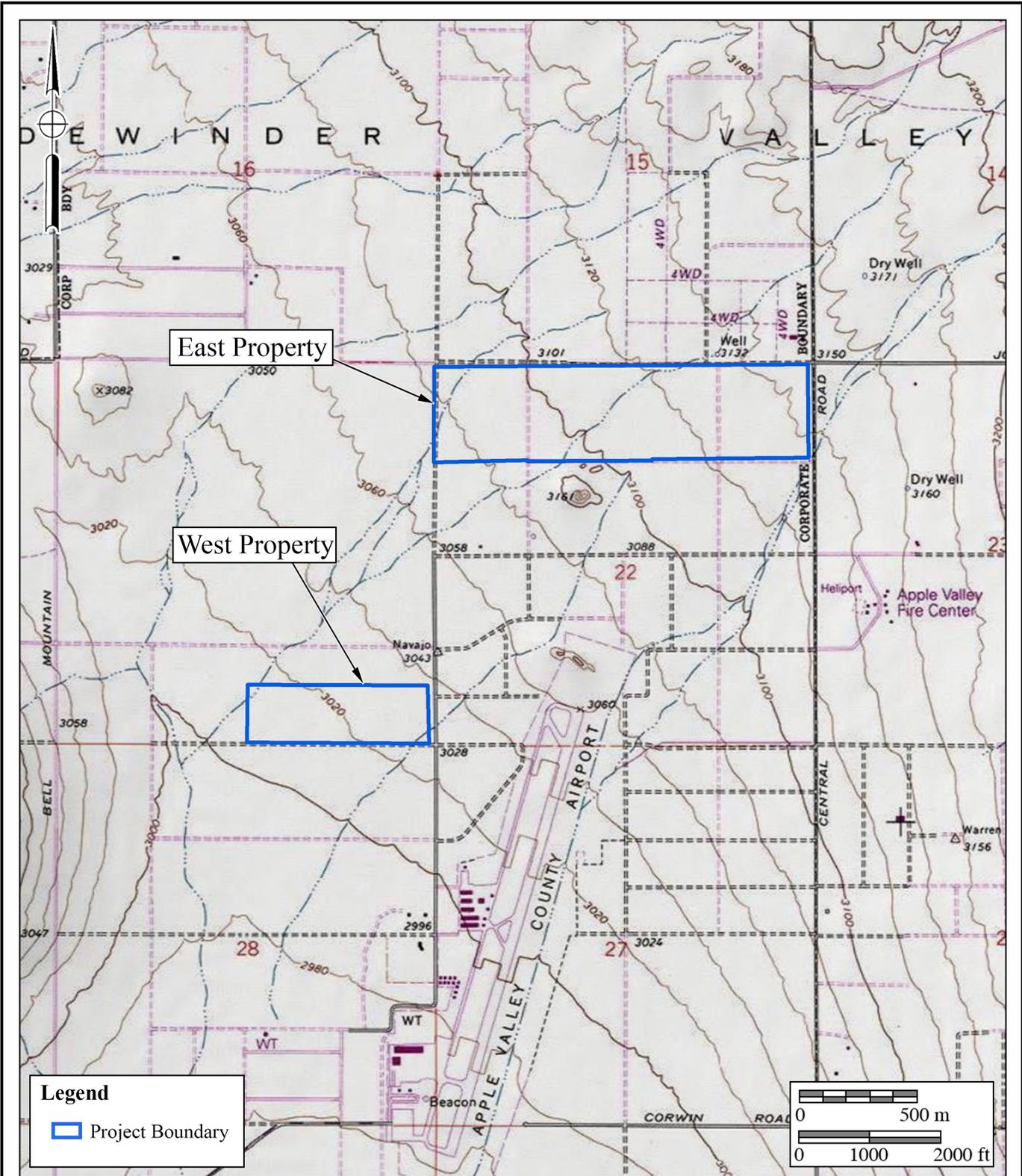
CEQA, which is patterned after the National Environmental Policy Act, is the overriding regulation that sets the requirement for protecting California's cultural and paleontological resources. CEQA does not establish specific rules that must be followed but mandates that governing permitting agencies (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 Watson Apple Valley Project  
ESRI Street Map



**Figure 2**  
**Project Location Map**

The Watson Apple Valley Project  
 USGS *Apple Valley North Quadrangle* (7.5-minute series)



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 potentially yielding significant paleontological resources, and as such considers these deposits as having a high paleontological sensitivity. Holocene-aged deposits at the surface are deemed as having a low sensitivity, since these deposits generally do not contain significant paleontological resources. The General Plan indicates that "Shallow grading of younger Quaternary [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.

