



T: 626.408.8006
info@paleowest.com

LOS ANGELES COUNTY
517 S. Ivy Avenue
Monrovia, CA 91016

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: Supplemental Paleontological Resource Study of Off-Site Improvement Areas 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 a supplemental paleontological resources study in support of the Menifee Valley Specific Plan Project (Project) in the city of Menifee, Riverside County, California. The Project involves the development of a mixed-use, master-planned community consisting of a residential development, along with commercial and business parks, public facilities, and open space recreation. Paleontological resource assessments of the 590.3-acre Project site have previously been completed by Applied EarthWorks (Æ) (2019) and PaleoWest (DeBusk 2022).

PaleoWest understands that off-site road improvements, which encompass approximately 60 additional acres, have recently been defined for the proposed Project (Attachment A, Project Off-site Improvement Map). Because the existing paleontological studies did not assess the offsite improvement areas, Brookfield Properties has requested that PaleoWest conduct a supplementary study that considers the potential impacts of off-site improvements to paleontological resources under the California Environmental Quality Act (CEQA). The supplemental paleontological resources study consisted of a review of geological maps and existing record search data to assess the potential impacts of the proposed off-site road improvements on paleontological resources. Based on the findings of analysis, mitigation recommendations are provided to reduce Project impacts on paleontological resources in the off-site improvement areas to a less than significant level.

This technical memorandum was written in accordance with the guidelines set forth by the Society of Vertebrate Paleontology (SVP) (2010) and draws heavily from the reports prepared by Æ (2019) and DeBusk (2022).

Geological Setting

According to published geologic mapping (Morton et al., 2003; Morton and Miller, 2006), the geologic units underlying the Project's off-site improvement areas include Cretaceous igneous granitic bedrock and Quaternary alluvial fan deposits (Attachment A, Project Off-Site



Improvement Geologic Map). A description of each of these deposits, which have been adapted from Æ (2019), is provided below.

Cretaceous Granodiorite to Tonalite (Kdvg)

Cretaceous granitic bedrock is exposed in a weathered outcrop along proposed off-site improvements north of the Case Road – Briggs Road intersection. The composition of the intrusive igneous rock grades from medium-grained biotite-hornblende granodiorite into tonalite, with moderately abundant mafic inclusions (Morton and Miller, 2006). The granitic rock belongs to the Domenigoni Valley pluton of the Peninsular Ranges Batholith. Plutonic igneous rocks do not contain fossils due to their high heat of formation deep below the surface of the earth.

Old Alluvial Fan Deposits (Qof)

Most of the off-site road improvement areas are immediately underlain by middle to late Pleistocene alluvial fan deposits (see Attachment A, Project Off-Site Geology Map). The Quaternary older alluvial fan deposits (Qof) disconformably overlie the granodiorite to tonalite bedrock at an unknown but likely relatively shallow depth (Æ, 2019). The surficial sediments are composed of tan to reddish-brown sandstone and siltstone that was deposited in alluvial fan and local channel environments during the Pleistocene. Pleistocene age alluvial, fluvial, and lacustrine deposits have proven to yield scientifically significant paleontological resources throughout Southern California (see discussion in Æ 2019 report).

Young Alluvial Fan Deposits (Qyf)

Holocene alluvial fan deposits (Qya) are restricted to a small portion of the proposed off-site improvement area along Briggs Road. These deposits consist of unconsolidated, moderately dissected, sand, silt, and clay-bearing alluvium that overlie the older Quaternary alluvium. (Morton et al., 2003). 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.

Review of Existing Record Search Data

The paleontological resources assessment of the proposed off-site improvement areas included a review of record search data previously obtained for the Project site from the Natural History Museum of Los Angeles County (NHMLAC) by Æ (2019) and the Western Science Center (WSC) by PaleoWest (DeBusk 2022). In addition, results of PaleoWest’s online search of the University of California Museum of Paleontology (UCMP) were also examined (DeBusk, 2022). These record searches included the Project site, along with all of the proposed off-site improvement areas.

