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LOS ANGELES COUNTY  
517 S. Ivy Avenue  
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November 17, 2022

Shaun Bowen  
Project Manager, Land & Housing Development  
Brookfield Properties  
3200 Park Center Drive, Suite 1000  
Costa Mesa, CA 92626  
Transmitted via email to shaun.bowen@brookfieldpropertiesdevelopment.com

**RE: Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California**

Dear Mr. Bowen,

At the request of Brookfield Properties, PaleoWest LLC (PaleoWest) conducted an updated paleontological resource study for the Menifee Valley Specific Plan Project (Project) in the city of Menifee, Riverside County, California. A prior paleontological resource assessment (PRA) was completed for the Project site (previously known as the Brookfield Menifee Valley Project [hereafter "previous project"]) by Applied EarthWorks, Inc. (Æ) (2019). The proposed Project consists of the development of a mixed-used master-planned community.

PaleoWest was retained to complete a supplemental paleontological assessment in support of the updated Project. The study included paleontological resource records searches of the Project area conducted by the Western Science Center (WSC) in Hemet, California and on the University of California Museum of Paleontology (UCMP) online database. The records searches were supplemented by a review of existing geologic maps within the vicinity of the Project. Data obtained from the updated records searches and map review were used in conjunction with the findings of Æ's study to assess the potential impacts of the updated Project on paleontological resources and to determine if the mitigation recommendations presented in Æ's report remain valid.

This technical memorandum was written in accordance with the guidelines set forth by the Society of Vertebrate Paleontology (SVP) (2010). It has been prepared to support environmental review under the California Environmental Quality Act (CEQA). The City of Menifee is the lead CEQA agency for the Project.

## PROJECT LOCATION AND DESCRIPTION

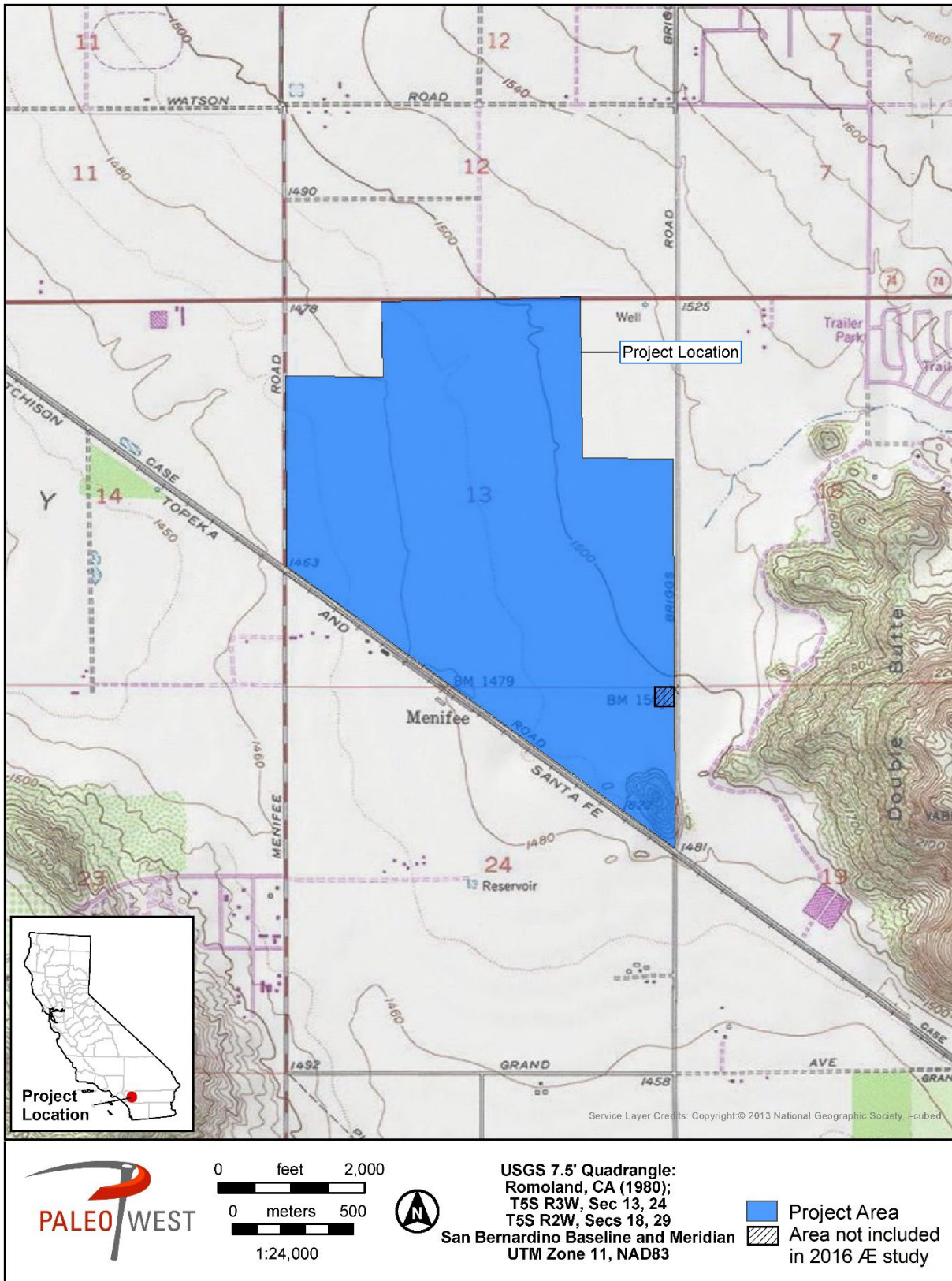
The Project lies in the northeastern portion of the city of Menifee in western Riverside County (Figure 1). The Project site encompasses 590.3 acres of land that is bounded by State Route 74 on the north, Menifee Road on the west, railroad tracks and Matthews Road to the south, and Briggs Road to the east (Figure 2). More specifically, it lies in Section 13 and 14, Township 5



