APPENDIX D12

Paleontological Resources Technical Report, May 18, 2022

PALEOSERVICES
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Paleontological Resources Technical Report

The District at Jurupa Valley Specific Plan
City of Jurupa Valley
Riverside County, California

May 6, 2022 (revised May 18, 2022)

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Executive Summary

This technical report provides an assessment of paleontological resources within the proposed The District at Jurupa Valley Specific Plan area, located in the City of Jurupa Valley, Riverside County, California. The purpose of this report is to identify and summarize paleontological resources that occur within the proposed specific plan area and immediate vicinity, identify construction 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 Bernardino County Museum (SBCM), San Diego Natural History Museum (SDNHM), and Western Science Center (WSC).

The approximately 224-acre specific plan area includes 94 Assessor's Parcel Numbers. The specific plan area is generally bordered by State Route (SR) 60 to the north, the Santa Ana River to the east, 34th Street to the south, and Rubidoux Boulevard to the west. Existing conditions consist of generally level topography with grade changes related to a variety of different land uses. These include a segment of the Jurupa Ditch (a former regional irrigation canal), remnants of the abandoned Emerald Meadows Ranch (a former horse training facility), several former agricultural fields, some large graded pads of former businesses, and several existing private residences.

The new specific plan would permit development of up to 1,192 residential units; 3 million square feet of commercial and industrial land uses; a hotel with conference and hospitality area; and 7 acres of parks and open space (the "Project").

Based on published geologic mapping, the proposed Project site is primarily underlain by Holocene- to late Pleistocene-age (less than approximately 129,000 years old) young axial-channel deposits (Qya) representing alluvium deposited by the Santa Ana River during periods of high flow. Middle Pleistocene-age (approximately 774,000 to 129,000 years old) old alluvial-fan deposits, Unit 1 (Qof_1) derived from the Jurupa Mountains underlie part of the northern and northwestern portions of the Project site, and presumably may also underlie Qya deposits elsewhere within the Project site. Artificial fill deposits (Qaf) underlie the southeastern margin of the site, and were placed during levee construction along the modern Santa Ana River channel.

The SBCM has two nearby fossil localities from similar Pleistocene-age alluvial deposits that produced fossil remains of mastodon (*Mammut pacificus*) at a depth of approximately 25 feet bgs (located 0.6 miles north of the Project site) and fossil remains of a saber-toothed cat (*Smilodon* sp.) at a depth of 5 feet bgs (located 5 miles west-northwest of the Project site). Fossil localities have not been documented by the SDNHM or WSC within a one-mile radius of the Project site. However, multiple localities are known more broadly from western Riverside County. Several recorded fossil collection localities have been documented in similar Pleistocene-age alluvial deposits located in the City of Moreno Valley, which 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 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 south of Hemet 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 30 miles to the southeast 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 Qof_1 deposits underlying the Project site. This assignment is supported by known occurrences of fossils in similar deposits elsewhere in western Riverside County. Qya and Qaf deposits are assigned a low paleontological sensitivity rating. Qya and Qaf deposits are estimated to be at least 5 feet thick within the Project site, and may in turn overlie Qof_1 deposits.

Construction of the proposed Project has the potential to impact paleontological resources during earthwork in areas mapped as Qof_1 deposits and during any earthwork exceeding approximately 5 feet below ground surface in areas mapped as Qya or Qaf 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 within the proposed The District at Jurupa Valley Specific Plan area, located in the City of Jurupa Valley, Riverside County, California (Figure 1). The approximately 224-acre specific plan area includes the following 94 Assessor's Parcel Numbers (APNs): 178-252-003 and 178-252-004, 178-261-001 and 178-261-002; 178-262-001 through -008; 178-290-005; 178-290-009; 178-300-001 through -008; 178-310-001 and 178-310-002; 178-310-004 though -009; 178-310-011 through -015; 178-310-023 through -026; 178-310-028; 178-310-031 through -033; 178-310-041; 178-310-042; 178-310-044; 178-310-046; 178-310-051; 179-130-003 and 179-130-004; 179-130-006 through -008; 179-170-001; 179-170-003 and 179-170-004; 179-170-005; 179-170-007 and 179-170-008; 179-170-016; 179-170-018; 179-170-020; 179-230-010; 179-270-001; 179-270-011 through 179-270-018; 179-270-024; 179-270-028; 179-270-033 and 179-270-034; 179-310-001; 179-310-004; 179-310-005; 179-340-001; 179-340-002; 179-340-005; 178-310-017; 178-310-043; 178-310-045; 179-170-015; 178-310-040; 178-310-018; 178-310-047; 178-310-049; 178-310-030; 178-310-003; 178-310-039 and 178-310-034. The specific plan area is generally bordered by State Route (SR) 60 to the north, the Santa Ana River to the east, 34th Street to the south, and Rubidoux Boulevard to the west. Existing conditions consist of generally level topography with grade changes related to a variety of different land uses. These include a segment of the Jurupa Ditch (a former regional irrigation canal), remnants of the abandoned Emerald Meadows Ranch (a former horse training facility), several former agricultural fields, some large graded pads of former businesses, and several existing private residences.

