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Paleontological Resources Technical Report

9 Acres South of Iris
City of Moreno Valley
Riverside County, California

April 11, 2022

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Executive Summary

This technical report provides an assessment of paleontological resources at the proposed 9 Acres South of Iris project (Project) site in the City of Moreno Valley, Riverside County, California. The purpose of this report is to identify and summarize paleontological resources that occur within the Project site and immediate vicinity, identify Project elements (if any) that may negatively impact paleontological resources, and provide, if necessary, recommendations to reduce any potential negative impacts to less than significant levels. The report includes the results of institutional records searches conducted at the San Diego Natural History Museum (SDNHM) and Western Science Center (WSC).

The 9.58-gross-acre Project site is comprised of Assessor's Parcel Numbers (APNs) 316-030-002, -018, and -019, with 9.18 acres of this slated for development. The site has approximately 328 linear feet of street frontage along both the south side of Iris Avenue and the planned extension of Goya Street, which is the southerly property line for the Project. The site is approximately 1,000 feet west of Emma Lane and 500 feet east of Indian Street between the southerly right-of-way line for Iris Avenue and the northerly planned right-of-way for Goya Avenue. The Project proposes to construct a private community with 78 2-story single-family residential buildings. In the site plans, proposed vehicular access is shared between 6 dwelling units via one common driveway that connects private driveways for each unit with the proposed north/south private collector road between Iris Avenue and Goya Avenue. To discourage speeding, the 36-foot-wide private collector street meanders at a point adjacent to the proposed 0.33 acres of designated open space in the eastern portion of the site. Since the proposed collector road is a private gated road, the developer set aside land for turn arounds at gates and provided pathways for pedestrian circulation in compliance with the City's Planning department. In order to meet the City's requirements, additional site developments will include construction to roadways, landscape, drainage, utilities, and the development of a water quality basin, to follow City Ordinance No. 827. A retention basin has been proposed in the southwestern portion of the site and is approximately 17,835 sq. ft and accommodates a 12 ft. access road along the perimeter of the basin. The Project also includes offsite improvements to Iris Avenue and Goya Avenue such as widening, installation of street lights, and improvements to curbs, gutters, and sidewalks.

Based on published geologic mapping, the proposed Project site is primarily underlain by early to middle Pleistocene-age (approximately 2.58 million to 774,000 years old) very old alluvial-fan deposits (Qvof). These deposits are partially overlain by late Pleistocene- to Holocene-age (less than approximately 129,000 years old) young alluvial-fan deposits (Qyf) along the eastern margin of the Project site.

Fossil localities are not documented by the SDNHM or WSC within a one-mile radius of the Project site. However, multiple localities are known from the City of Moreno Valley and more broadly from western Riverside County. Several recorded fossil collection localities were documented in similar Pleistocene-age alluvial deposits located in the City of Moreno Valley, approximately 5 miles northeast of the proposed Project site, that produced fossil remains of giant ground sloth (*Megalonyx jeffersonii or Nothrotheriops shastensis*), camelid (*Hemiauchenia*), and horse (*Equus*). The SDNHM has one documented fossil locality from Pleistocene-age alluvial deposits located in the City of San Jacinto, approximately 15 miles to the east-southeast of the proposed Project site, that produced fossil remains of physid snails, frogs, colubrid snakes, lizards, and rodents (including the pocket gopher *Thomomys* sp.). In addition, significant fossils were discovered approximately 17 miles to the southeast of the Project site in Pleistocene-age braided stream and lake deposits exposed during construction of the Diamond Valley Lake project. Recovered fossils from this project represent a diversity of "Ice Age" mammals (e.g., ground sloth, weasel, skunk, badger, wolf, saber-toothed cat, American lion, puma, peccary, camel, pronghorn antelope, deer, bison, mastodon, and mammoth). Further, the San Bernardino County Museum (SBCM) reports several recorded Pleistocene fossil collection localities in the City of Menifee,

approximately 13 miles to the south of the Project site. These localities yielded fossil remains of western camel (*Camelops hesternus*), as well as small-bodied vertebrates including lizards, rodents, and rabbits.

A high paleontological sensitivity is assigned to the Qvof deposits underlying the Project site. This assignment is supported by known occurrences of fossils in these deposits within the City of Moreno Valley and elsewhere in western Riverside County. Qyf deposits are assigned a low paleontological sensitivity rating. These younger deposits may be up to 5 feet thick along the northern half of the eastern boundary of the Project site, and appear to overlie Qvof deposits.