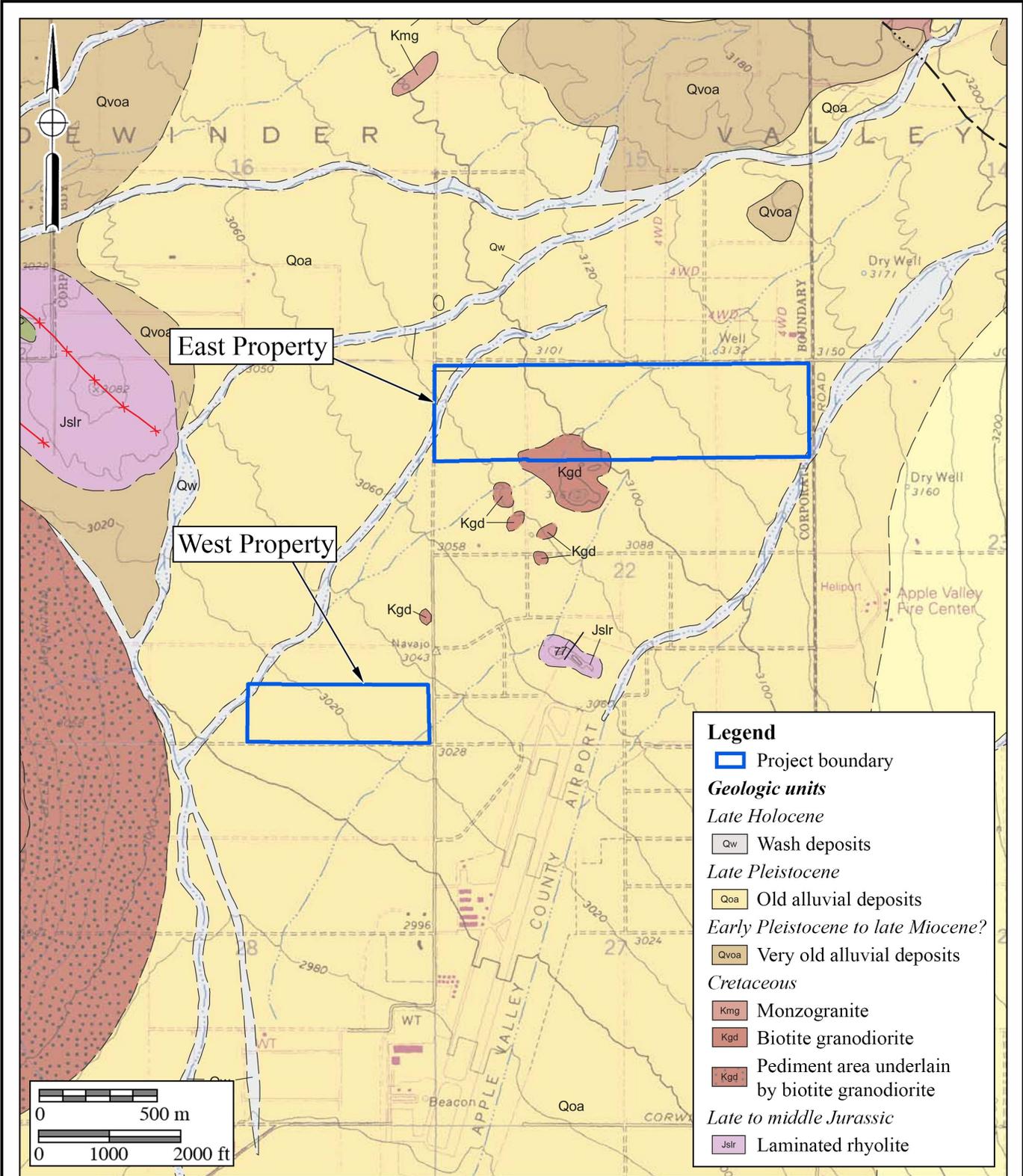
### **III. GEOLOGY**

The project is situated over or near the Victorville Basin, a structural depression about 40 kilometers wide and filled with sediments up to 1,300 meters thick, a succession of deposits ranging in age from middle Miocene through late Pleistocene time. The Victorville Basin is bordered by the San Gabriel and San Bernardino Mountains to the south and, along the north, local peaks and ridges of pre-Cenozoic basement rocks in the areas of Quartzite Mountain and the southeastern Shadow Mountains. These deposits record the erosional and depositional cycles of the region during episodes of crustal slip along the San Andreas Fault, along with the coeval uplift and trans-rotation of the San Bernardino and San Gabriel Mountains. A major feature of the area is the evolution of the northward-flowing ancestral Mojave River. The project is a few miles north of a path of the ancestral Mojave River, where the river once flowed through Apple Valley (Cox et al. 2003).

As shown on Figure 3 (after Hernandez and Tan 2007), the parcels are mostly mapped as late Pleistocene-aged old alluvial deposits, characterized as fine- to medium-grained sand and fine- to medium-sized gravel of inactive alluvial fans. Surfaces are described as smooth, slightly varnished pavements composed of sand and angular gravel clasts (amber areas labeled “Qoa” in Figure 3). Modern washes pass through the area (light gray streaks labeled “Qw” in Figure 3). A small outcrop of Cretaceous plutonic rocks lies across the southern boundary of the East Property (dark brown spots labeled “Kgd”). Holocene to late Pleistocene lacustrine and playa deposits of Apple Valley Dry Lake are mapped just over two miles south of the project, where the ancestral Mojave River once passed through.

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 developed gradually 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 on terrestrial vertebrate fossils (Cox et al. 2003).

Percolation tests were recently performed for the East and West properties, offering a description of project-specific, near-surface geologic conditions (Hayward and Trazo 2022a, 2022b). At both properties, undisturbed alluvium was encountered at the ground surface at each boring location, to the maximum depth explored of approximately 25 feet below the surface. At the East Property, soils generally consisted of loose to very dense, silty fine- to medium-grained sand and silty fine- to coarse-grained sand with traces of fine gravel. Alluvium encountered at the West Property was somewhat more variable, with medium dense to very dense, silty fine-grained sands, silty fine- to medium-grained sands, clayey fine-grained sands, and clayey fine- to medium-grained sands. Occasional layers of hard, fine-grained sandy clay were also encountered. Alluvium at both properties occasionally possessed calcareous nodules and cementation. The reports did not speculate on the geologic age of the stratigraphy encountered at either property.