The new specific plan would permit development of up to 1,192 residential units; 3 million square feet of commercial and industrial land uses; a hotel with conference and hospitality area; and 7 acres of parks and open space (the "Project").

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 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 Bernardino County Museum (SBCM), San Diego Natural History Museum (SDNHM) and Western Science Center (WSC). Due to the extensive degree of prior disturbance resulting from previous land uses at the Project site, it was determined that a paleontological field survey was not warranted. This technical report was prepared by Katie M. McComas and Thomas A. Deméré of the Department of PaleoServices, SDNHM.

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

Figure 1: Project overview map, The District at Jurupa Valley Specific Plan, City of Jurupa 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 Jurupa Valley, Riverside County) laws, regulations, and ordinances, outlined below.

1.4.1 State

Notable State legislative protection for paleontological resources includes the California Environmental Quality Act.

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."

Most CEQA lead agencies follow the definitions and guidelines provided by SVP (2010), which are in line with industry standards (e.g., Murphey et al., 2019). As advised by SVP (2010), impacts to paleontological resources can be minimized to a level below the threshold of significance through 1.) the permanent preservation of a fossil locality and its contained fossil resources); or 2.) the implementation of a paleontological mitigation program that would reduce any adverse impacts to a level below the threshold of significance through the salvage and permanent storage of any salvaged fossils in an established scientific institution.

1.4.2 Local

The **City of Jurupa Valley General Plan** (City of Jurupa Valley, 2017) Conservation and Open Space (COS) Element identifies the occurrence of important historical, archaeological, and paleontological resources within the City, and generally addresses paleontological resources under the umbrella of cultural resources, in accordance with the Riverside County General Plan. In addition, Figure 4-18 (Paleontological Sensitivity in Jurupa Valley) included in the City of Jurupa Valley General Plan provides an overview of paleontological sensitivity within the City's boundaries.

The COS Element contains the following goals and policies relevant to paleontological resources:

- Goal COS 7: Ensuring the preservation of cultural, historical, archaeological, and paleontological resources.
- Policy COS 7.1: Preservation of Significant Cultural Resources. Identify, protect, and, where necessary, archive significant paleontological, archaeological, and historical resources.

The Multipurpose Open Space Element of the **Riverside County General Plan** (County of Riverside, 2015) identifies the occurrence of important historical, archaeological, and paleontological resources within the County. Several policies of the County's General Plan Multipurpose Open Space Element address paleontological resources directly, and provide the following recommendations:

- Policy OS 19.6*:* Whenever existing information indicates that a site proposed for development has high paleontological sensitivity … a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.
- Policy OS 19.7: Whenever existing information indicates that a site proposed for development has low paleontological sensitivity … no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological

resources on the site and establish appropriate mitigation measures for further site development.

- Policy OS 19.8: Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity … a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.
- Policy OS 19.9: Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the Western Science Center in the City of Hemet.

As outlined below, in Section 2.3, Riverside County has provided criteria to assess the sensitivity of paleontological resources.

2.0 Methods

2.1 Paleontological Records Searches and Literature Review

Paleontological records searches were conducted at the SBCM, 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. Formal records searches of the paleontological collections at SBCM and WSC were requested from these institutions (SBCM, 2022; Appendix A; WSC, 2022; Appendix B).