Construction of the proposed Project has the potential to impact paleontological resources during earthwork in areas mapped as Qvof deposits and during any earthwork exceeding approximately 5 feet below ground surface in areas mapped as Qyf deposits. Thus, implementation of a paleontological mitigation program centered around paleontological monitoring is recommended, as outlined in the provided Mitigation Measures 1–7. Implementation of the paleontological mitigation program will reduce any Project-related impacts to paleontological resources to a level that is less than significant.

Contents

1.0 Introduction

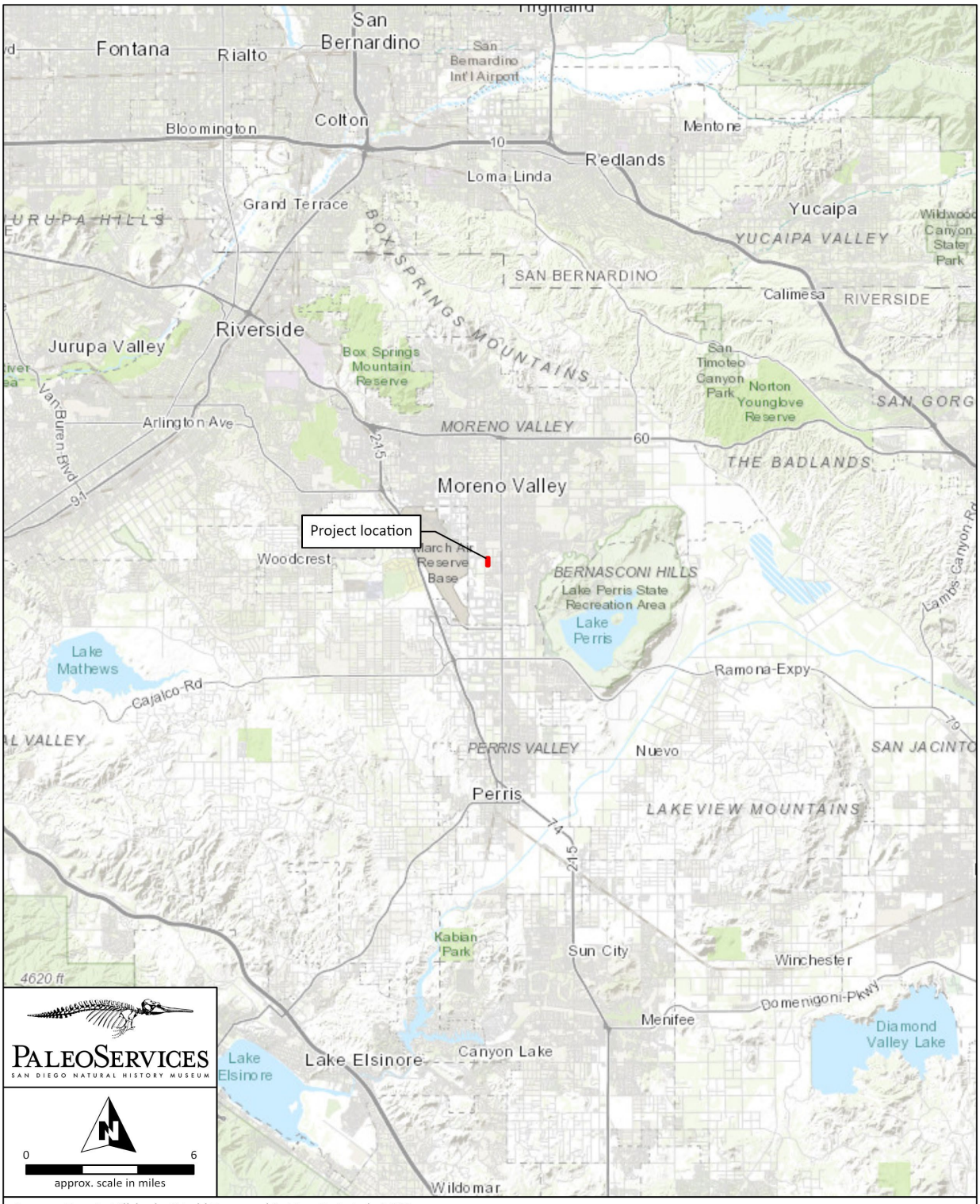
1.1 Project Description

This technical report provides an assessment of paleontological resources for the proposed 9 Acres South of Iris project (Project) site located in the City of Moreno Valley, Riverside County, California (Figure 1). The 9.58-gross-acre Project site is comprised of Assessor's Parcel Numbers (APNs) 316-030-002, -018, and -019, with 9.18 acres of this slated for development. The site has approximately 328 linear feet of street frontage along both the south side of Iris Avenue and the planned extension of Goya Street, which is the southerly property line for the Project. The site is approximately 1,000 feet west of Emma Lane and 500 feet east of Indian Street between the southerly right-of-way line for Iris Avenue and the northerly planned right-of-way for Goya Avenue. Adjacent parcels to the west are mostly vacant, to the east adjacent parcels are urbanized, and north of Iris Avenue lies an elementary school with a mix of developments and open space. The Project proposes to construct a private community with 78 2-story single-family residential buildings. A residential density of 8.5 dwelling units per acre (DU/AC) is proposed with Moreno Valley Zoning Code and General Plan. This will require a General Plan Amendment and Zone change from R-5 to R-10 to be compliant with the City's Municipal Code. In addition to the General Plan Amendment and Zone Change, the Project requires a Tentative Tract Map for individual lots and Conditional Use Permit for Planned Unit Development.

The Project plans indicate that the residential developments have four distinct design plans varying in square footage (2,535 sq. ft., 2,551 sq. ft., 2,695 sq. ft.). In the site plans, proposed vehicular access is shared between 6 DU via one common driveway that connects private driveways for each unit with the proposed north/south private collector road between Iris Avenue and Goya Avenue. To discourage speeding, the 36-foot-wide private collector street meanders at a point adjacent to the proposed 0.33 acres of designated open space in the eastern portion of the site. Since the proposed collector road is a private gated road, the developer set aside land for turn arounds at gates and provided pathways for pedestrian circulation in compliance with the City's Planning department. In order to meet the City's requirements, additional site developments will include construction to roadways, landscape, drainage, utilities, and the development of a water quality basin, to follow City Ordinance No. 827. A retention basin has been proposed in the southwestern portion of the site and is approximately 17,835 sq. ft and accommodates a 12 ft. access road along the perimeter of the basin. The Project also includes offsite improvements to Iris Avenue and Goya Avenue such as widening, installation of street lights, and improvements to curbs, gutters, and sidewalks.

1.2 Scope of Work

