APPENDIX E

PALEONTOLOGICAL RESOURCES MEMORANDUM

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CARLSBAD
CLOVIS
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

MEMORANDUM

DATE: March 21, 2025

TO: Ryan Rigali, Real Estate Administrator, County Executive Office/Real Estate/Land Development

FROM: Kelly Vreeland, M.Sc., Senior Paleontologist

SUBJECT: Paleontological Resources Memorandum for the County of Orange Workforce Reentry Center Project (LSA Project No. OCY2001.51)

INTRODUCTION

This memorandum documents the results of the paleontological analysis conducted for the proposed County of Orange Workforce Reentry Center Project (project) in Orange, Orange County, California. This analysis was conducted to determine the potential for the project to impact paleontological resources in compliance with all applicable State, County of Orange (County), and City of Orange (City) regulations and requirements regarding paleontological resources, as well as the standards of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology [SVP], 2010). The applicable regulations and requirements include the California Environmental Quality Act (CEQA), Public Resources Code (PRC) Division 13, Chapter 2.6; the *State CEQA Guidelines*, California Code of Regulations, Title 14, Chapter 3, Appendix G; PRC Section 5097.5; the Resources Element of the County of Orange General Plan (County of Orange, 2015) and the Cultural Resources and Historic Preservation Element from the City's General Plan (City of Orange, 2015). Information from this paleontological memorandum is intended for incorporation in the Initial Study being prepared for this project to address the CEQA checklist questions regarding paleontological resources.

GEOLOGY AND SOILS

Methods

To assess the impacts of the project with respect to paleontological resources, LSA reviewed geologic maps of the project site and relevant geological and paleontological literature to determine which geologic units are present within the project site and whether fossils have been recovered within the project site or from those or similar geologic units elsewhere in the region. In addition, a fossil locality search was conducted through the Natural History Museum of Los Angeles County (NHMLAC) to determine the status and extent of previously recorded paleontological resources within and surrounding the project site. On February 5, 2025, LSA conducted a pedestrian field survey of the project area. The purpose of the field survey was to document and collect any paleontological resources that may have been present, as well as to note the sediments at the surface.

Setting

Refer to Figure 1, Project Location, for the location of the project area within the greater regional context. Results of the literature review indicate that the project area is within the Peninsular Ranges Geomorphic Province, a 900-mile-long northwest-southeast trending structural block with similarly trending faults, that extends from the Transverse Ranges in the north to the tip of Baja California in the south and includes the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). The total width of this province is 225 miles, extending from the Colorado Desert in the east, across the continental shelf, to the southern Channel Islands (Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) in the west (Sharp, 1976). This province is characterized by a series of mountain ranges and valleys that trend in a northwest-southeast direction roughly parallel to the San Andreas Fault Zone (Norris and Webb, 1976; Sharp, 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rocks covered by Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb, 1976).

Geologic mapping by Morton and Miller (2006) shows that the entire project site is underlain by Young Alluvial Fan Deposits (see Figure 2, Geology Map, in Attachment B). Although not mapped by Morton and Miller (2006), Artificial Fill is likely present from the prior development of the project area. These geologic units and their paleontological sensitivities are described in more detail below. Dates for the geologic time intervals referenced in this report are derived from the *International Chronostratigraphic Chart* published by the International Commission on Stratigraphy (Cohen et al., 2024).

Artificial Fill

Artificial fill consists of sediments that have been removed from one location and transported to another location by human activity, rather than by natural means. The transportation distance can vary from a few feet to many miles, and composition depends on the source and purpose. Artificial fill will sometimes contain modern debris such as asphalt, wood, bricks, concrete, metal, glass, plastic, and even plant material.

Although artificial fill may contain fossils, these fossils have been removed from their original location and are thus out of stratigraphic context. Therefore, they are not considered important for scientific study, and artificial fill has no paleontological sensitivity.

Young Alluvial Fan Deposits

The Young Alluvial Fan Deposits are Holocene to late Pleistocene in age (less than 126,000 years ago) and consist of unconsolidated silt, sand, and gravel (Morton and Miller, 2006). Cobble- and boulder-size clasts are also present and become more abundant closer to the hills and mountains (Morton and Miller, 2006). These sediments were eroded from higher elevations, carried by flooding streams and debris flows, and deposited in a fan or lobe shape at the base of the hills. They show slight to moderate dissection by erosional gullies (Morton and Miller, 2006).

Although Holocene (less than 11,700 years ago) deposits can contain remains of plants and animals, only those from the middle to early Holocene (4,200 to 11,700 years ago; Walker et al., 2012) are considered scientifically important (SVP, 2010), and fossils from this time interval are not very

common. These Holocene deposits overlie older, Pleistocene deposits, which have produced scientifically important fossils elsewhere in the region (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). These older, Pleistocene deposits span the end of the Rancholabrean NALMA, which dates from 11,000 to 240,000 years ago (Sanders et al., 2009) and was named for the Rancho La Brea fossil site in central Los Angeles. The presence of bison defines the beginning of the Rancholabrean NALMA (Bell et al., 2004), but fossils from this time also include other large and small mammals, reptiles, fish, invertebrates, and plants (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). There is a potential to find these types of fossils in the older sediments of this geologic unit, which may be encountered below a depth of approximately 10 feet. Therefore, these deposits are assigned a low paleontological sensitivity above a depth of 10 feet and a high sensitivity below that mark.