Additionally, a review was conducted of relevant published geologic mapping (e.g., Dibblee and Minch, 2004; Morton, 2003; Morton and Miller, 2006; Morton et al., 2002), published geological and paleontological reports (e.g., Springer et al., 2009, 2010), 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 County of Riverside has developed standards for assessing paleontological potential/sensitivity that are based, in part, on the standards set forth by Society of Vertebrate Paleontology (SVP, 2010), and that also take into account the possibility for adverse impacts due to human influence. The County recognizes a tripartite scale: High Potential (High A and High B subcategories), Low Potential, and Undetermined Potential.

The specific criteria for each scale of Paleontological Potential/Sensitivity is outlined below.

2.2.1 High Potential/Sensitivity

High sensitivity is assigned to geologic units known to contain paleontological localities with rare, well-preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleobiology and evolutionary history (phylogeny) of animal

and plant groups. Generally speaking, highly sensitive formations produce vertebrate fossil remains or are considered to have the potential to produce such remains.

In Riverside County, High Paleontological Potential A is assigned to rock units present immediately at the surface, while High Paleontological Potential B is assigned to rock units found at a depth of 4 feet or greater below existing grade.

2.2.2 Low Potential/Sensitivity

Low sensitivity is assigned to geologic units that, based on their relative youthful age and/or high-energy depositional history, are judged unlikely to produce important fossil remains. Typically, low sensitivity formations produce invertebrate fossil remains in low abundance. Low paleontological potential is also assigned to geologic formations that are entirely igneous in origin and therefore have no potential for producing fossil remains, or to artificial fill materials which lose the stratigraphic/geologic context of any contained organic remains (e.g., fossils).

2.2.3 Undetermined Potential/Sensitivity

Undetermined sensitivity is assigned to geologic units that exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the geology and/or paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may be useful for more precisely determining the paleontological sensitivity.

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 potential) 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: As mapped by Morton and Miller (2006), the proposed Project site is primarily underlain by Holocene- to late Pleistocene-age (less than approximately 129,000 years old) young axial-channel deposits (Qya) representing alluvium deposited by the Santa Ana River within its former natural floodplain during periods of high flow (Figure 2). Morton et al. (2002) characterized these deposits as "gray, unconsolidated alluvium consisting of coarse- to fine-grained sand and lesser gravel and silt" forming "terraces slightly elevated above [the] main Santa Ana River channel," while Dibblee and Minch (2004) describe these deposits as "alluvial sand, gravel, and clay of level areas covered with soil" of primarily Holocene age.

Mapping by Morton (2003) and Morton and Miller (2006) suggests that the north central portion of the Project site is underlain at the surface by middle Pleistocene-age (approximately 129,000 to 774,000 years old) old alluvial-fan deposits, Unit 1 (Qof_1) (as depicted in Figure 2). These alluvial fan sediments were derived from erosion of the uplifted plutonic bedrock exposed in the Jurupa Mountains to the north and northwest of the Project site. Mapping by Dibblee and Minch (2004) suggests that the alluvial fan deposits are more extensive and underlie a broader area in the northwestern portion of the Project site—this interpretation of the aerial extent of Qof_1 deposits is apparently utilitized in Figure 4-18 "Paleontological Sensitivity in Jurupa Valley" in the City of Jurupa Valley General Plan (City of Jurupa Valley, 2017). Pleistocene-age alluvial fan deposits may also underlie Qya deposits elsewhere within the Project site, at estimated depths of 5 to 15 feet below ground surface (bgs) (Reynolds and Reynolds, 1991).

In addition, deposits of artificial fill (Qaf) associated with levee construction line the modern Santa Ana River channel along the southeastern boundary of the Project site.