Because the Project site occurs in an area underlain by native sedimentary deposits, a paleontological resource assessment was conducted in order to satisfy City of Moreno Valley requirements and to evaluate whether the proposed Project has the potential to negatively impact paleontological resources. The assessment addresses potential impacts to paleontological resources that may occur during construction of the proposed Project by summarizing existing paleontological resource data at the Project site, evaluating the significance of these resources, examining potential Project-related impacts to paleontological resources, and, if necessary, suggesting mitigation measures to reduce impacts to paleontological resources to less than significant levels. The assessment also includes the results of a literature review of relevant geological and paleontological reports and institutional records searches of the paleontological collections at the San Diego Natural History Museum (SDNHM) and Western Science Center (WSC). This technical report was prepared by Katie M. McComas and Thomas A. Deméré of the Department of PaleoServices, SDNHM.



Sources: Terrain Hillshade, World Topographic Map, Esri et al., 2022

Figure 1: Project overview map, 9 Acres South of Iris, City of Moreno Valley, Riverside County, California

1.3 Definition of Paleontological Resources

As defined here, paleontological resources (i.e., fossils) are the buried remains and/or traces of prehistoric organisms (i.e., animals, plants, and microbes). Body fossils such as bones, teeth, shells, leaves, and wood, as well as trace fossils such as tracks, trails, burrows, and footprints, are found in the geologic units/formations within which they were originally buried. The primary factor determining whether an object is a fossil or not is not how the organic remain or trace is preserved (e.g., "petrified"), but rather the age of the organic remain or trace. Although typically it is assumed that fossils must be older than ~11,700 years (i.e., the generally accepted end of the last glacial period of the Pleistocene Epoch), organic remains older than recorded human history and/or older than middle Holocene (about 5,000 radiocarbon years) can also be considered to represent fossils (SVP, 2010).

Fossils are considered important scientific and educational resources because they serve as direct and indirect evidence of prehistoric life and are used to understand the history of life on Earth, the nature of past environments and climates, the membership and structure of ancient ecosystems, and the pattern and process of organic evolution and extinction. In addition, fossils are considered to be non-renewable resources because typically the organisms they represent no longer exist. Thus, once destroyed, a particular fossil can never be replaced.

Finally, paleontological resources can be thought of as including not only the actual fossil remains and traces, but also the fossil collection localities and the geologic units containing those localities. The locality includes both the geographic and stratigraphic context of fossils—the place on the earth and stratum (deposited during a particular time in earth's history) from which the fossils were collected. Localities themselves may persist for decades, in the case of a fossil-bearing outcrop that is protected from natural or human impacts, or may be temporarily exposed and ultimately destroyed, as is the case for fossil-bearing strata uncovered by erosion or construction. Localities are documented with a set of coordinates and a measured stratigraphic section tied to elevation detailing the lithology of the fossil-bearing stratum as well as that of overlying and underlying strata. This information provides essential context for any future scientific study and educational use of the recovered fossils.