The record search results from the NHMLAC and WSC indicate that there are no known fossil localities in the proposed off-site improvement areas. However, results of the NHMLAC record search indicate that several miles to the southwest along the western margin of Meniffee Valley near the Railroad Canyon Reservoir, locality LACM 5168 has yielded fossil remains of horse from similar Quaternary older alluvium. Additionally, another vertebrate fossil locality, LACM 6059, was identified in the vicinity of Lake Elsinore that yielded a specimen of fossil camel from similar Pleistocene alluvial deposits. Results of the WSC record search indicate that there have been numerous fossil localities within old alluvial sediments similar to that found in the off-site improvement areas; some of these localities are associated with the Diamond Valley Lake Project located a little over a mile to the southeast (see discussion in Æ 2019 and DeBusk



2022). Finally, an online search of the UCMP database found numerous Pleistocene-age vertebrate fossil localities have been recorded in Riverside County, several of which derived from unnamed Pleistocene-age deposits.

Discussion and Recommendations

Based on the geological map review and museum records search results, the off-site improvement area appears to be underlain by geologic units that have low to high paleontological sensitivity, in accordance with criteria set forth by SVP (2010) (see discussion of SVP guidelines in *Æ*, 2019). The Quaternary older alluvial fan deposits have a high potential for paleontological resources because similar deposits in the vicinity of the Project and throughout Riverside County have proven to yield significant vertebrate fossils; however, the upper extent of these deposits (2 to 4 feet) has been disturbed by road construction and maintenance. Therefore, the surficial Quaternary older alluvium in the Project area has a low to high paleontological resource potential, dependent on depth. The younger Quaternary alluvial fan deposits, which are restricted to a very small area along Briggs Road, have a low paleontological resource potential because they are generally too young to preserve fossilized remains; however, they may shallowly overlies older intact Pleistocene alluvium. Finally, Cretaceous igneous plutonic rock (e.g., granodiorite to tonalite) has no paleontological resource potential due to the formation processes associated with these deposits.

Given the paleontological sensitivity of the proposed off-site improvement areas, PaleoWest recommends that the mitigation measures proposed for the Project site by *Æ* (2019) be applied to the off-site improvement areas. Through the implementation of these measures, adverse impacts to paleontological resources can be reduced to a less than significant level per CEQA. The proposed mitigation measures include:

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 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 fossil specimens will be identified to the lowest taxonomic level, catalogued, 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.

It has been a pleasure working with you on this Project. If you have any questions, please do not hesitate to contact me at jdebusk@paleowest.com.

Sincerely,

PALEOWEST



Jessica DeBusk, M.B.A., Regional Principal

Attachments

Attachment A – Maps



References

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.

DeBusk, J.

- 2022 Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, County, California. Technical Memorandum prepared by PaleoWest for Brookfield Properties, Costa Mesa, California.

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.

Morton, D.M. and Miller, F.K.