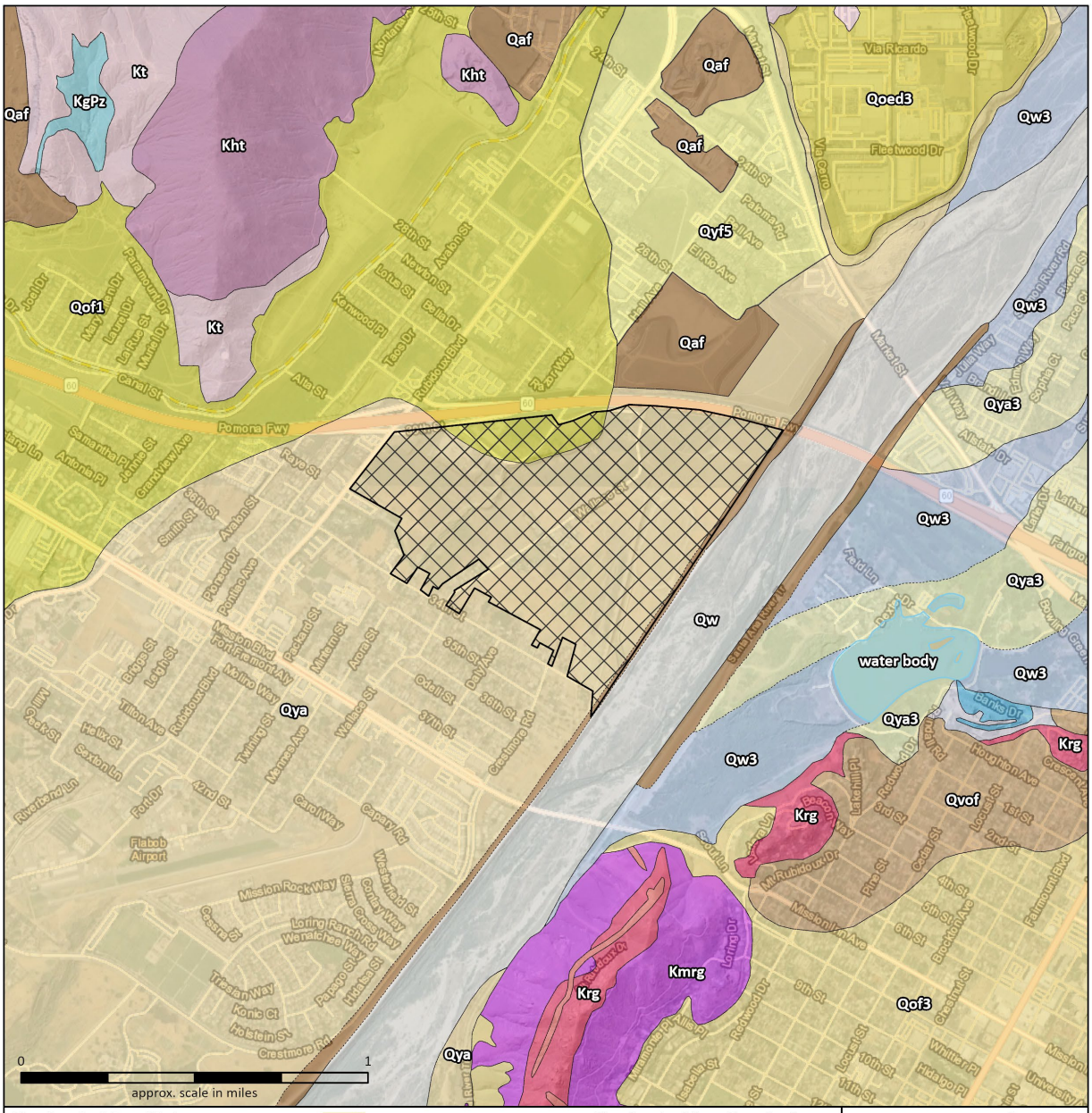
3.1.2 Project Paleontology

A records search of paleontological collections data at the SBCM generated a response that there are no recorded SBCM fossil collection localities that lie within the Project site, but two localities have been documented in the vicinity of the Project site (SBCM, 2022; Appendix A). The nearest fossil locality (SBCM 5.1.22) lies approximately 0.6 miles north of the Project site within Pleistocene-age alluvial deposits, and produced fossil remains of mastodon (*Mammut pacificus*) at a depth of approximately 25 feet bgs. A second fossil locality (SBCM 5.1.11) lies approximately 5 miles west-northwest of the Project site, and produced fossil remains of a saber-toothed cat (*Smilodon* sp.) at a depth of 5 feet bgs, in an area where recent alluvial sediments overlie older Pleistocene-age alluvium.

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 35 miles to the 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 bgs during paleontological monitoring of mass grading for a new middle school (SDNHM, unpublished paleontological collections data).

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 noted that localities are documented in the region in similar Pleistocene-age alluvial deposits (WSC, 2022; Appendix B). 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.