1.3.1 Definition of Significant Paleontological Resources

The California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) dictates that a paleontological resource is considered significant if it "has yielded, or may be likely to yield, information important in prehistory or history" (Section 15064.5, [a][3][D]). The Society of Vertebrate Paleontology (SVP) has further defined significant paleontological resources as consisting of "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" (SVP, 2010).

1.4 Regulatory Framework

Paleontological resources are considered scientifically and educationally significant nonrenewable resources, and as such they are protected under state (e.g., California Environmental Quality Act [CEQA]) and local (City of Moreno Valley) laws, regulations, and ordinances, outlined below.

1.4.1 State

Notable State legislative protection for paleontological resources includes the California Environmental Quality Act and the Public Resources Code.

The **California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.)** protects paleontological resources on both state and private lands in California. This act requires the

identification of environmental impacts of a Project, the determination of significance of the impacts, and the identification of alternative and/or mitigation measures to reduce adverse environmental impacts. The Guidelines for the Implementation of CEQA (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.) outlines these necessary procedures for complying with CEQA. Paleontological resources are specifically included as a question in the CEQA Environmental Checklist (Section 15023, Appendix G): "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature." Also applicable to paleontological resources is the checklist question: "Does the project have the potential to… eliminate important examples of major periods of California history or pre-history."

1.4.2 Local

The **City of Moreno Valley General Plan 2040** does not directly address paleontological resources. However, the Final Environmental Impact Report (FEIR) produced and certified alongside the General Plan provides Mitigation Measure PAL-1 to mitigate potential impacts to paleontological resources:

- PAL-1: Applications for future development, wherein the Community Development Director or his or her designee has determined a potential for impacts to paleontological resources, shall review the underlying geology and paleontological sensitivity of the site. If it is determined that the potential exists that sensitive paleontological resources are present, the applicant shall be required to comply with the following mitigation framework.

  A qualified paleontological monitor shall be present during grading in project areas where a project specific geological technical study has determined that such monitoring is necessary due to the potential for paleontological resources to reside within the underlying geologic formations. The geologic technical study shall also provide specific duties of the monitor, and detailed measures to address fossil remains, if found.

The FEIR utilizes the California Department of Transportation Standard Environmental Reference guidelines for paleontology (Caltrans, 2017), and provides mapping that summarizes areas of high, low, and no paleontological resource potential within city boundaries (City of Moreno Valley, 2021).

2.0 Methods

2.1 Paleontological Records Searches and Literature Review

Paleontological records searches were conducted at the SDNHM and WSC in order to determine if any documented fossil collection localities occur within the Project site or immediate surrounding area. The SDNHM records search involved examination of the paleontological database for any records of known fossil collection localities from sedimentary deposits similar to those underlying the Project site within an approximately one-mile radius. A formal records search of the paleontological collections at WSC was also requested (WSC, 2022; Appendix A).

Additionally, a review was conducted of relevant published geologic mapping (e.g., Morton and Matti, 2002; Morton and Miller, 2006), published geological and paleontological reports (e.g., Springer et al., 2009), and other relevant literature (e.g., unpublished paleontological mitigation reports). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic units within which they are entombed. Knowing the geologic history of a particular area and the fossil productivity of geologic units that occur in that area, makes it is possible to predict where fossils may, or may not, be encountered.

2.2 Paleontological Resource Assessment Criteria

The City of Moreno Valley General Plan 2040 FEIR (City of Moreno Valley, 2021) adopted the tripartite scale for assessing paleontological potential utilized by Caltrans (Caltrans, 2017).

The specific criteria for each scale of paleontological potential/sensitivity is outlined below.

2.2.1 High Potential/Sensitivity

Geologic units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils. These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with extremely limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing: 1) abundant vertebrate fossils; 2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; 3) areas that may contain datable organic remains older than Recent, including *Neotoma* sp. middens; or 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation during construction.

2.2.2 Low Potential/Sensitivity

This category includes sedimentary rock units that: 1) are potentially fossiliferous, but have not yielded significant fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock unit are well understood. Sedimentary rock units expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized stratum. Geologic units designated as low potential generally do not require monitoring and mitigation. However, as excavation for construction gets underway it is possible that new and unanticipated paleontological resources might be encountered. If this occurs, a qualified Principal Paleontologist should evaluate the resource. If the resource is determined to be significant, monitoring and mitigation is required.

2.2.3 No Potential/Sensitivity

Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing significant paleontological resources. Artificial fill is also classified as having no potential based on the fact that it has been moved from its original site of deposition, and any fossils present within these deposits lack their original geographic and stratigraphic context. For projects encountering only these types of rock units, paleontological resources can generally be eliminated as a concern when the technical study is prepared and no further action needs to be taken.