Figure 1. Project Vicinity Map



Figure 2. Project Location Map



South, Range 3 West, San Bernardino Baseline and Meridian, of the United States Geological Survey (USGS) *Romoland, California 7.5'* topographic quadrangle map (USGS 1980). Elevation of the Project ranges from 1,487 to 1,623 feet. The Project is currently situated on vacant land though portions of the property are under cultivation.

The proposed mixed-use, master-planned community consists of a residential development, along with commercial and business parks, public facilities, and open space recreation. The residential portion of the Project includes an array of housing types and amenities including a private recreation center, greenbelts with multi-use trails and paths, a dog park, and an agri-commercial area. The commercial and business park developments will accommodate a mixture commercial, retail, incubator, small-scale light industrial use, manufacturing, warehouse/storage, fulfillment center, and e-commerce operations. The southwestern extent of the property is designated for the location of a fire station or similar public service use. Finally, the southeastern corner of the Project, which encompasses Granite Hill, will be used for open space recreation involving a large public sports park and passive open space park area. It is anticipated that ground disturbing activities associated with construction would involve the overexcavation of sediments to depths ranging from 5 to 12 feet below the ground surface (bgs) (Figure 3).

## PROJECT BACKGROUND

In 2019, Æ prepared a PRA for the previous project (Æ, 2019). The study included a review of published and unpublished literature and museum collections records maintained by the Natural History Museum of Los Angeles County, along with a field survey. Based on the results of the museum records search and field survey, the paleontological resource potential of the previous project was determined in accordance with SVP (2010) guidelines. Although the field survey did not document any paleontological localities, the study concluded that large portions of the project had high paleontological resource potential.