**Figure 3**  
**Geologic Map**

The Watson Apple Valley Project  
Geology after Hernandez and Tan (2007)

## **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 [SVP] 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (see Section II of this report).

### **Paleontological Resource Record Search**

A paleontological resource (fossil) record search was performed for the project by the Division of Earth Sciences at the San Bernardino County Museum (SBCM) (Kottkamp 2024; Appendix B). The record search report indicated that there are no fossil localities near the current project. The closest localities are located approximately six miles southwest of the current project, derived from Holocene alluvial fan deposits and recent alluvial deposits of the Mojave River (Hernandez et al. 2008). The report indicates 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 localities 1.114.51-54). Kottkamp (2024) indicated that sedimentary deposits similar to those mapped at the project “have been found to be highly fossiliferous throughout San Bernardino County, yielding the remains of mastodons, mammoths, camels, horses, bison, and ground sloths, as well as microfossils including rodents.”

A review of published and unpublished literature was conducted for potential paleontological resources that are 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.

### **Field Survey**

BFSA Environmental Services (BFSA) staff, under supervision of BFSA paleontological principal investigator Todd A. Wirths, conducted a site visit on March 12, and 13, 2024. The field methodology employed for the project included walking evenly spaced survey transects set approximately 15 to 20 meters apart while visually inspecting the ground surface. The survey found the project to consist primarily of vacant desert terrain. The sparse vegetation found within the property is primarily comprised of Creosote bush scrub community plants. Visibility was

characterized as good to excellent. Noted impacts to the property consisted of dirt access/off-highway (OHV) vehicle roads and modern trash found throughout 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). Therefore, these Pleistocene sediments are accorded a high paleontological resource sensitivity.

