Appendix F Paleontological Resources Assessment

Appendices

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PALEONTOLOGICAL RESOURCES ASSESSMENT

ONE METRO WEST PROJECT

COSTA MESA, ORANGE COUNTY, CALIFORNIA

LSA

July 2019

PALEONTOLOGICAL RESOURCES ASSESSMENT

ONE METRO WEST PROJECT

COSTA MESA, ORANGE COUNTY, CALIFORNIA

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LSA Project No. RSE1901

LSA

July 2019

EXECUTIVE SUMMARY

LSA is under contract to Rose Equities to prepare a Paleontological Resources Assessment for the One Metro West Project (project), in Costa Mesa, Orange County, California. This assessment was conducted pursuant to all applicable State and City of Costa Mesa (City) regulations and policies regarding paleontological resources, as well as guidelines established by the Society of Vertebrate Paleontology. The City is the Lead Agency responsible for compliance with the aforementioned regulations and policies.

The project is a mixed-use development that consists of residential, specialty retail, creative office, and recreation uses. The vision of the project is to provide housing near jobs in a campus-like setting with on-site amenities, a 1.7-acre open space area, and connections to bike trails.

Geologic mapping indicates that the project area contains Holocene to late Pleistocene (less than 126,000 years ago) Young Alluvial Fan Deposits. The field survey and the Draft Preliminary Geotechnical Investigation for this project also noted areas with Artificial Fill. The Young Alluvial Fan Deposits have low paleontological sensitivity from the surface to a depth of 10 feet (ft) and high paleontological sensitivity below a depth of 10 ft. Artificial Fill does not have the potential to contain scientifically significant paleontological resources because of its disturbed context and therefore, has no paleontological sensitivity.

Maximum excavation for this project could have the potential of reaching 50 ft below the surface, with remedial excavation across the project area extending to depths of 3–12 ft. As such, excavation during development of the project is expected to extend into deposits with high paleontological sensitivity and has the potential to impact scientifically significant paleontological resources. Therefore, LSA recommends the following mitigation measures for the project:

PALEO-1 A qualified paleontologist meeting the requirements of 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 include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.

PALEO-2 Excavation and grading activities in deposits with high paleontological sensitivity (Young Alluvial Fan Deposits below a depth of 10 feet) shall be monitored by a paleontological monitor following a PRIMP. No paleontological monitoring is required for activities in Artificial Fill or the Young Alluvial Fan Deposits from the surface to a depth of 10 feet. 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. 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 a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field. Sediments shall be occasionally be spot-screened through one-eighth to one-twentieth-inch mesh screens to determine whether microfossils exist. If microfossils are encountered, additional sediment samples (up to 6,000 pounds) shall be collected and processed through one-twentieth-inch mesh screens to recover additional fossils.

PALEO-3 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.

By following the aforementioned mitigation measures, project impacts to scientifically significant paleontological resources would be reduced to a less than significant level.

TABLE OF CONTENTS

FIGURE

TABLE

APPENDIX

LIST OF ACRONYMS

CEQA	California Environmental Quality Act
City	City of Costa Mesa
ft	foot/feet
LACM	Natural History Museum of Los Angeles County
Ma	million years ago
NALMA	North American Land Mammal Age
PRC	Public Resources Code
PRIMP	Paleontological Resources Impact Mitigation Program
project	One Metro West Project
SVP	Society of Vertebrate Paleontology
USGS	United States Geological Survey