Geologic Map Units

Qaf	artificial fill
Qw	very young wash deposits
Qw3	very young wash deposits, Unit 3
Qw1	very young wash deposits, Unit 1
Qyf5	young alluvial-fan deposits, Unit 5
Qya	young axial-channel deposits
Qya3	young axial-channel deposits, Unit 3
Qof3	old alluvial-fan deposits, Unit 3
Qof1	old alluvial-fan deposits, Unit 1
Qoed3	old eolian deposits, Unit 3
Qvof	very old alluvial-fan deposits
Kht	heterogeneous tonalitic rocks
Kmrg	granite of Mount Rubidoux
Krg	granite of Riverside area
Kt	tonalite, undifferentiated
Ktd	tonalite dikes of Mount Rubidoux
Kvt?	Val Verde tonalite
KgPz	intermixed granitic rocks and Pz schist
Pzms	marble and schist, undifferentiated

Geologic Map Symbols

Contact; accurately located

Contact; approx. located

Project site

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

Figure 2: Geologic map of the Project site, The District at Jurupa Valley Specific Plan, City of Jurupa Valley, Riverside County, CA

More broadly, fossils have been documented in similar Pleistocene-age alluvial deposits elsewhere within western Riverside County. For example, multiple fossil localities were discovered in Pleistocene-age alluvial deposits during construction of the Aldi Distribution Center in the City of Moreno Valley, located approximately 15 miles east-southeast 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). Additionally, significant fossils were discovered approximately 38 miles to the south-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 30 miles southeast 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 Jurupa Valley General Plan (City of Jurupa Valley, 2017) assigns the middle Pleistocene-age old alluvial-fan deposits (Qof_1) exposed in the northern and northwestern portions of the Project site a high paleontological sensitivity. This rating is supported by the known occurrence of scientifically significant fossils from similar deposits elsewhere in western Riverside County. In contrast, the primarily Holocene-age young axial-channel deposits (Qya) present in the southern and northeastern portions of the Project site are assigned a low paleontological sensitivity rating, based on the relatively young geologic age of these deposits. Finally, mapped artificial fill deposits (Qaf) present along the Santa Ana River channel, as well as any unmapped artificial fill deposits present elsewhere within the Project site, are also assigned a low paleontological sensitivity rating because any contained fossil remains will have lost their original stratigraphic and/or geographic context.

Taking a conservative approach, Qof_1 deposits are presumed to be exposed at or near the surface across the largest geographic extent of these deposits indicated by existing geological mapping (i.e., as reported by Dibblee and Minch, 2004), and are estimated to be overlain by at least 5 feet of Qya deposits and/or Qaf deposits in the remaining portions of the Project site (Figure 3).

3.3 Results of the Paleontological Impact Analysis

Based on the available conceptual land use plan (dated 25 April 2022), residential development is proposed for the southern and southwestern portions of the specific plan area, adjacent to existing residential properties. Industrial development is proposed for the eastern portion of the specific plan area along the Santa Ana River. Commercial development is proposed for the central, northern, and northwestern portions of the specific plan area along SR 60. Several new internal roadways are proposed that would separate these land use areas and provide access and connectivity to existing local roads. Installation of utilities (e.g., sewer, water, storm drain, and dry utilities) would also be required throughout the specific plan area. Finally, several parks and walking trails are proposed as open space.