### Professional Standards

The SVP 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, while the nearest-known fossil localities are several miles away, sedimentary deposits similar to those at the project in the southeast region of Antelope Valley have produced multiple fossils localities.

### **Town of Apple Valley Assessment**

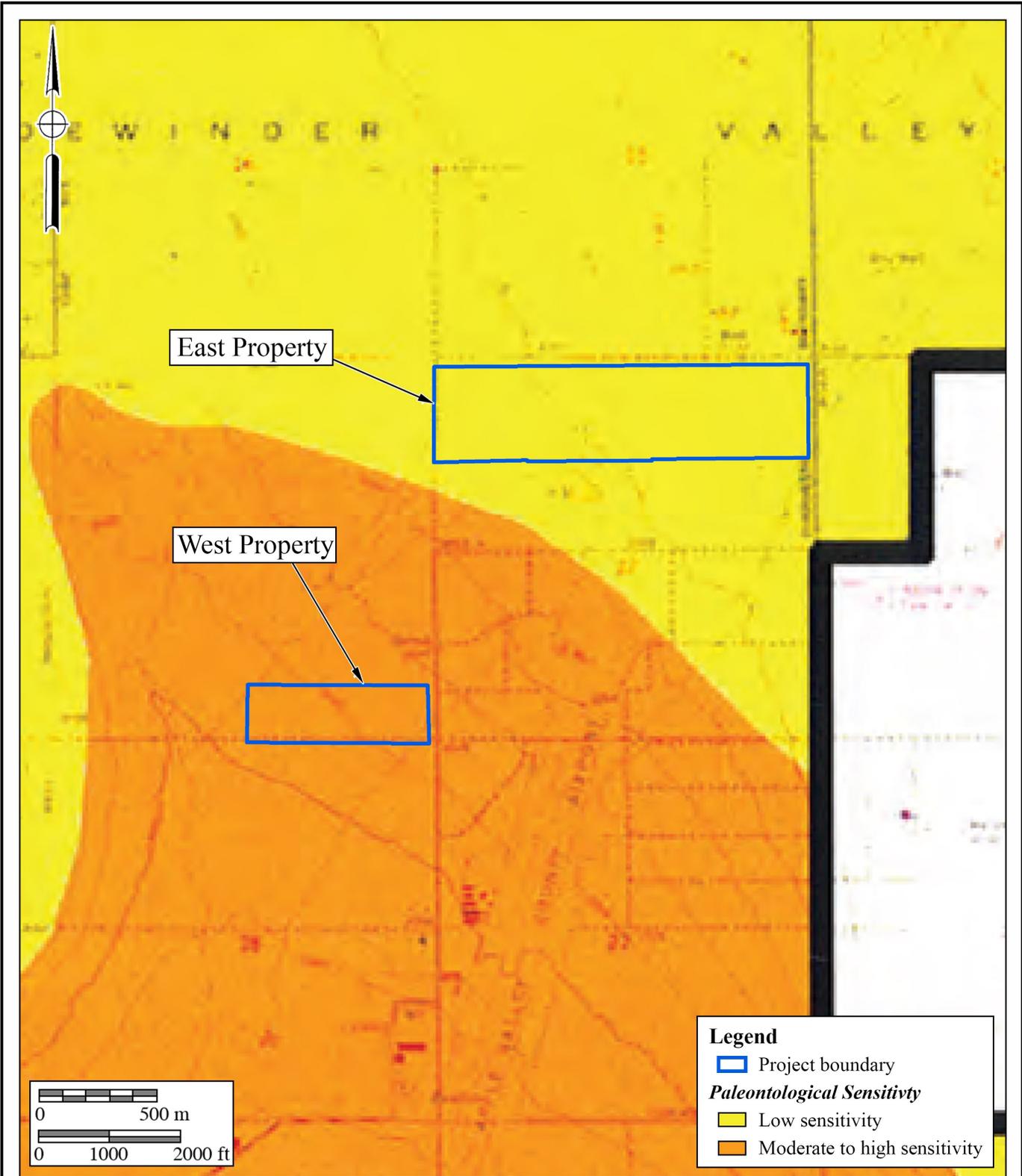
Section III of the Town of Apple Valley's EIR for the General Plan (Town of Apple Valley 2009b) describes the paleontological resources within the city. As summarized in the EIR, "the likelihood of encountering paleontological resources during future development projects within the boundaries of the planning area ranges from low to high, depending on the location and sediments encountered." Figure 4 shows the East and West properties 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 a moderate to high sensitivity, and red a high sensitivity (red areas are out of view in Figure 4). The areas tinted red generally correlate to surface exposures of Pleistocene deposits of the ancient Mojave River, while yellow correlates to formations with a variety of lithologies with a low to no paleontological potential, 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 4, the East Property is situated within an area rated as having a low paleontological sensitivity, while the West Property is positioned in an area rated with a moderate to high paleontological sensitivity.