Fossil Locality Search

According to the locality search conducted by the NHMLAC, there are no known fossil localities within the boundaries of the project. However, this search noted three fossil localities nearby. The first locality, LACM VP 1652, located at Rio Vista Avenue (south of Lincoln Avenue), produced remains of sheep (*Ovis*) from Pleistocene alluvium. The next closest locality, LACM VP 3292, from Richfield, California (south of Yorba Linda), produced remains of elephant clade (Proboscidea) from Pleistocene Terrace deposits. The third locality, LACM VP 7657 – 7659, from Ellis Avenue and Patterson Lane in Huntington Beach, produced remains of school shark (*Galeorhinus*), eagle ray (*Myliobatus*), goby (*Lepidogobius, Leptocottus*), midshipmen (*Porichthys*), croaker (*Seriphus*), flatfish (*Citharichthys*), skate (*Raja*), angelshark (*Squatina*), and sculpin (*Cottidae*) from Pleistocene sediments. A copy of the NHMLAC fossil locality search results letter is included in Attachment C.

Field Survey

During the pedestrian field survey, visibility varied from good to poor (less than approximately 10 percent visible sediments). Open areas with good visibility contained native sediments, and areas of poor visibility contained paved areas and buildings. The observed sediments in the project area consisted of medium brown silty sand consistent with mapping by Morton and Miller (2006). No paleontological resources were observed during the field survey.

Impact Analysis

The project site contains Artificial Fill, which has no paleontological sensitivity, and Young Alluvial Fan Deposits, which have low paleontological sensitivity above a depth of 10 feet and a high sensitivity below that mark. The deepest excavation expected for the project will reach a maximum depth of 16 feet; therefore, there is a potential for the project to impact scientifically significant paleontological resources.

Mitigation

To ensure that potential impacts to undiscovered paleontological resources remain less than significant, preparation of a Paleontological Resources Impacts Mitigation Program (PRIMP), paleontological monitoring of construction activities, appropriate treatment of newly discovered resources, and preparation of a final paleontological monitoring report would be required, as outlined in the following Mitigation Measure (MM) PALEO-1.

MM PALEO-1 **Paleontological Resources.** Prior to the commencement of ground-disturbing activities, a qualified, professional paleontologist who meets the standards set by the Society of Vertebrate Paleontology (SVP) shall be retained to develop a Paleontological Resources Impact Mitigation Program (PRIMP) for this project. The PRIMP shall be consistent with the guidelines of the SVP and shall include the methods that will be used to protect paleontological resources that may exist within the project limits, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of ground disturbance.

If ground-disturbing activities occur in deposits with high paleontological sensitivity (i.e., Young Alluvial Fan Deposits below a depth of 10 feet and Old Alluvial Fan Deposits), those activities shall be monitored by a qualified paleontological monitor following the PRIMP. If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance. Once soils have been monitored during the excavation stage and determined to lack the presence of paleontological resources, monitoring of these soils would no longer be necessary for the remainder of grading activities. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and the paleontologist or paleontological monitor shall be contacted to assess the find for scientific significance. If determined to be scientifically significant, the fossil shall be collected from the field.

Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a museum repository. At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.

Attachments: A: References
B: Figures
C: Results of the Fossil Locality Search at the Natural History Museum of Los Angeles County