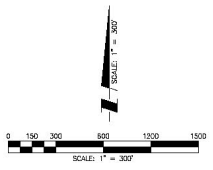
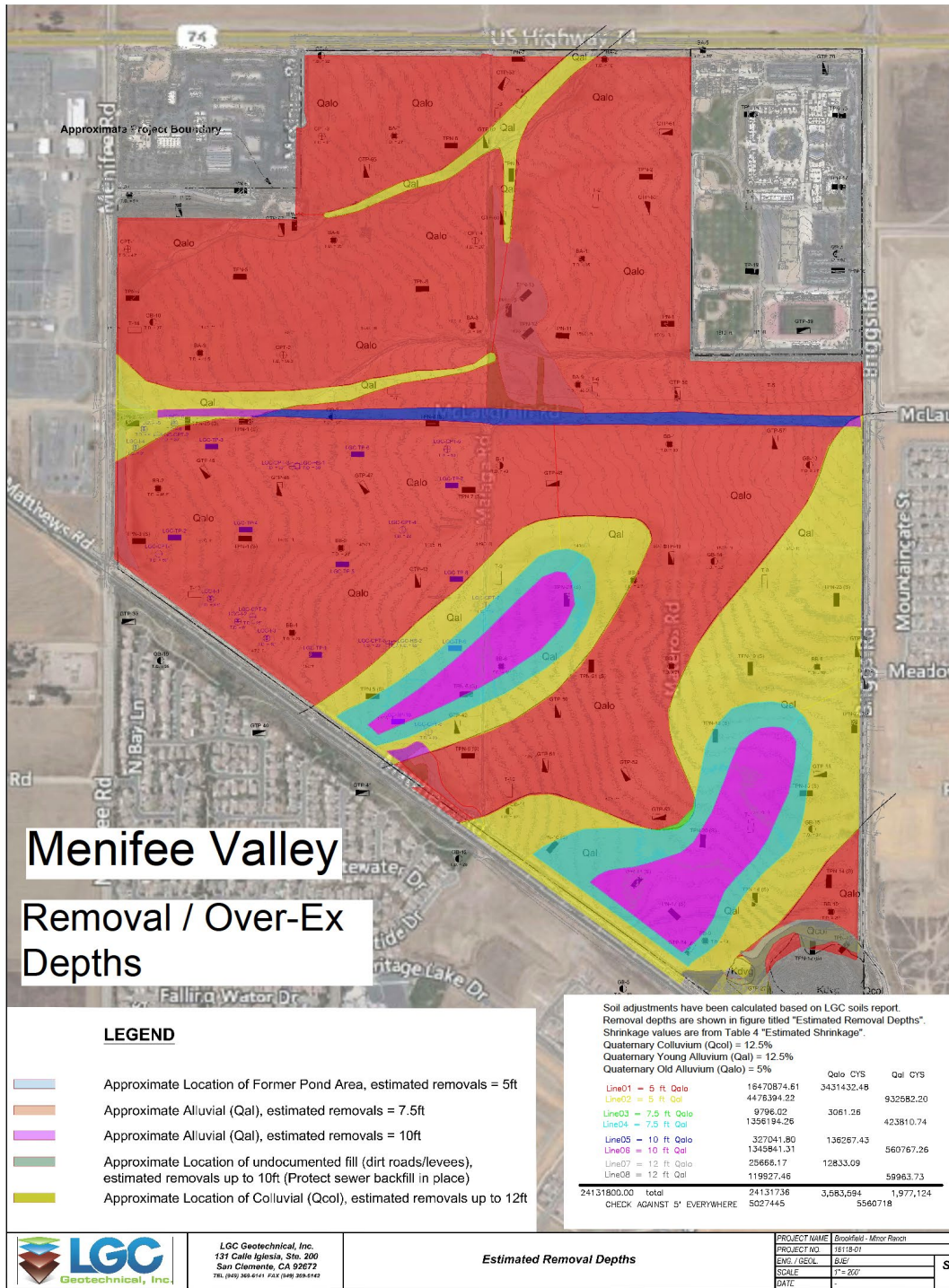
Based on these findings, Æ (2019:22-23) developed the following recommended mitigation to reduce potential impacts of the project on paleontological resources:

**WORKER'S ENVIRONMENTAL AWARENESS TRAINING.** Prior to the start of construction, all field personnel should be briefed regarding the types of fossils that could be found in the Project area and the procedures to follow should paleontological resources be encountered. This training should be accomplished at the pre-grade kick-off meeting or morning tailboard meeting and should be conducted by the Project Paleontologist or his/her representative. Specifically, the training should provide a description of the fossil resources that may be encountered in the Project area, outline steps to follow in the event that a fossil discovery is made, and provide contact information for the Project Paleontologist and on-site monitor(s). The training should be developed by the Project Paleontologist and may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.).

**PALEONTOLOGICAL MITIGATION MONITORING.** Prior to the commencement of ground-disturbing activities, a qualified professional paleontologist will be retained to prepare and implement a Paleontological Resource Impact Mitigation Program (PRIMP) for the Project. Initially, full-time monitoring is recommended for grading and excavation



Figure 3. Overexcavation Depths for Proposed Project



activities 4 feet bgs that will disturb previously undisturbed Quaternary older alluvium (Qof), according to criteria set forth by SVP (2010). Due to soil development and previous agricultural disturbances, monitoring will not be required in Project areas where construction activities disturb native sediments at depths less than 4 feet bgs.