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

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.



**Figure 4**  
**Paleontological Sensitivity Map**

The Watson Apple Valley Project  
 After Town of Apple Valley EIR (2007)

## **VI. ANALYSIS**

As demonstrated in Figures 3 and 4, the geologic and paleontological sensitivity maps do not correlate. The Town's analysis of paleontologically sensitive areas was derived from a paleontological assessment performed by CRM Tech and presented in an appendix of the EIR, but the EIR's appendices are not available on the Town's website (<https://www.applevalley.org/services/planning-division/climate-action-plan/general-plan-eir>).

The map of paleontologically sensitive areas is presumed to be modeled after published geologic maps that were available at the time the paleontological assessment was completed, and so an older source other than that of Hernandez and Tan (2007) was likely used. An online search attempting to locate the CRM Tech report and an older, suitable geologic map was not successful; a 1960 map by Thomas Dibblee did not clarify the discrepancy.

It is important to note that the Town assigns a high paleontological sensitivity to geologic formations of Pleistocene age. According to the map published by Hernandez and Tan (2007), both properties are in late Pleistocene-aged old alluvial deposits. They show the northern extent of lacustrine deposits of Apple Valley Dry Lake to be about 2.25 miles to the south (just south of Waalew Road), not as far north as to encompass the West Property (Figure 4). However, the geotechnical investigation performed at the West Property demonstrates the presence of shallow, fine-grained sediments (at seven feet deep) that suggest a possible lacustrine (lake environment) origin. Nevertheless, the extent of the late Pleistocene-aged old alluvial deposits mapped by Hernandez and Tan (2007) cover areas tinted yellow, orange, and red in the EIR sensitivity map, an unsuitable assessment.

In this report, the latest geologic mapping available, that of Hernandez and Tan (2007), is assumed to be the most accurate and is used to assess the paleontological potential of the project. The Town's definitions of paleontological sensitivity are retained. Thus, both properties of the project are rated as having a high paleontological sensitivity.

## **VII. CONCLUSIONS AND RECOMMENDATIONS**

Research has confirmed the existence of potentially fossiliferous Pleistocene-aged alluvial deposits that are present at the East and West properties of 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 at both properties of the project. In addition, monitoring of the excavation in the Holocene wash deposits mapped at the properties ("Qw") is not recommended, however these deposits will simply constitute as a thin veneer over the Pleistocene alluvial deposits and will likely be immediately excavated away.

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 an M.S. or Ph.D. in paleontology or geology who has proven experience in San Bernardino County paleontology and who 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 from the surface will be conducted in areas where grading, excavation, or drilling activities occur in undisturbed alluvium to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Monitoring is not warranted in disturbed soils, such as artificial fill, or in crystalline bedrock formations, should they become exposed.
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 San Bernardino County Museum 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.