2.3 Paleontological Impact Analysis

Direct impacts to paleontological resources occur when earthwork activities (e.g., mass grading, utility trenching) cut into the geologic units within which fossils are buried and physically destroy the fossil remains. As such, only earthwork activities that will disturb potentially fossil-bearing sedimentary deposits (i.e., those rated with a high paleontological sensitivity) have the potential to significantly

impact paleontological resources. Paleontological mitigation typically is recommended to reduce any negative impacts to paleontological resources to less than significant levels.

The purpose of the impact analysis is to determine which (if any) of the proposed Project-related earthwork activities may disturb potentially fossil-bearing geologic units, and where and at what depths this earthwork will occur. The paleontological impact analysis involved analysis of available project documents, and comparison with geological and paleontological data gathered during the records searches and literature review.

3.0 Results

3.1 Results of the Records Searches and Literature Review

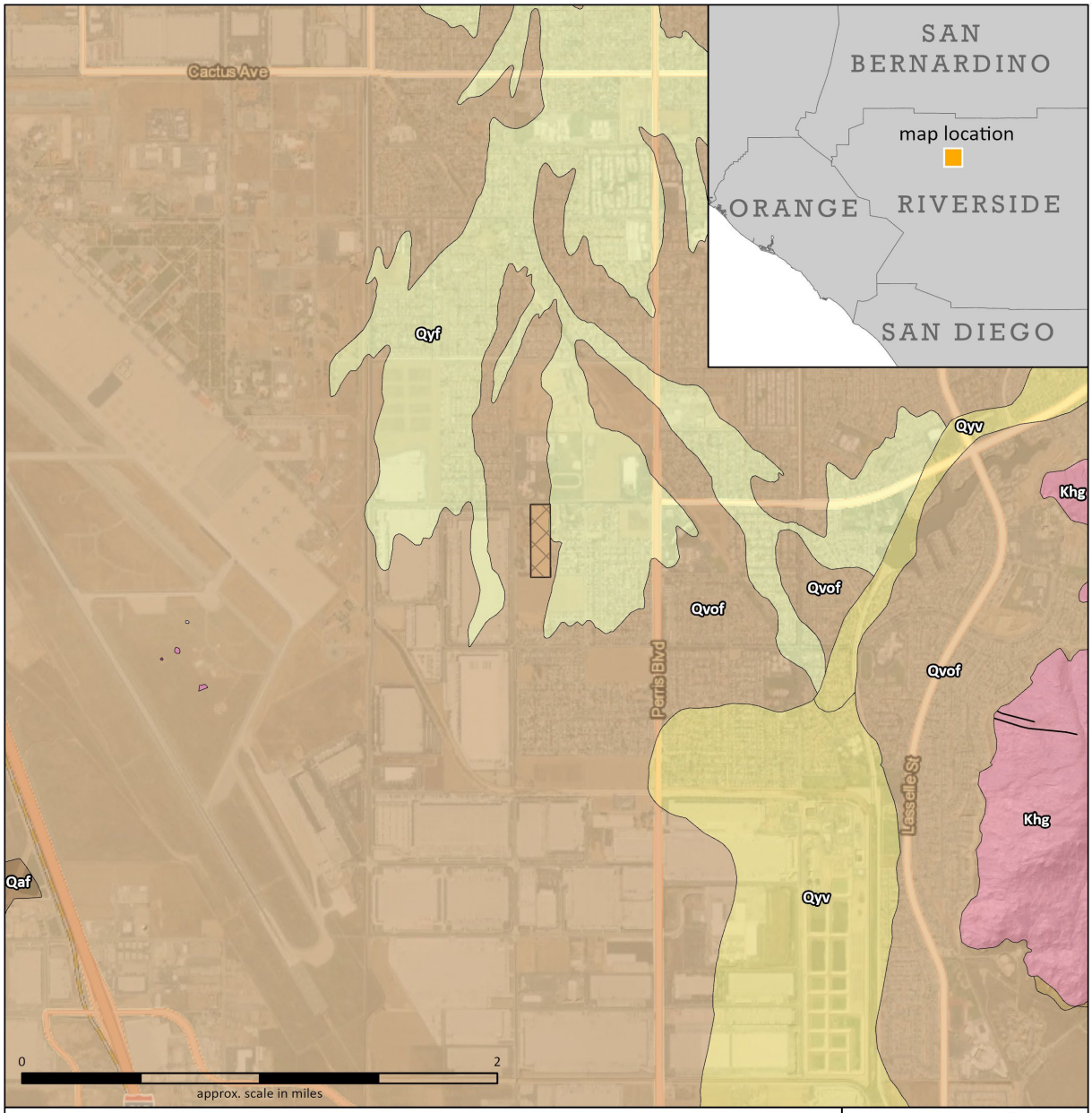
3.1.1 Project Geology

Geologic setting: The proposed Project site is located within the Perris Block of the Peninsular Ranges Geomorphic Province (English, 1926; Norris and Webb, 1990). This structural block is surficially expressed as a relatively low relief, weathered basin punctuated by resistant hills and small mountains, and is surrounded by the Sana Ana Mountains to the west and south, the San Jacinto Mountains to the east, and the San Gabriel and San Bernardino Mountains to the north. The Perris Block is a fault-controlled region, with the San Jacinto Fault to the northeast and the Elsinore Fault to the southwest. Faulting is responsible for the uplift of the surrounding mountain ranges, and the down drop of the Perris Block. As a consequence, the surrounding mountain ranges are actively being eroded, and the sediments derived from this erosion have in the past been, and are still being deposited in the basin lowlands as alluvial fans and/or stream channel deposits. These surficial deposits overlie a deeply weathered mass of Cretaceous plutonic igneous rocks of the Peninsular Ranges Batholith and older metasedimentary basement rocks.

Project-specific geology: The proposed Project site is primarily underlain by early to middle Pleistocene-age (approximately 2.58 million to 774,000 years old) very old alluvial-fan deposits (Qvof) (Morton and Matti, 2002; Morton and Miller, 2006). These deposits are partially overlain by late Pleistocene- to Holocene-age (less than approximately 129,000 years old) young alluvial-fan deposits (Qyf) along the extreme eastern margin of the Project site (Morton and Matti, 2002; Morton and Miller, 2006) (Figure 2). The alluvial sediments were likely deposited on an irregular plutonic bedrock terrain by a south-flowing drainage system or by local alluvial fans derived from the highlands to the east of the Project site.