Spot-checking may occur in previously undisturbed young alluvial deposits (Qya) in order to determine if Project activities are impacting the underlying highly sensitive Pleistocene units. Monitoring will not be required in Project areas underlain by geologic units with no paleontological resource potential (i.e., the granodiorite to tonalite, Kdvg).

Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor will have the authority to divert temporarily the construction equipment around the find until it is assessed for scientific significance and collected. In areas of high sensitivity, monitoring efforts can be reduced or eliminated at the discretion of the Project Paleontologist if no fossil resources are encountered after 50 percent of the excavations are completed.

**FOSSIL PREPARATION, CURATION, AND REPORTING.** Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped paleontology laboratory to a point ready for curation. Preparation will include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossils specimens will be identified to the lowest taxonomic level, cataloged, analyzed, and delivered to the Western Science Center for permanent curation and storage. The cost of curation is assessed by the repository and is the responsibility of the Project owner.

At the conclusion of laboratory work and museum curation, a final report will be prepared describing the results of the paleontological mitigation monitoring efforts associated with the Project. The report will include a summary of the field and laboratory methods, an overview of the Project area geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report will also be submitted to the Western Science Center.

## REGULATORY CONTEXT

Paleontological resources (i.e., fossils) are considered nonrenewable scientific resources because once destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal, state, and local laws and regulations. Laws pertinent to this Project are discussed below.

### STATE LAWS AND REGULATIONS

#### California Environmental Quality Act

CEQA requires that a determination be made as to whether a project would directly or indirectly destroy a unique paleontological resource or site or unique geological feature (CEQA Appendix G(vii)(f)). Specifically, Appendix G provides an Environmental Checklist of questions which includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?" (Section 15023, Appendix G, Section VII, Part



F). CEQA does not define “a unique paleontological resource or site.” However, the SVP has provided guidance specifically designed to support state and Federal environmental review. The SVP broadly defines significant paleontological resources as follows (SVP 2010, page 11):

“Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).”

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology, paleoecology, paleophylogeography, or depositional histories. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiometric dating is possible. As such, common fossils (especially vertebrates) may be scientifically important, and therefore considered significant.

## California Public Resources Code

Section 5097.5 of the Public Resources Code (PRC) 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...As used in this PRC 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.”

Consequently, public agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

## LOCAL

In accordance with Open Space and Conservation Element OSC-5: Paleontological and Cultural Resources of the City’s General Plan “paleontological and cultural resources are important for scientific, historic, and/or religious reasons to cultures, communities, groups or individuals” (City of Menifee 2021). Although paleontological resources are not discussed explicitly in the OSC-5 goal and associated policies, Rieboldt and Parham (2017:4) state that their inclusion can be inferred because paleontological resources are referenced in the section’s heading of the General Plan. The following presents Goal OSC-5, as well as potentially relevant policies that include paleontological resources.



**Goal OSC-5:** Archaeological, historical, and cultural resources that are protected and integrated into the City's built environment.

**Policy OSC-5.1:** Preserve and protect archaeological and historic resources and cultural sites, places, districts, structures, landforms, objects and native burial sites, traditional cultural landscapes and other features, consistent with state law and any laws, regulations or policies which may be adopted by the city to implement this goal and associated policies.

**Policy OSC-5.4:** Establish clear and responsible policies and best practices to identify, evaluate, and protect previously unknown archaeological, historic, and cultural resources, following applicable CEQA and NEPA procedures and in consultation with the appropriate Native American tribes who have ancestral lands within the city.

**Policy OCS-5.5:** Develop clear policies regarding the preservation and avoidance of cultural resources located within the city, in consultation with the appropriate Native American tribes who have ancestral lands within the city

The General Plan also contains a map (Exhibit OSC-4) that identifies the City's paleontological resources. The map indicates that the entirety of the Project is identified as containing a high sensitivity for paleontological resources.