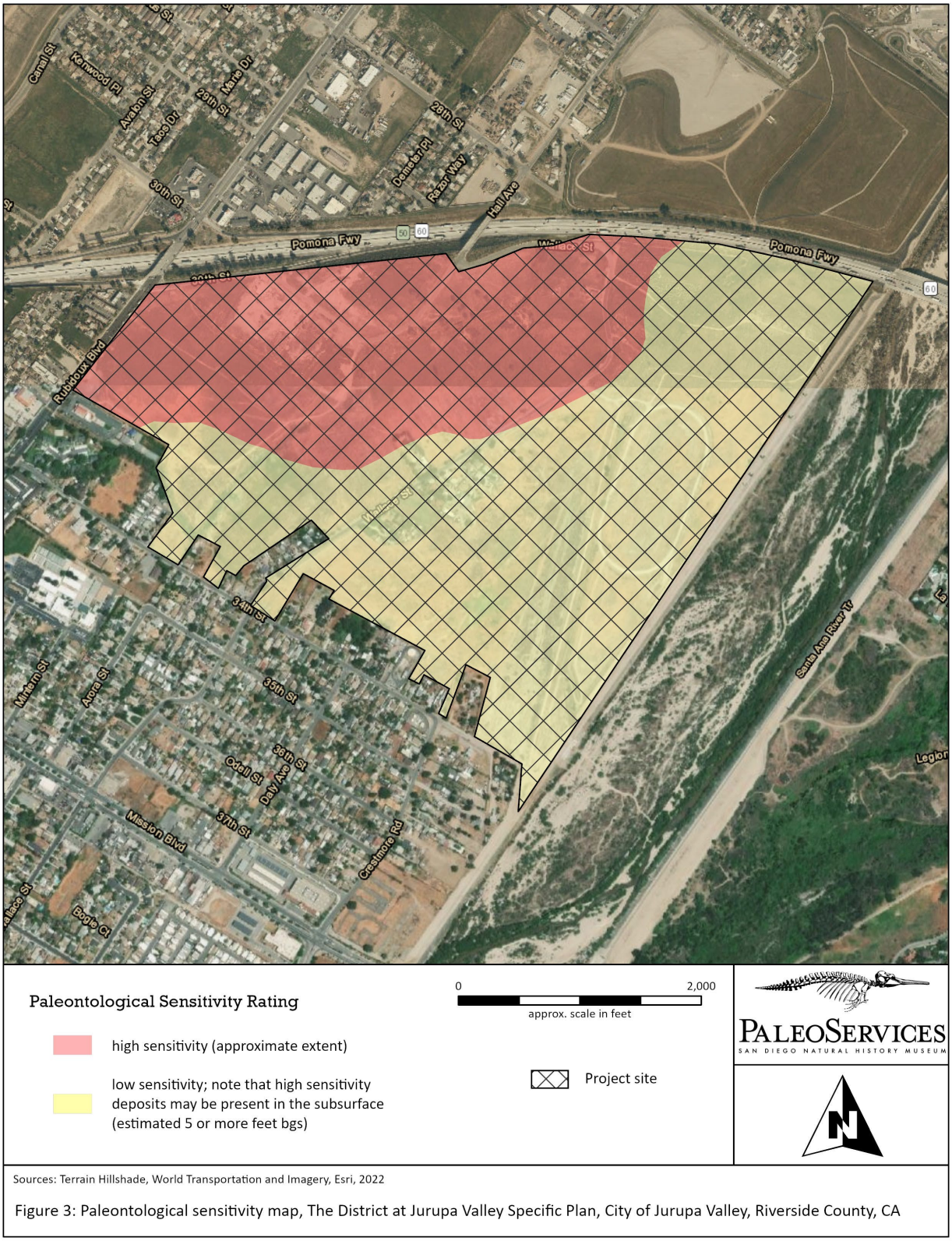

Figure 3: Paleontological sensitivity map, The District at Jurupa Valley Specific Plan, City of Jurupa Valley, Riverside County, CA

While the specific locations and dimensions of earthwork that will be required for construction of the Project have not yet been defined, it is anticipated that significant excavations will occur. Types of earthwork typically associated with construction of residential, industrial, and commercial developments include: mass grading of building lots and interior roadways, trenching for subgrade utilities, removal and recomplaction of artificial fill and poorly consolidated modern soils, and excavation for the installation of storm water management systems.

Based on the published geologic mapping of the Project site (Dibblee and Minch, 2004; Morton and Matti, 2002; Morton and Miller, 2006), a portion of this earthwork will take place in areas mapped as Qof_1 deposits, where impacts to paleontological resources are possible. Shallower earthwork (i.e., extending less than ~5 feet bgs) occurring in areas mapped as Qya deposits is unlikely to impact paleontological resources, but deeper earthwork (i.e., extending more than ~5 feet bgs) in these areas could impact the underlying Qof_1 deposits. Shallower earthwork that occurs in the later portion of site development (e.g., installation of hardscaping and landscaping) is likely to take place within deposits that were already disturbed during site grading (Qaf), and this earthwork is, therefore, unlikely to impact paleontological resources. These potential impacts and paleontological monitoring recommendations are summarized in Table 1.

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

Project Components	Impact Analysis	Monitoring recommended?
Site grading (for building lots, roadways)	Impacts possible	**Qof_1: Yes; Qaf/Qya: No**
Trenching for subgrade utilities	Impacts possible	**Qof_1: Yes; Qaf/Qya: No**
Excavation for storm water management systems	Impacts possible	**Qof_1: Yes; Qaf/Qya: No**
Hardscaping, landscaping	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 middle Pleistocene-age old alluvial-fan deposits (Qof_1).