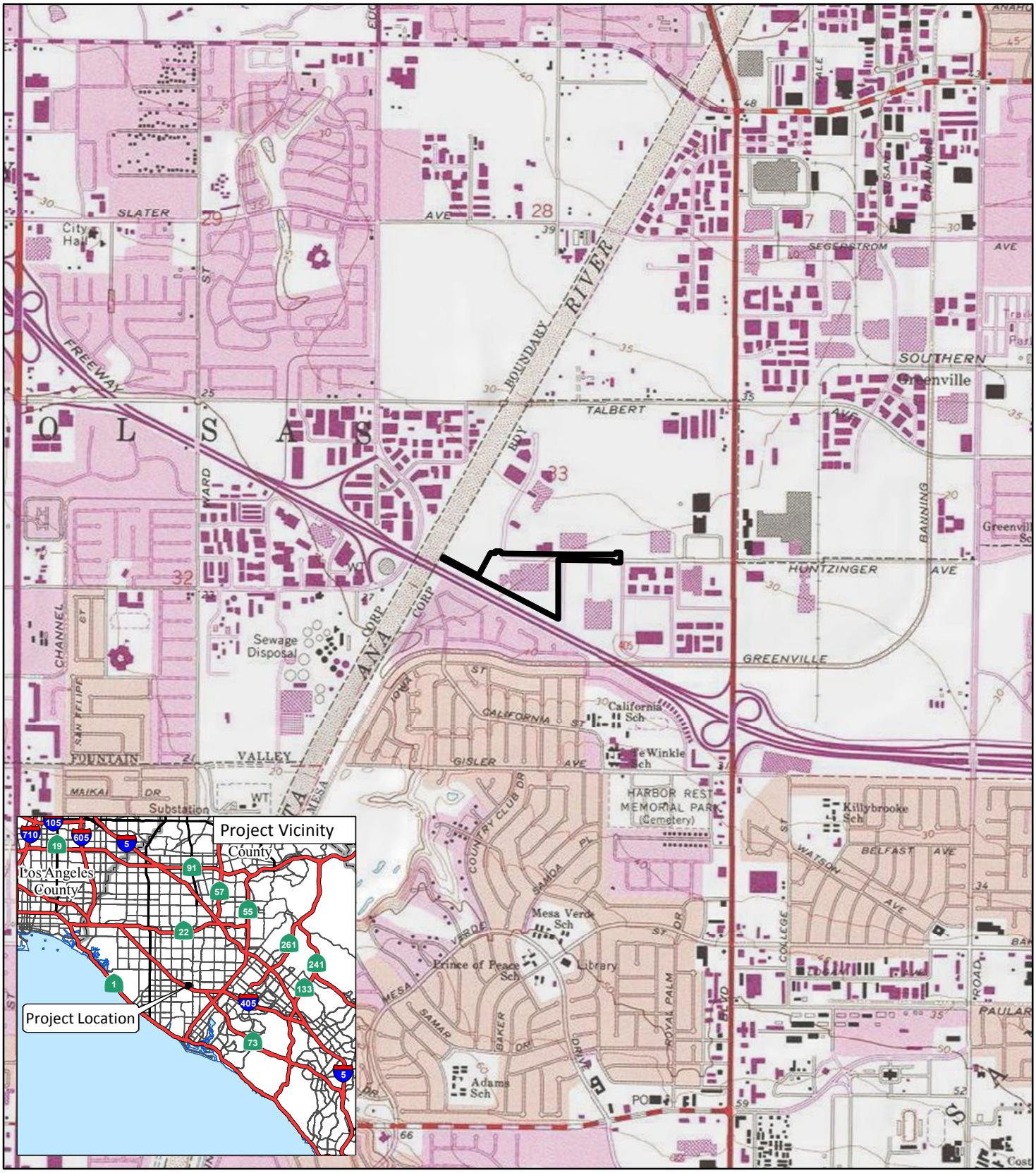
INTRODUCTION

LSA is under contract to Rose Equities to prepare a Paleontological Resources Assessment for the One Metro West Project (project), in Costa Mesa, Orange County, California. The City of Costa Mesa (City) is the Lead Agency responsible for compliance with the regulations and policies for this project. This assessment was conducted pursuant to all applicable State and City regulations and policies regarding paleontological resources, as well as guidelines established by the Society of Vertebrate Paleontology ([SVP] 2010). This assessment documents the potential for encountering paleontological resources during project development and makes recommendations on how to mitigate impacts to those resources. It is not, and should not be used as, a geological assessment.

PROJECT LOCATION AND DESCRIPTION

The project area is at 1683 Sunflower Avenue in Costa Mesa, and is bounded by Sunflower Avenue to the north, Hyland Avenue to the east, and Interstate 405 to the west and south, with the South Coast Collection Shopping Complex to the east and industrial uses to the north. It is depicted on the *Newport Beach, California* 7.5-minute United States Geological Survey (USGS) topographic map in Township 5 South, Range 10 West, and Section 33, San Bernardino Baseline and Meridian (USGS, 1981; Figure 1).