## METHODS

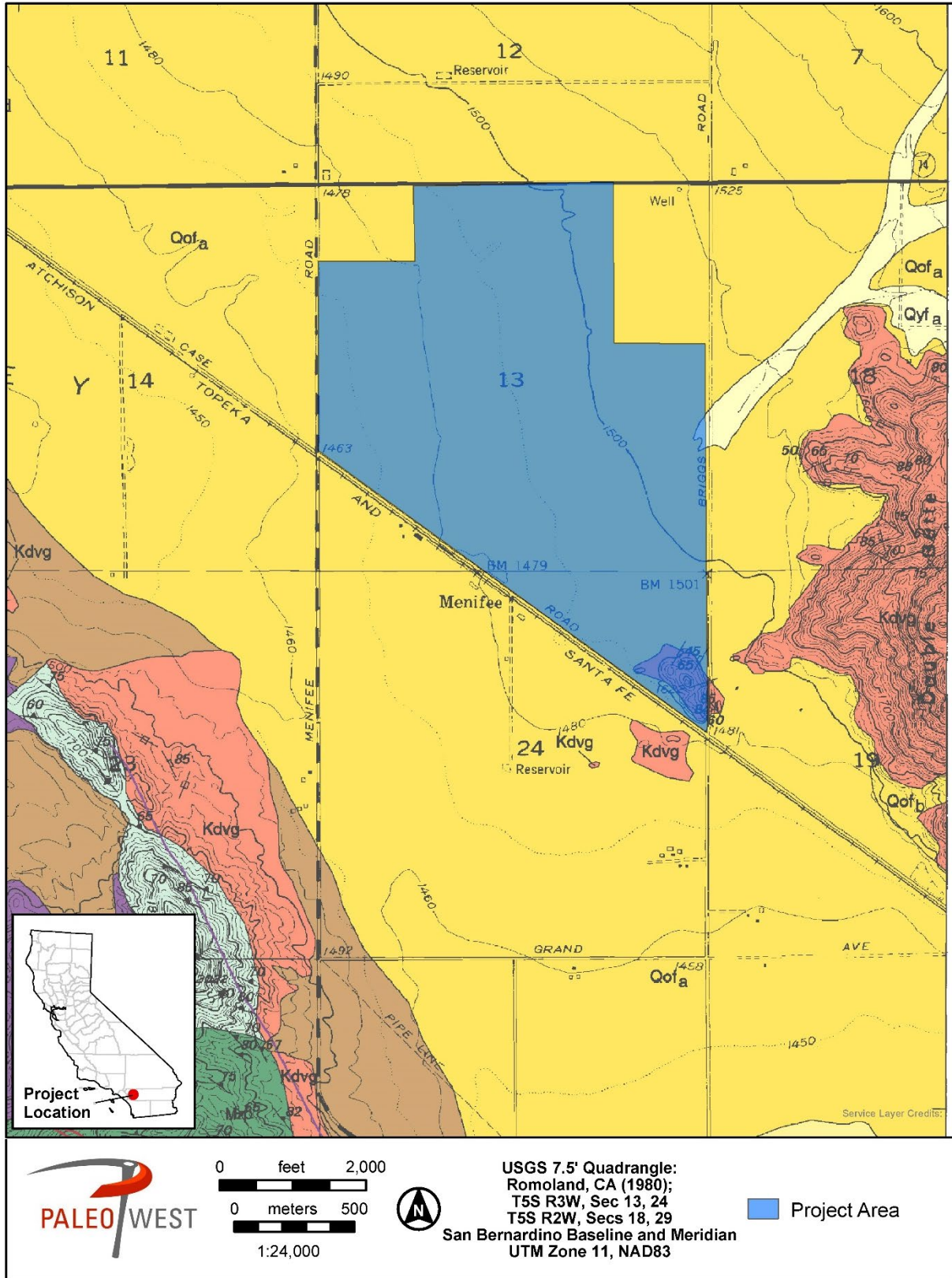
The purpose of this study is to conduct a supplemental assessment of paleontological resources in the Project area to determine if the mitigation recommendations presented in the previous PRA (see **Project Background** section) remain valid. PaleoWest requested a paleontological resource records search of the Project area from the WSC to identify any additional paleontological resources that may have been documented within the vicinity of the Project not previously reported by Æ's record search of the Natural History Museum of Los Angeles County in May 2016. In addition, PaleoWest completed a search of online records maintained by the UCMP. A supplemental field survey was deemed unnecessary due to the limited surface visibility noted in Æ's 2019 study.