Implementation of the following mitigation measures will reduce any Project-related impacts to paleontological resources to a level that is less than significant. The mitigation measures outlined below are based on established industry best practices (Murphey et al., 2019).

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. emphasizing paleontology and sedimentary geology who 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 two

years. 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 at all depths in areas mapped as having high paleontological sensitivity (Figure 3 of the May 6, 2022 Paleontological Resources Technical Report, areas symbolized in red) and during earthwork exceeding approximately 5 feet bgs in areas mapped as having low paleontological sensitivity, where high sensitivity deposits may be present in the subsurface (Figure 3 of the May 6, 2022 Paleontological Resources Technical Report, areas symbolized in light yellow). A paleontological monitor is defined as an individual with a college degree emphasizing paleontology with experience in the recognition and salvage of fossils materials or who has two years of demonstrable equivalent 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 the Project proponent and appropriate agencies (e.g., City of Jurupa 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 Jurupa Valley and to the designated museum repository. The report and specimen inventory, when submitted to the City of Jurupa Valley with confirmation of the curation of recovered specimens (if any) into an established, accredited repository, shall signify completion of the program to mitigate impacts to paleontologic resources.

5.0 References

City of Jurupa Valley. 2017. City of Jurupa Valley, California, 2017 General Plan. Prepared by the Planning Department, City of Jurupa Valley. Adopted 7 September 2017.

County of Riverside. 2015. County of Riverside General Plan. Prepared by the Planning Department, Riverside County. Adopted 8 December 2015.

Dibblee, T.W., and J.A. Minch. 2004. Geologic map of the Riverside West/south 1/2 of Fontana quadrangles, San Bernardino and Riverside County, California. Dibblee Geological Foundation, Dibblee Foundation Map DF-128. Scale 1:24,000.

English, W.A. 1926. Geology and oil resources of the Puente Hills Region, California: U.S. Geological Survey Bulletin 768. 110 p.

LSA Associates, Inc. (LSA). 2014. Paleontological Mitigation Monitoring Report for the Aldi Distribution Center Project, City of Moreno Valley, Riverside County, California. Prepared by Sarah Rieboldt.

Morton, D.M. 2003. Preliminary geologic map of the Fontana 7.5' quadrangle, Riverside and San Bernardino Counties, California. U.S. Geological Survey Open-File Report OF-2003-418. Scale 1:24,000.

Morton, D.M., and F.K. Miller. 2006. Geologic map of the San Bernardino and Santa Ana 30’ x 60’ quadrangles, California. U.S. Geological Survey Open-File Report 2006-1217. Scale 1:100,000.

Morton, D.M., B.F. Cox, R.M. Alvarez, and V.M. Diep. 2002. Geologic map of the Riverside West 7.5 ‘ quadrangle, Riverside County, California. U.S. Geological Survey Open-File Report OF-2001-451. Scale 1:24,000.

Murphey, P.C., G.E. Knauss, L. H. Fisk, T.A. Deméré, and R.E. Reynolds. 2019. Best practices in mitigation paleontology. San Diego Society of Natural History, Proceedings 47: 1–43.

Norris, R.M., and R.W. Webb. 1990. Geology of California. Wiley and Sons, New York.

Reynolds, R E., and R.L. Reynolds. 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.

San Bernardino County Museum (SBCM). 2010. Paleontological Literature and Records Review, City of Menifee General Plan, Riverside County, California. Prepared for Discovery Works, Inc. by E. Scott. 1 June 2010.

SBCM. 2022. Paleontological records review for proposed site of District at Rubidoux Project, Riverside County, California. Prepared by Scott Kottkamp on 30 March 2022.

San Diego Natural History Museum (SDNHM) unpublished paleontological collections data and field notes.

Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology, p. 1-11.

Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray. 2009. The Diamond Valley Lake local fauna: late Pleistocene vertebrates from inland southern California. In: L.B. Albright III (ed.) Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in honor of Michael O. Woodburne. Museum of Northern Arizona, Bulletin 65:217-235.

Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray. 2010. Late Pleistocene large mammal faunal dynamics from inland southern California: The Diamond Valley Lake local fauna. Quaternary International 217: 256–265.

Western Science Center (WSC). 2022. Unpublished paleontological records search prepared for the District at Rubidoux Project. Prepared by Brittney Stoneburg on 9 March 2022.