The project is a mixed-use development that consists of residential, specialty retail, creative office, and recreation uses. The vision of the project is to provide housing near jobs in a campus-like setting with on-site amenities, a 1.7-acre open space area, and connections to bike trails. In order to redevelop the project area, all existing buildings, structures, parking areas, drive aisles, and hardscape improvements would be demolished, and a number of mature ornamental trees and other landscape improvements throughout the site would be removed. The site would then be cleared and graded for development of the project.



LSA

LEGEND

Project Location

FIGURE 1

N

0 1000 2000

FEET

SOURCE: USGS 7.5' Quad - Newport Beach (1981), CA

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One Metro West

Regional and Project Location Map

Based on the *Draft Preliminary Geotechnical Investigation* completed for the project (Geocon West, Inc., 2019), as well as personal communication with Geocon West, Inc. (April 2019) and Urban Resource (April 2019), the maximum depths of excavation for the various components of the project are detailed below in Table A.

Table A: Anticipated Maximum Excavation Depths for Components of the One Metro West Project

Project Component	Depth (feet)
Mass Grading	3–12[1]
Building RAP system	30[1]
Subterranean Parking Garage	25[2]
Utilities	21[2]
Dry Wells (if used)	20–50[2]
Retaining Walls (into native sediment below finished grade)	1[1]
Elevator Piston	TBD

[1] Personal communication, Jelisa Adams, Geocon West, Inc., April 2019
[2] Personal communication, Jay Ruby, Urban Resource, April 2019
RAP = Rammed Aggregate Pier
TBD = to be determined

REGULATORY ENVIRONMENT

This project is subject to State and City regulations and policies regarding paleontological resources. A discussion of these regulations and policies is provided below.

STATE OF CALIFORNIA

Under State law, paleontological resources are protected by the California Environmental Quality Act (CEQA) and Public Resources Code (PRC) Section 5097.5.

California Environmental Quality Act (Public Resources Code 21000 et seq.)

The purpose of CEQA is to provide a statewide policy of environmental protection. As part of this protection, State and local agencies are required to analyze, disclose, and, when feasible, mitigate the environmental impacts of, or find alternatives to, proposed projects. The State *CEQA Guidelines* (California Code of Regulations 15000 et seq.) provide regulations for the implementation of CEQA and include more specific direction on the process of documenting, analyzing, disclosing, and mitigating environmental impacts of a project. To assist in this process, Appendix G of the State *CEQA Guidelines* provides a sample checklist form that may be used to identify and explain the degree of impact a project will have on a variety of environmental aspects, including paleontological resources (Section VII[f]). As stated in Section 15002(b)(1–3) of the State *CEQA Guidelines*, CEQA applies to governmental action, including activities that are undertaken by, financed by, or require approval from a governmental agency. Because this project requires approval by a governmental agency, CEQA regulations apply.

California Public Resources Code, Section 5097.5

This law protects historic, archaeological, and paleontological resources on public lands within California and establishes criminal and civil penalties for violations. Specifically, PRC Section 5097.5 states:

> "(a) No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.
>
> (b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof."

Because this project involves public lands as defined in Section 5097.5(b), the project is required to comply with this regulation.

CITY OF COSTA MESA

Chapter 11, the Historical and Cultural Resources Element of the City's General Plan (City of Costa Mesa, 2002), includes the following goals, objectives, and policies to protect paleontological resources:

Goal HCR-1: Historical, Archaeological, and Paleontological Resource Preservation. The City of Costa Mesa supports focused efforts to provide residents with a sense of community and history through the protection and preservation of historical and cultural resources.

Objective HCR-1A: *Encourage preservation and protection of the City's archaeological, paleontological, and historical resources.*

Policy HCR-1.9: Require paleontological studies for all applicable discretionary projects. The studies should identify paleontological resources in the project area, and provide mitigation measures for any resources in the project area that cannot be avoided.

Policy HCR-1.10: Comply with the California Environmental Quality Act regarding the protection and recovery of paleontological resources during development activities.