3.1.2 Project Paleontology

The SDNHM does not have any documented fossil collection localities within a one-mile radius of the proposed Project site. The closest SDNHM fossil locality from similar Pleistocene-age alluvial deposits is located approximately 15 miles to the east-southeast in the San Jacinto Valley within the City of San Jacinto, where fossil remains of physid snails, frogs, colubrid snakes, lizards, and rodents (including the pocket gopher *Thomomys* sp.) were discovered at a depth of 10 feet below ground surface (bgs) during paleontological monitoring of mass grading for a new middle school (SDNHM, unpublished paleontological collections data).



Sources: Geology from Morton and Miller, 2006; Terrain Hillshade, World Transportation and Imagery, Esri et al., 2022

Figure 2: Geologic map of the Project site, 9 Acres South of Iris, City of Moreno Valley, Riverside County, California

A records search request of paleontological collections data at the WSC generated a response that there are no recorded WSC fossil collection localities within a one-mile radius of the proposed Project site, but does note that localities are documented in the region in similar Pleistocene-age alluvial deposits (WSC, 2022; Appendix A). These localities have produced mammoth (*Mammuthus columbi*), mastodon (*Mammut pacificus*), saber toothed cats (*Smilodon fatalis*), ancient horse (*Equus* sp.), and other Pleistocene-age large-bodied and small-bodied organisms that lived during the Pleistocene.

In addition, multiple localities were documented in similar Pleistocene-age alluvial deposits during construction of the Aldi Distribution Center, located approximately 5 miles northeast of the proposed Project site (LSA, 2014). These localities produced isolated fossil remains of giant ground sloth (*Megalonyx jeffersonii* or *Nothrotheriops shastensis*), camelid (*Hemiauchenia*), and horse (*Equus*) (LSA, 2014). The fossil-bearing deposits were exposed at depths of 11 and 13 feet bgs in an area where young alluvial-fan deposits are mapped at the surface (LSA, 2014).

In addition, significant fossils were discovered approximately 17 miles to the southeast of the Project site in Pleistocene-age braided stream and lake deposits exposed during construction of the Diamond Valley Lake project. Recovered fossils consist of large-bodied "Ice Age" mammals (e.g., ground sloth, weasel, skunk, badger, wolf, saber-toothed cat, American lion, puma, peccary, camel, pronghorn antelope, deer, bison, mastodon, and mammoth) (Springer et al., 2009, 2010). Further, the San Bernardino County Museum (SBCM) reports several recorded paleontological collection localities in the northeastern and eastern portions of the City of Menifee, approximately 13 miles south of the Project site. These fossil localities yielded fossil remains of western camel (*Camelops hesternus*) and small-bodied vertebrates including lizards, rodents, and rabbits (SBCM, 2010).