ATTACHMENT A

REFERENCES

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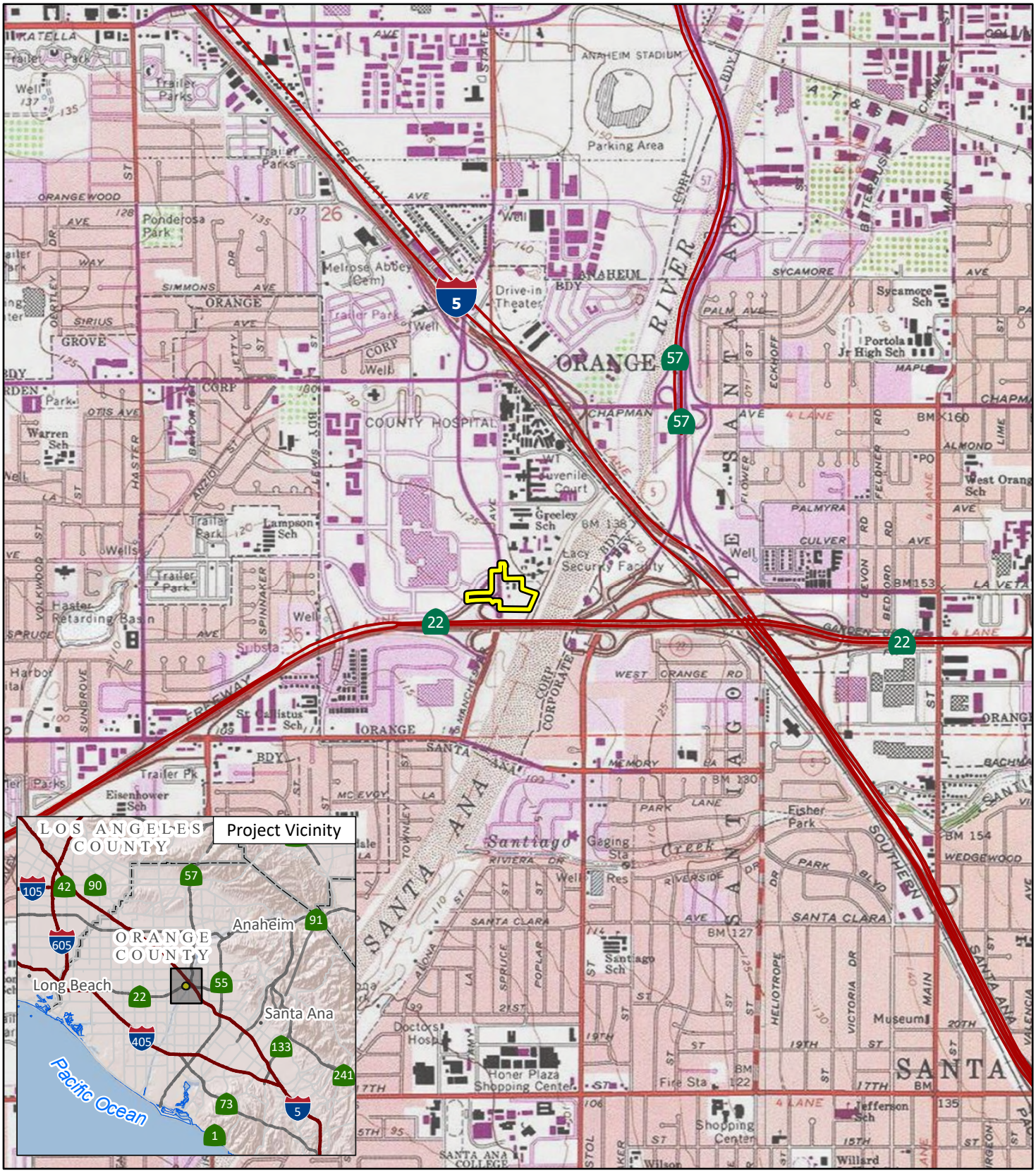
ATTACHMENT B

FIGURES

FIGURE 1: PROJECT LOCATION



LSA

FIGURE 1

0 1000 2000
FEET

County of Orange Workforce Reentry Center Project

Project Location

SOURCE: USGS 7.5' Quad - *Anaheim(1981)*, *Orange (1981)*, CA

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FIGURE 2: GEOLOGY MAP

LSA

Project Site

Geologic Units

Qw - Very young wash deposits

Qyf - Young alluvial-fan deposits

FIGURE 2

N

0 100 200

FEET

County of Orange Workforce Reentry Center Project

Geology Map

SOURCE: Google Maps (2024), City of Orange (2022), Morton and Miller (2006)

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ATTACHMENT C

RESULTS OF THE FOSSIL LOCALITY SEARCH AT THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

January 26, 2025

LSA Associates, Inc.
Attn: Kelly Vreeland

re: Paleontological resources records search for the Workforce Reentry Center Project (OCY2001.51)

Dear Kelly:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Workforce Reentry Center Project area as outlined on the portion of the Anaheim USGS topographic quadrangle map that you sent to me via e-mail on January 14, 2025. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that may occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP 1652	Rio Vista Avenue south of Lincoln Avenue	Alluvium (Pleistocene)	Sheep (*Ovis*)	Unknown (excavations for housing project)
LACM VP 3292	Richfield, CA (south of Yorba Linda)	Terrace deposits (Pleistocene)	Elephant clade (Proboscidae)	Unknown
LACM VP 7657 - 7659	Ellis Avenue & Patterson Lane, Huntington Beach	Unknown formation (Pleistocene; gray siltstone)	School shark (*Galeorhinus*), eagle ray *(Myliobatus*), goby (*Lepidogobius, Leptocottus*), midshipmen (*Porichthys*), croaker (*Seriphus*), flatfish (*Citharichthys*), cusk-eel (*Otophidium*), skate (*Raja*), angelshark (*Squatina*), sculpin (Cottidae)	150 - 350 ft bgs

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As

such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Federal (43 Code of Federal Regulations Part 49.110) or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County