SCIENTIFIC SIGNIFICANCE AND SENSITIVITY

SCIENTIFIC SIGNIFICANCE

The SVP (2010) provides the following definitions of significance:

- **Significant Nonrenewable Paleontological Resources** are fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small; uncommon invertebrate, plant, and trace fossils; and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than the middle Holocene (i.e., older than approximately 4,200 years ago [Cohen et al., 2018]).

Eisentraut and Cooper (2002) developed a useful set of criteria for judging whether fossils are scientifically significant. Using their method, fossils can be judged scientifically significant if they meet any of the criteria within the following categories:

- **Taxonomy:** Assemblages that contain rare or unknown taxa, such as defining new (previously unknown to science) species or that represent a species that is the first or has very limited occurrence within the area or formation.

- **Evolution:** Fossils that represent important stages or links in evolutionary relationships or that fill gaps or enhance underrepresented intervals in the stratigraphic record.

- **Biostratigraphy:** Fossils that are important for determining or confining relative geologic (stratigraphic) ages or for use in defining regional to interregional stratigraphic associations. These fossils are often known as biostratigraphic markers and represent plants or animals that existed for only a short and restricted period in the geologic past.

- **Paleoecology:** Fossils that are important for reconstructing ancient organism community structure and interpretation of ancient sedimentary environments. Depending on which fossils are found, much can be learned about the ancient environment from water depth, temperature, and salinity to what the substrate was like (muddy, sandy, or rocky) to even whether the area was in a high-energy location, such as a beach, or a low-energy location, such as a bay. Even terrestrial animals can contain information about the ancient environment. For example, an abundance of grazing animals such as horse, bison, and mammoth suggest more of a grassland environment, whereas an abundance of browsing animals such as deer, mastodon, and camel suggest more of a brushy environment. Preserved parts of plants can also lend insight into what was growing in the area at a particular time. In addition, by studying the ratios of different species to each other's population densities, relationships between predator and prey can be determined.

  There is a complex but vital interrelationship among evolution, biostratigraphy, and paleoecology. Biostratigraphy (the record of fossil succession and progression) is the expression

of evolution (change in populations of organisms through time), which in turn is driven by natural selection pressures exerted by changing environments (paleoecology).

- **Taphonomy:** Fossils that are exceptionally well or unusually/uniquely preserved or are relatively rare in the fossil record. This could include preservation of soft tissues such as hair, skin, or feathers from animals or the leaves/stems of plants that are not commonly fossilized.

Summary of Scientific Significance

All identifiable vertebrate fossils that have contextual information, such as the location and geologic unit from which they were recovered, are considered a scientifically significant, nonrenewable paleontological resource. Invertebrate and plant fossils, as well as other environmental indicators associated with vertebrate fossils, are considered scientifically significant. Certain invertebrate and plant fossils that are regionally rare or uncommon or help to define stratigraphy, age, or taxonomic relationships are considered scientifically significant.

SENSITIVITY

Paleontological sensitivity is a ranking that describes the potential to find scientifically significant fossils in a given geologic unit based on an evaluation of several factors, including the composition, age, depositional environment, and known importance of fossils from, or suspected to be in, that geologic unit. The sensitivity ranking provides the basis for determining which mitigation measures, if any, are appropriate for a particular project.

The *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP, 2010) has four categories for paleontological sensitivity: High, Low, No, and Undetermined. Each of these categories is described in more detail below.

- **High Potential:** Rock units from which vertebrate or scientifically significant invertebrate, plant, or trace fossils have been recovered are considered to have a High Potential for containing additional scientifically significant paleontological resources. Rock units classified as having High Potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), some low-grade metamorphic rocks that contain scientifically significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, and fine-grained marine sandstones). Paleontological potential consists of both (1) the potential for yielding abundant or scientifically significant vertebrate fossils or for yielding a few scientifically significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils, and (2) the importance of recovered evidence for new and scientifically significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units that contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways, are also classified as having High Potential.

- **Low Potential:** Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have a Low Potential for yielding scientifically significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, fossils are only preserved in rare circumstances; the presence of fossils is the exception, not the rule (e.g., basalt flows or Recent colluvium). Rock units with Low Potential typically will not require impact mitigation measures to protect fossils.