3.2 Results of the Paleontological Resource Assessment

The City of Moreno Valley General Plan 2040 FEIR (City of Moreno Valley, 2021) assigns the Pleistocene-age very old alluvial-fan deposits (Qvof) underlying the majority of the Project site a high paleontological sensitivity. This rating is supported by the known occurrence of fossils from similar deposits in the City of Moreno Valley and elsewhere in western Riverside County. In contrast, the primarily Holocene-age young alluvial-fan deposits (Qyf) present along the eastern boundary of the Project site are assigned a low paleontological sensitivity rating, based on the relatively young geologic age of these deposits.

Within the Project site, Qvof deposits are presumably exposed at or near the surface over the majority of the site (where indicated by existing geological mapping) and are estimated to be overlain by up to 5 feet of Qyf deposits along the northern half of the extreme eastern boundary of the site (Figure 3).

3.3 Results of the Paleontological Impact Analysis

Based on conceptual grading plans (dated 20 September 2021), the existing parcel is nearly flat-lying and currently slopes subtley from 1507 feet above sea level (asl) along Iris Avenue to 1497 feet asl at the southwestern corner of the site. The proposed site grading maintains this gentle slope, with finished grades located within 2 feet of original grade. Accordingly, grading for the creation of level building pads (which may include overexcavation and recompaction of the underlying sediments) and trenching for subgrade utilities are estimated to extend approximately 5 feet bgs. The grading plans also indicate that a storm water retention basin will be constructed in the southwestern corner of the site. The basin is anticipated to require somewhat deeper, unspecified excavations, extending approximately 6 feet bgs.

Sources: Terrain Hillshade, World Transportation and Imagery, Esri et al., 2022

Figure 3: Paleontological sensitivity map, 9 Acres South of Iris, City of Moreno Valley, Riverside County, California

Based on the published geologic mapping of the Project site (Morton and Matti, 2002; Morton and Miller, 2006), the majority of excavations will take place in areas mapped as Qvof, where impacts to paleontological resources are possible. Proposed Project components that will involve significant excavations into Qvof deposits include: site grading, trenching for subgrade utilities, and excavation of the storm water retention basin. Shallower excavations that occur in the later portion of site development (e.g., installation of hardscaping and landscaping) are likely to take place within materials that were already disturbed during site grading, and are therefore these excavations are unlikely to impact paleontological resources. Offsite improvements to Iris Avenue and Goya Avenue are also underlain by Qvof deposits, but grading along these existing streets is anticipated to be relatively shallow (no deeper than 2 feet bgs) and will likely primarily impact previously disturbed sediments.

Table 1. Summary of Project impacts and paleontological monitoring recommendations.

Project Components	Anticipated Depth of Earthwork	Impact Analysis	Monitoring recommended?
Site grading	Approximately 5 feet bgs	Impacts possible	Qvof: Yes; Qyf: No
Construction of interior roadways	Approximately 5 feet bgs	Impacts possible	Qvof: Yes; Qyf: No
Trenching for subgrade utilities	Approximately 5 feet bgs	Impacts possible	Qvof: Yes; Qyf: No
Retention basin excavation	Approximately 6 feet bgs	Impacts possible	Yes
Hardscaping, landscaping	Less than approximately 2 feet bgs	No impacts anticipated	No
Offsite improvements to Iris Avenue and Goya Avenue	Approximately 2 feet bgs	No impacts anticipated	No

4.0 Recommendations & Conclusions

Implementation of a paleontological mitigation program, in the form of paleontological monitoring, is recommended for earthwork at the Project site that will directly impact early to middle Pleistocene-age very old alluvial-fan deposits (Qvof).

Implementation of the following mitigation measures will reduce any Project-related impacts to paleontological resources to a level that is less than significant.

4.1 Mitigation Measures

1. Prior to the start of earthwork, a qualified Project Paleontologist shall be retained to oversee the paleontological monitoring program and shall attend the pre-construction meeting to consult with Project contractors concerning excavation schedules, paleontological field techniques, and safety issues. A qualified Project Paleontologist is defined as an individual with an M.S. or Ph.D. in paleontology or geology that is experienced with paleontological procedures and techniques, who is knowledgeable in the geology and paleontology of Riverside County, and who has worked as a paleontological mitigation project supervisor for at least one year. In addition, a professional repository shall be designated to receive and curate any discovered fossils. A professional repository is defined as a recognized paleontological specimen repository (e.g., an AAM-accredited museum or university) with a permanent curator, and should be capable of

storing fossils in a facility with adequate security against theft, loss, damage, fire, pests, and adverse climate conditions (e.g., Western Science Center, San Diego Natural History Museum).