## RESULTS

The PRA for the previous project identified that the Project is underlain by three geologic units (Æ, 2019) (Figure 4). Cretaceous granodiorite to tonalite (Kdvg) are exposed along the southeastern Project boundary, near the intersection of Case (Matthews) Road and Briggs Road. These granitic rocks do not contain fossils due to their high heat of formation deep below the surface of the Earth. Quaternary older alluvium (Qof) of late to middle Pleistocene age underlie the majority of the Project. Pleistocene-age deposits have proven to yield scientifically significant paleontological resources throughout Southern California. As noted above, the field survey performed for the previous project did not document any paleontological localities in the current Project area (Æ, 2019). However, a literature search of the vicinity of the previous project documented nearby diverse fossil assemblages in the vicinity of Lakeview and in the Diamond Valley Lake fauna of Diamond and Domenigoni valleys (Anderson, et al. 2002;



Figure 4. Project Geology Map



Springer, et al. 2009), and in the vicinity of Lake Mathews (Woodford, et al. 1971). Holocene-age alluvial fan deposits (Qyf) are restricted to a small western portion of the Project where they overlie the Quaternary older alluvium. Holocene-age alluvial sediments are typically too young to contain fossilized material (SVP, 2010), but they may overlie sensitive older deposits at an unknown but potentially shallow depth.

The PRA concluded the Quaternary older alluvial fan deposits have a high potential for paleontological resources because similar deposits in the vicinity of the Project area and throughout Riverside County have proven to yield significant vertebrate fossils; however, near the surface, the Quaternary older alluvium has been disturbed by previous agricultural activities and soil development to a depth of 2 – 4 feet bgs. Further, the Riverside County General Plan (2008) shows that the Project has a high potential (High B; Hb) for buried paleontological resources, which indicates that fossil resources may occur at depths as shallow 4 feet bgs. Therefore, the Qof in the Project area has a low paleontological resource potential from the surface to 4 feet bgs, then a high paleontological resource potential past 4 feet bgs.

The records search results obtained by PaleoWest from the WSC indicates there are no recorded fossil localities within the Project boundaries. However, Darla Radford, Collections Manager at the WSC, noted that just over a mile away is the previously discussed Diamond Valley Lake fauna (see WSC letter in Appendix A). An online search of the UCMP database revealed 18 Pleistocene-age vertebrate fossil localities in Riverside County, of which 5 are from unnamed Pleistocene-age deposits. UCMP RV8601 yielded 10 fossil specimens of unspecified Mammalia (mammal), *Neotoma* sp. (packrat), and *Microtus* sp. (vole). UCMP V7006 yielded a single specimen of *Gopherus* sp. (tortoise) and UCMP V65248 yielded a specimen belonging to *Mammuthus* sp. (UCMP Database Search Results in Appendix A).

A review of available paleontological data indicates that most of the Project is underlain by Quaternary older alluvium (Morton, et al. 2003). The records search by the WSC and search of the UCMP database indicates this geologic unit has proven to be highly fossiliferous in nearby areas. Based on these findings, it may be concluded that the majority of the Project area has a high paleontological resource sensitivity at depths as shallow as 4 feet bgs.

## CONCLUSIONS AND RECOMMENDATIONS

The findings of PaleoWest's study indicate that the mitigation recommendations included in the 2019 PRA remain valid. Ground disturbing activities, particularly overexcavation, are anticipated to range between 5 and 12 feet bgs throughout the Project. These excavations are expected to extend below the depth at which previously undisturbed Quaternary older alluvial fan deposits may transition into Pleistocene-age deposits which have a high paleontological resource sensitivity. These activities may result in significant impacts under CEQA to paleontological resources, such as destruction, damage, or loss of scientifically important paleontological resources.

Based on the results obtained from the updated paleontological resource study, PaleoWest concurs with AE's (2019) recommended mitigation that a qualified paleontologist be retained to develop and implement a Paleontological Resource Impact Mitigation Program that includes Worker Environmental Awareness Training, full-time monitoring of Project-related ground



disturbances that extend below four feet into undisturbed Quaternary older alluvial fan deposits, permanent curation of all significant fossils that are found during the course of on-site monitoring, and a technical report of paleontological resource findings to be drafted and submitted to the City at the completion of Project construction (see **Project Background** section).

It has been a pleasure working with you on this Project. If you have any questions, please do not hesitate to contact us.

Sincerely,

PALEOWEST

A handwritten signature in black ink that reads "Jess DeBusk". The signature is written in a cursive, flowing style.