- **No Potential:** Some rock units have No Potential to contain scientifically significant paleontological resources (e.g., high-grade metamorphic rocks [such as gneisses and schists] and plutonic igneous rocks [such as granites and diorites]). Rock units with No Potential require no protection or impact mitigation measures relative to paleontological resources.

- **Undetermined Potential:** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have Undetermined Potential. Further study is necessary to determine whether these rock units have High, Low, or No Potential to contain scientifically significant paleontological resources. A field survey by a qualified professional to specifically determine the paleontological resource potential of these rock units is required before a paleontological mitigation plan can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

Summary of Sensitivity

A formation or rock unit has paleontological sensitivity or the potential for scientifically significant paleontological resources if it has previously produced, or has lithologies conducive to the preservation of, vertebrate fossils and associated or regionally uncommon invertebrate and plant fossils. All sedimentary rocks, except those younger than 4,200 years, certain extrusive volcanic rocks, and mildly metamorphosed rocks are considered to have potential for paleontological resources.

METHODS

LITERATURE REVIEW

The literature review included an examination of geologic maps of the project area and a review of relevant geological and paleontological literature to determine which geologic units are present in the project area, and whether fossils have been recovered from those geologic units elsewhere in the region. As geologic units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas well beyond the project area. The results of this literature review include an overview of the geology of the project area and a discussion of the paleontological sensitivity (or potential) of the geologic units in the project area.

LOCALITY SEARCH

The purpose of a locality search is to establish the status and extent of previously recorded paleontological resources within and adjacent to the study area for a given project. In April 2019, a locality search was conducted through the Natural History Museum of Los Angeles County (LACM). This search identified any fossil localities in the LACM records that exist within the project area or near the project area in the same or similar deposits. A copy of the locality search results from the LACM is attached in Appendix A.

FIELD SURVEYS

The purpose of a field survey is to note the sediments at the surface; relocate any known paleontological localities, if present; and identify any unrecorded paleontological resources exposed on the surface of the project area. In this way, impacts to existing, unrecorded paleontological material may be mitigated prior to the beginning of ground-disturbing activities, and portions of the project area that are more likely to contain paleontological resources may be identified. On April 11, 2019 and May 30, 2019, LSA paleontologist Kelly Vreeland conducted a pedestrian survey of the project area by walking linear transects across the property.

RESULTS

LITERATURE REVIEW

The project is at the northern end of the Peninsular Ranges Geomorphic Province, a 900-mile-long, northwest-southeast trending structural block 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). This province is characterized by mountains and valleys that trend in a northwest-southeast direction, roughly parallel to the San Andreas Fault Zone (Norris and Webb, 1976; Sharp, 1976). The total width of the province is approximately 225 miles, extending from the Colorado Desert in the east, across the continental shelf, to the southern Channel Islands (i.e., Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) (Sharp, 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rock covered by Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb, 1976).

Within this larger region, the project is within the Los Angeles Basin, a broad alluvial lowland bounded to the north and east by the San Gabriel and Santa Ana Mountains, respectively, and by the Pacific Ocean to the southwest (Yerkes et al., 1965). The basin is underlain by a structural depression that has discontinuously accumulated thousands of feet of marine and terrestrial deposits since the late Cretaceous (approximately 100.5 Ma) (Yerkes et al., 1965). Over millions of years, the basin has experienced episodes of subsidence, deposition, uplift, erosion, and faulting, all of which have resulted in very complex geology as well as a prolific oil deposits (Bilodeau et al., 2007; Yerkes et al., 1965). The surface of the basin slopes gently southwestward toward the ocean, interrupted in various places by low hills and traversed by several large rivers (Sharp; 1976; Yerkes et al., 1965).

Geologic mapping by Morton and Miller (2006) indicates that the entire project area is underlain by Holocene to late Pleistocene (less than 126,000 years ago) Young Alluvial Fan Deposits. Although not mapped by Morton and Miller (2006) but noted during the field survey and in the *Draft Preliminary Geotechnical Investigation* completed for the project (Geocon West, Inc., 2019), the project area contains varying amounts of Artificial Fill in some portions. All of these geologic units and their paleontological sensitivities are described in more detail below. Dates for the geologic periods and epochs referenced in this report are derived from the *International Chronostratigraphic Chart* published by the International Commission on Stratigraphy (Cohen et al., 2018).