2. A paleontological monitor shall be on-site during earthwork in areas mapped as early to middle Pleistocene-age very old alluvial-fan deposits (Qvof; Figure 3, areas symbolized in red). A paleontological monitor is defined as an individual with a college degree in paleontology or geology who has experience in the recognition and salvage of fossil materials. The paleontological monitor shall work under the direction of the Project Paleontologist. The paleontological monitor shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Paleontological monitoring may be reduced (e.g., part-time monitoring or spot-checking) or eliminated, at the discretion of the Project Paleontologist and in consultation with appropriate agencies (e.g., Project proponent, City of Moreno Valley representatives). Changes to the paleontological monitoring schedule shall be based on the results of the mitigation program as it unfolds during site development, and current and anticipated conditions in the field.
3. If fossils are discovered, the Project Paleontologist (or paleontological monitor) shall make an initial assessment to determine their significance. All identifiable vertebrate fossils (large or small) and uncommon invertebrate, plant, and trace fossils are considered to be significant and shall be recovered (SVP, 2010). Representative samples of common invertebrate, plant, and trace fossils shall also be recovered. Although fossil salvage can often be completed in a relatively short period of time, the Project Paleontologist (or paleontological monitor) shall be allowed to temporarily direct, divert, or halt earthwork at his or her discretion during the initial assessment phase if additional time is required to salvage fossils. If it is determined by the Project Paleontologist that the fossil(s) should be recovered, the recovery shall be completed in a timely manner. Some fossil specimens (e.g., a large mammal skeleton) may require an extended salvage period. Because of the potential for the recovery of small fossil remains (e.g., isolated teeth of small vertebrates), it may be necessary to collect bulk-matrix samples for screen washing.
4. In the event that fossils are discovered during a period when a paleontological monitor is not on site (i.e., an inadvertent discovery), earthwork within the vicinity of the discovery site shall temporarily halt, and the Project Paleontologist shall be contacted to evaluate the significance of the discovery. If the inadvertent discovery is determined to be significant, the fossils shall be recovered, as outlined in Mitigation Measure 3.
5. Fossil remains collected during monitoring and salvage shall be cleaned, repaired, sorted, taxonomically identified, and cataloged as part of the mitigation program. Fossil preparation may also include screen-washing of bulk matrix samples for microfossils or other laboratory analyses (e.g., radiometric carbon dating), if warranted in the discretion of the Project Paleontologist. Fossil preparation and curation activities may be conducted at the laboratory of the contracted Project Paleontologist, at an appropriate outside agency, and/or at the designated repository, and shall follow the standards of the designated repository.
6. Prepared fossils, along with copies of all pertinent field notes, photos, and maps, shall be curated at a professional repository. The Project Paleontologist shall have a written repository agreement with the professional repository prior to the initiation of mitigation activities.

7. A final summary report shall be completed at the conclusion of the monitoring and curation phases of work, and shall summarize the results of the mitigation program. A copy of the paleontological monitoring report shall be submitted to the City of Moreno Valley and to the designated museum repository. The report and specimen inventory, when submitted to the City of Moreno Valley with confirmation of the curation of recovered specimens into an established, accredited repository, shall signify completion of the program to mitigate impacts to paleontologic resources.

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Appendix A

Records Search Results: Western Science Center

WESTERN SCIENCE CENTER

San Diego Natural History Museum
Katie McComas
1788 El Prado
San Diego, CA 92101

February 10, 2022

Dear Ms. McComas,

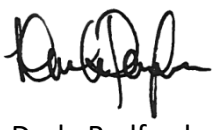
This letter presents the results of a record search conducted for South Iris Project (PS0003) in the city of Moreno Valley, Riverside County, California. The project site is located south of Iris Avenue, north of Krameria Avenue, east of Indian Street, and west of Emma Lane in Section 30 of Township 3 South and Range 3 West on the *Sunnymead, CA* USGS 7.5 minute topographic quadrangles.

The geologic unit underlying the project area is mapped entirely as alluvial deposits dating to the early Pleistocene epoch (Morton et al., 2002). Pleistocene sedimentary units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or a one mile radius, but does have numerous localities throughout the region in similarly mapped sediments. Southern California Pleistocene units are well known to produce fossil localities and specimen including those associated with mammoth (*Mammuthus columbi*), mastodon (*Mammut pacificus*) sabertooth cats (*Smilodon fatalis*), ancient horse (*Equus sp*.) and many other Pleistocene megafauna and microfauna.

Any fossils recovered from the South Irish Project area would be scientifically significant. Excavation activity associated with development of the area has the potential to impact the paleontologically sensitive Pleistocene 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

Sincerely,



Darla Radford
Collections Manager