## **VIII. 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.



May 10, 2024

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Todd A. Wirths  
Senior Paleontologist  
California Professional Geologist No. 7588

Date

## **IX. REFERENCES**

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**APPENDIX A**

**Qualifications of Key Personnel**

# Todd A. Wirths, MS, PG No. 7588

## Senior Paleontologist

BFSAE nvironmental Services, A Perennial Company

14010 Poway Road • Suite A •

Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: twirths@bfsa.perennialenv.com



## Education

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

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

## Professional Certifications

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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

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Board member, 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

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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 BFSAE nvironmental Services, 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

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2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California.* Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

- 2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County.* Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County.* Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California.* Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California.* Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California.* Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Assessment for the Manitou Court Logistics Center Project, City of Jurupa Valley, Riverside County, California.* Prepared for Link Industrial. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County.* Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Assessment for the Alessandro Corporate Center Project (Planning Case PR-2020-000519), City of Riverside, Riverside County, California.* Prepared for OZI Alessandro, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Monitoring Report for the Boardwalk Project, La Jolla, City of San Diego.* Prepared for Project Management Advisors, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

**APPENDIX B**

**Paleontological Resource Record Search Report**



**Museum**  
Division of Earth Science

**David Myers**  
Director

**Scott Kottkamp**  
Curator of Earth Science

3 May 2024

BFSA Environmental Services  
Attn: Todd Wirths  
14010 Poway Rd.  
Poway, CA 92064

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PALEONTOLOGY RECORDS REVIEW for proposed site of Watson Apple Valley,  
Apple Valley, San Bernardino County, California

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Dear Mr. Wirths,

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 (Watson Apple Valley) is in the city of Apple Valley, California, as shown on the United States Geological Survey (USGS) 7.5-minute Apple Valley North, California, quadrangle.

Geologic mapping of that region done by Hernandez and Tan (2007) indicates the entire southwestern section of the project area is located atop late Pleistocene alluvial deposits (Qoa). Qoa regionally consists of brown colored fine to medium grained sand, as well as brown clay. Surface exposures are smooth in texture, have slight desert varnish, and are composed of the aforementioned sand as well as angular fine-to-medium gravel clasts. These sediments are mostly sourced from the Fairview Valley Formation, the Sidewinder Volcanic series, and minor plutonic clasts (Hernandez and Tan 2007). Similar Pleistocene age alluvial deposits have been found to be highly fossiliferous throughout San Bernardino County, yielding the remains of mastodons, mammoths, camels, horses, bison, and ground sloths, as well as microfossils including rodents (Reynolds and Reynolds, 1991). The northeastern portion of the project area is also mostly situated atop Qoa, but also contains several outcrops of Cretaceous age biotite granodiorite (Kgd). Kgd is not fossiliferous.

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Qoa overlies older alluvial deposits of early Pleistocene to possibly late Miocene age (Qvoa; Hernandez and Tan, 2007). Qvoa is a moderately consolidated, strong-brown to yellow-red sand and fine to coarse gravel, with rare boulders. Sediments are from the same sources as Qoa, but can be distinguished by color, absence of clay, maximum size of gravel clasts, strong desert varnish, and caliche-coated gravel clasts. Qvoa is possibly fossiliferous and occurs at the surface less than one mile to the north of the project area. Qvoa in turn directly overlies Cretaceous monzogranite units (Kmg; Hernandez and Tan, 2007). Kmg is nonfossiliferous. Other nearby and potentially underlying Mesozoic units, like Kgd and a Jurassic age laminated rhyolite (Jslr) are likewise of igneous origin and not fossiliferous.

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 resources have been discovered within the proposed project site, nor within 1 mile of its perimeter. Pleistocene alluvial sediments like those at the project site are highly fossiliferous in Victorville, Adelanto, and southern Apple Valley, and thus the local absence of SBCM fossil localities is likely because of lack of data rather than lack of fossils. The nearest paleontological localities are SBCM 1.114.51-54, which are situated approximately 6 miles southwest from the project's perimeter. These localities occur within Holocene age alluvial fan deposits (Qf) and recent alluvial deposits of the Mojave River (Qa; Hernandez et al., 2008). Surface collection during monitoring work at SBCM 1.114.51-54 yielded a mix of unaltered Holocene bones and older permineralized bone fragments, suggesting the fossilized bone was reworked from older units.

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,

A handwritten signature in black ink that reads "Scott Kottkamp". The signature is written in a cursive, slightly slanted style.

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

### Literature Cited

Hernandez, J.L., Brown, H.J., and Cox, B.F. 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.

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Reynolds, R. E., and Reynolds, R.L. 1991. The Pleistocene Beneath our Feet: Near-surface Pleistocene Fossils from Inland Southern California Basins. San Bernardino County Museum Association Quarterly 38(3-4): 41-43