Jessica DeBusk, M.B.A. Office Principal



## REFERENCES

- Anderson, R.S., Power, M.J., Smith, S.J., Springer, K., and E. Scott  
2002 Paleoeology of a middle Wisconsin deposit from southern California: Quaternary Research, v. 58, p. 310-317.
- Applied Earthworks, Inc. (Æ)  
2019 Paleontological Resource Assessment for the Brookfield Menifee Valley Project, City of Menifee, Riverside County, California. Prepared by Applied EarthWorks for Albert A. Webb Associates, Riverside California.
- City of Menifee  
2021 City of Menifee General Plan, Open Space and Conservation Element, Exhibit OSC-4. Paleontologic Resource Sensitivity. Accessed November 1, 2021 at <https://www.cityofmenifee.us/255/OSC-5-Paleontological-Cultural-Resources>
- Morton, D.M., Bovard, K.R., and G. Morton  
2003 Geologic map and digital database of the Romoland 7.5' quadrangle, Riverside County, California. United States Geological Survey Open-File Report OF-2003-102, scale 1:24,000.
- Riverside County Planning Department  
2015 County of Riverside General Plan, Updated 2015, General Plan Amendment No. 960, Public Review Draft, February 2015,
- Radford, D.  
2021 Unpublished museum records search of the Western Science Center, Hemet, CA.
- Rieboldt, Sarah, and James Parham  
2017 Paleontological Resources Assessment, Fleming Ranch Project, City of Menifee, County of Riverside, California. Report submitted to T&B Planning, Inc. Accessed March 2, 2022 at [https://files.ceqanet.opr.ca.gov/61015-4/attachment/7gFY1195Uo7HP\\_b2j\\_8wIE53X-kFOS1Zknaml6OCQgOXUwzxayX2AsJbE0\\_5Wycj3C88pMleQbXU\\_kTp0](https://files.ceqanet.opr.ca.gov/61015-4/attachment/7gFY1195Uo7HP_b2j_8wIE53X-kFOS1Zknaml6OCQgOXUwzxayX2AsJbE0_5Wycj3C88pMleQbXU_kTp0)
- Society of Vertebrate Paleontology (SVP)  
2010 Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources Society of Vertebrate Paleontology. Impact Mitigation Guidelines Revision Committee. Pages 1–11. Bethesda, MD.
- Springer, K., Scott, E., Sagebiel, J.C., and Murray, L.K.  
2009 The Diamond Valley Lake Local Fauna - Late Pleistocene Vertebrates from Inland Southern California, in Albright, L.B., III, ed., Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne, Museum of Northern Arizona Bulletin 65, Flagstaff, Arizona.



United States Geological Survey (USGS)

1980 Romoland Quadrangle, California - Riverside County, 7.5 Minute Series  
(Topographic). Scale 1:24,000.

Woodford, A.O., Shelton, J.S., Doehring, D.O., and R.K. Morton, R.K.

1971 Pliocene-Pleistocene History of the Perris Block, Southern California: Geological  
Society of America Bulletin, v. 82, p. 3421-3448.



# **Appendix A. Paleontological Records Search Results**





PaleoWest  
Dr. Joshua Bonde  
331 S. Water Street, Unit D  
Henderson, NV 89015

April 28, 2021

Dear Dr. Bonde,

This letter presents the results of a record search conducted for the Menifee Technology Park Project in the city of Menifee, Riverside County, California. The project site is located south of Highway 74, east of Menifee Road, north of Case Road, and west of Briggs Road in Section 13 and 24, Township 5 South, Range 3 West on the *Romoland, CA* USGS 7.5 minute topographic quadrangles.

The geologic unit underlying the project area is mapped entirely as old alluvial fan deposits dating to the middle to late Pleistocene epoch (Morton, Bovard, and Morton, 2003). Pleistocene alluvial units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area, but does have numerous localities within similarly mapped alluvial sediments throughout the region including those associated with the Diamond Valley Lake Project starting just outside the 1 mile project radius. The Diamond Valley Lake Project consisted of hundreds of fossil localities and produced hundreds of thousands of Pleistocene fossils including those associated with Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammut pacificus*), Sabertooth cat (*Smilodon fatalis*), Ancient horse (*Equus sp.*) and many other Pleistocene megafauna.

Any fossils recovered from Menifee Valley Technology Park Project would be scientifically significant. Excavation activity associated with development of the area has the potential to impact the paleontologically sensitive Pleistocene alluvial units and it is the recommendation of the Western Science Center that a paleontological resource mitigation plan be put in place to monitor, salvage, and curate any recovered fossils associated with the current study area.