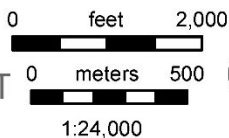
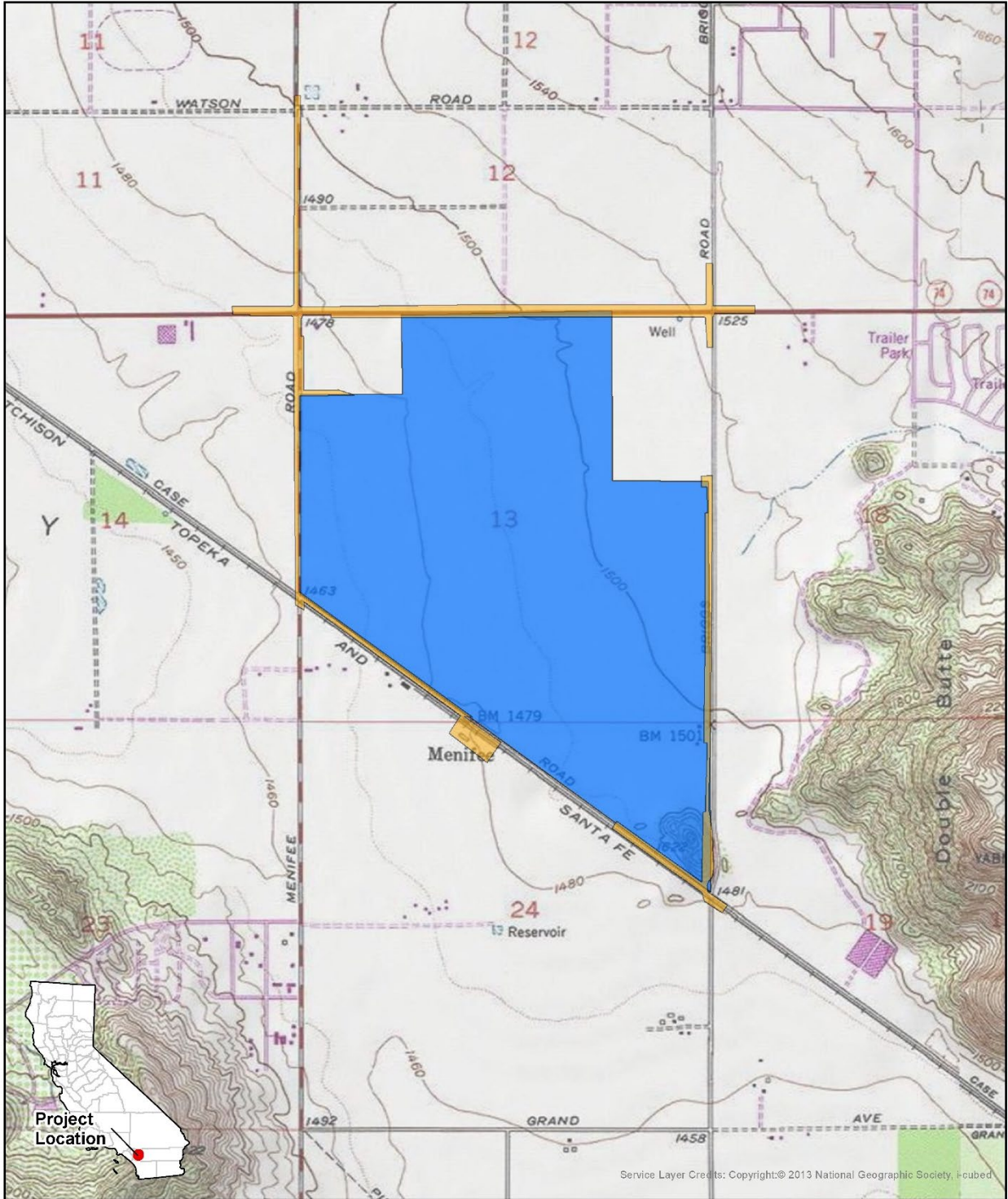
- 2006 Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey, Open-File Report OF-2006-1217, scale 1:100,000.

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.