Appendix A

Records Search Results: San Bernardino County Museum

2024 Orange Tree Lane, Redlands, California 92374 | Phone: 909.798.8608
www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum
Division of Earth Science

Scott Kottkamp
Curator of Earth Science

30 March, 2022

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

PALEONTOLOGY RECORDS REVIEW for proposed site of District at Rubidoux Project, Riverside County, California

Dear Ms. McComas,

The Division of Earth Science of the San Bernardino County Museum (SBCM) has completed a records search for the above-named project in Riverside County, California. The proposed project site (District at Rubidoux) is in the City of Jurupa Valley, California as shown on the United States Geological Survey (USGS) 7.5 minute Fontana and Riverside West, California quadrangles.

Geologic mapping of that region done by Dibblee and Minch (2004) indicates the north and northwestern areas of the proposed project are located atop older surficial deposits of Pleistocene or early Holocene age (Qoa). These are potentially-fossiliferous and weakly indurated alluvial sediments, composed mostly of tan to light red sand with a minor gravel component. Qoa alluvial sediments were deposited between ~1.8 million to ~11,000 years ago. Such older alluvial deposits have been found to be highly fossiliferous in the local area, yielding the remains of mastodons, mammoths, *Smilodon*, camels, horses, bison, and ground sloths, as well as microfossils including rodents.

The rest of the project site is situated atop recent Holocene age alluvial deposits (Qa), comprised of unconsolidated mixed sand, clay, and gravel covered by soil. These deposits are unlikely to be fossiliferous themselves, but directly overlie the older Pleistocene alluvial deposits

that are. Reynolds and Reynolds (1991) found that Pleistocene sediments in northwestern Riverside County generally lie about 5 – 15 feet below recent Holocene surface sediments. However, the depth of the recent sediments can be highly variable, and the recent alluvium at this site can generally be expected to thin as it nears the surface contact with the older alluvium.

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. The nearest fossil locality, SBCM locality 5.1.22, is approximately 0.6 miles north. Permineralized *Mammut pacificus* bones were discovered at site 5.1.22, within a ditch filled with the same older alluvial sediments found on the proposed project site. The mastodon bones were unearthed from sand approximately 25 feet below the surface. The next closest fossil locality, SBCM 5.1.11, is approximately 5 miles west-northwest of the proposed project site. Permineralized bones of the saber-toothed cat *Smilodon* sp. were unearthed there, from 5 feet below the surface at an elevation of 1000 feet, during the excavation of a pipeline trench. SBCM 5.1.11 is covered with recent alluvial sediment at the surface, overlaying older alluvium (where the *Smilodon* was found) by only a few feet; similar to the conditions at much of the proposed project site.

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,

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

Literature Cited

Dibblee, T.W., and Minch, J.A. 2004. Geologic map of the Riverside West/south 1/2 of Fontana quadrangles, San Bernardino and Riverside County, California. Dibblee Geological Foundation. Dibblee Foundation Map DF-128. Scale 1:24,000.
Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_71756.htm (accessed 25 March 2022).

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.

Appendix B

Records Search Results: Western Science Center

WESTERN SCIENCE CENTER

March 9, 2022

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

Dear Ms. McComas,

This letter presents the results of a record search conducted for the District at Rubidoux Project in the city of Riverside, Riverside County, California. The project site is located south of California State Route 60, north of Mission Blvd, and southeast of Rubidoux Blvd on the *Riverside West* USGS 7.5 minute quadrangle.

The geologic units underlying this project are mapped as alluvial deposits dating from the Pleistocene to the Holocene epochs, with Cretaceous quartz diorite units within a 1 mile radius (Dibblee and Minch 2004). Pleistocene alluvial units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or within a 1-mile radius, but does have numerous fossil localities in similarly mapped units throughout California.

Any fossil specimen from the District at Rubidoux Project would be scientifically significant. Excavation activity associated with the development of the project area would impact the paleontologically sensitive Pleistocene alluvial units, and it is the recommendation of the Western Science Center that a paleontological resource mitigation program be put in place to monitor, salvage, and curate any recovered fossils associated with the study area.

If you have any questions, or would like further information, please feel free to contact me at bstoneburg@westerncentermuseum.org.

Sincerely,

Brittney Elizabeth Stoneburg
Collections Technician