If you have any questions, or would like further information, please feel free to contact me at [dradford@westerncentermuseum.org](mailto:dradford@westerncentermuseum.org)

Sincerely,




A handwritten signature in black ink, appearing to read 'Darla Radford', written over a white background.

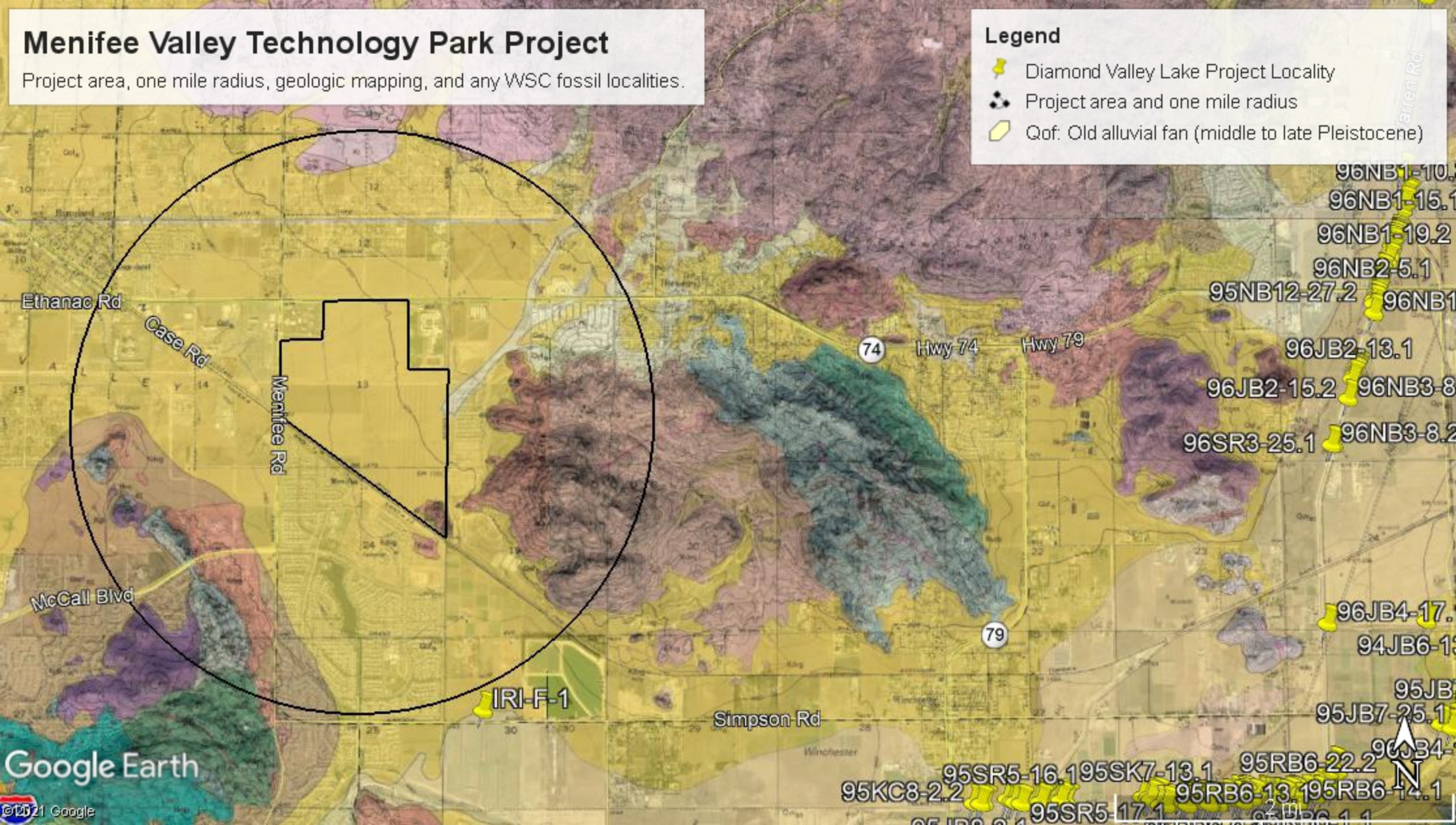
Darla Radford  
Collections Manager

# Menifee Valley Technology Park Project

Project area, one mile radius, geologic mapping, and any WSC fossil localities.

## Legend

-  Diamond Valley Lake Project Locality
-  Project area and one mile radius
-  Qof: Old alluvial fan (middle to late Pleistocene)



# UCMP Database Search Results