Attachment A. Maps

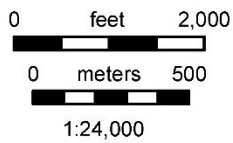
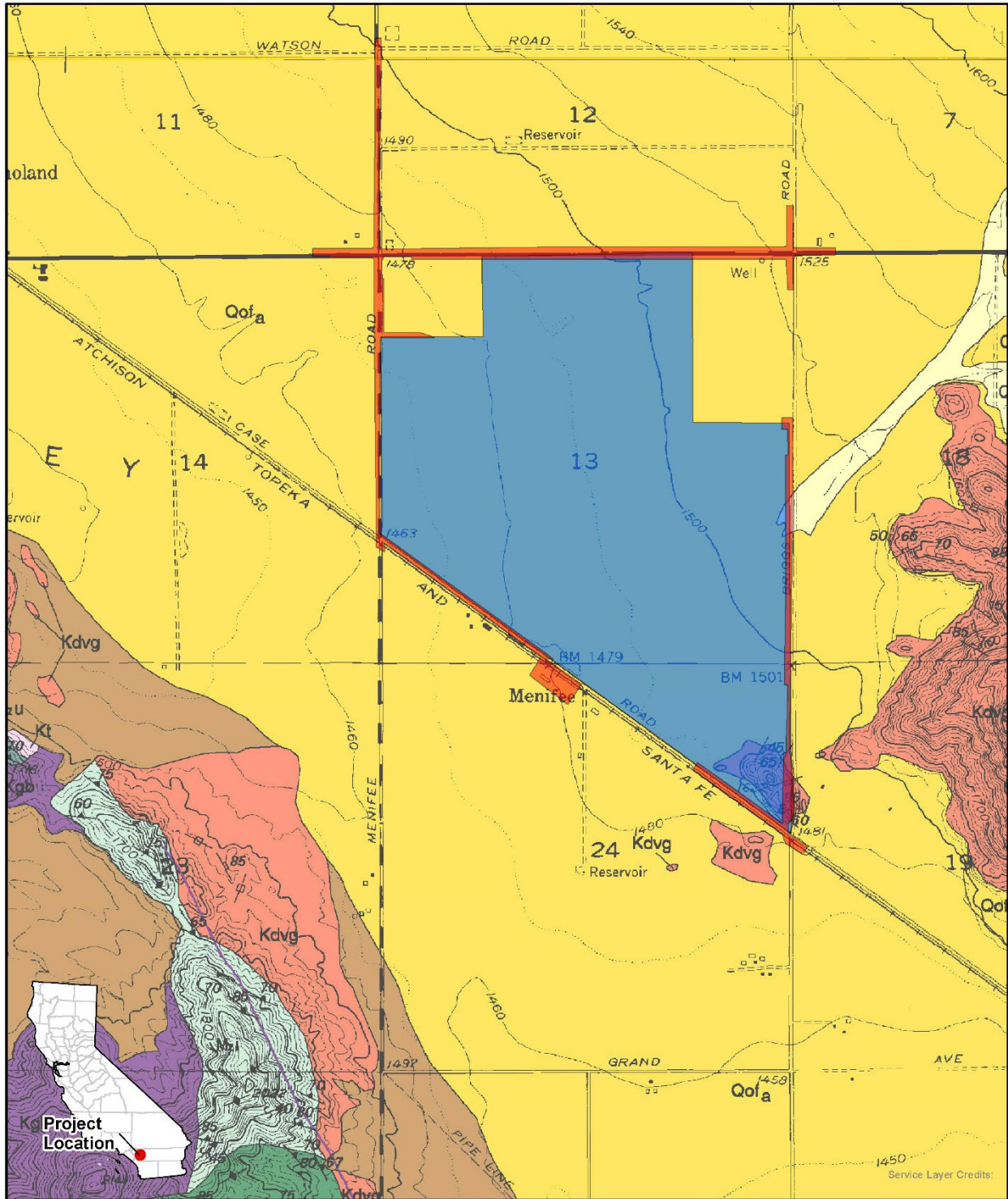


USGS 7.5' Quadrangle:
Romoland, CA (1980) &
Perris, Ca (1980)
T5S R3W, Sec 11-14 & 24; T5S
R2W, Sec 7 & 8-19
UTM Zone 11, NAD83 SBBM

- Project Area
- Off-site Improvement Area

Project Off-site Improvement Map





USGS 7.5' Quadrangle:
 Romoland, CA (1980) &
 Perris, Ca (1980)
 T5S R3W, Sec 11-14 & 24; T5S
 R2W, Sec 7 & 8-19
 UTM Zone 11, NAD83 SBBM

- Project Area
- Off-site Improvement Area

Project Off-Site Improvement Geology Map