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 is dependent 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. Artificial Fill was noted at the surface during the field survey and to depths of 2.5–3 ft in most of the wells drilled for the *Draft Preliminary Geotechnical Investigation* completed for the project (Geocon West, Inc., 2019).

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). These sediments were noted during the survey at the surface along the west side of the project area and at depths of 2.5–3 ft in the Draft Preliminary Geotechnical Investigation (Geocon West, Inc., 2019).

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) 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 North American Land Mammal Age (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 ft. Therefore, these deposits are assigned a low paleontological sensitivity above a depth of 10 ft and a high sensitivity below that mark.

LOCALITY SEARCH

According to the locality search conducted by the LACM, there are no known fossil localities within the boundaries of the project area, but there are records of localities nearby from the same sedimentary deposits that may occur at depth in the project area. The LACM notes that the entire project area has surface deposits of younger Quaternary Alluvium overlying older Quaternary deposits (i.e. Young Alluvial Fan Deposits), and only the older deposits have produced fossils near the project area. The closest vertebrate fossil locality from these older deposits is LACM 1339, from southwest of the project area, atop of the bluffs along Adams Avenue. This locality produced fossil specimens of mammoth (*Mammuthus*) and camel (Camelidae) from 15 ft below the top of the mesa. Farther to the southeast of the project area along the Costa Mesa Freeway (State Route 55) near Santa Isabel Avenue, locality LACM 4219 produced fossil specimens of sea turtle (*Chelonia*) and camel (Camelidae). Farther south, near the intersection of 19th Street and Anaheim Avenue, locality LACM 3267 produced a fossil specimen of elephant (Proboscidea). Even farther south of the project

area, from the Hoag Hospital lower campus parcel near the intersection of Superior Avenue and Pacific Coast Highway, locality LACM 6370 produced a fossil specimen of horse (*Equus*).

FIELD SURVEYS

Much of the project area contains paved parking lots and sidewalks and is currently developed with a large warehouse, which made ground visibility very poor (approximately 5 percent visible sediments) in most parts of the project area. Areas with exposed sediments were limited to patches in between grassy sections along the perimeter of the project area and adjacent to the bike trail along the northwestern portion of the project area. Where visible, the sediments consisted of brown silt. In some areas, small pieces of asphalt or concrete indicated the underlying sediments contained varying amounts of Artificial Fill.

No paleontological resources were found on the surface of the project area during the field survey.

RECOMMENDATIONS

The project area is underlain by Artificial Fill and Young Alluvial Fan Deposits. Artificial Fill has no paleontological sensitivity. Young Alluvial Fan Deposits have low paleontological sensitivity from the surface to a depth of 10 ft, and high paleontological sensitivity below a depth of 10 ft. Remedial grading is expected to reach a depth of 3–12 ft, while maximum excavation could reach 50 ft below the surface. As such, excavation during development of the project is expected to extend into paleontologically sensitive deposits and therefore, has the potential to impact scientifically significant paleontological resources. In order to mitigate potential impacts to scientifically significant nonrenewable paleontological resources, LSA recommends the following mitigation measures for the project:

PALEO-1 A qualified paleontologist meeting the requirements of 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 include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.

PALEO-2 Excavation and grading activities in deposits with high paleontological sensitivity (Young Alluvial Fan Deposits below a depth of 10 feet) shall be monitored by a paleontological monitor following a PRIMP. No paleontological monitoring is required for activities in Artificial Fill or the Young Alluvial Fan Deposits from the surface to a depth of 10 feet. 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. 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 a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field. Sediments shall be occasionally be spot-screened through one-eighth to one-twentieth-inch mesh screens to determine whether microfossils exist. If microfossils are encountered, additional sediment samples (up to 6,000 pounds) shall be collected and processed through one-twentieth-inch mesh screens to recover additional fossils.

PALEO-3 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.

By following the aforementioned mitigation measures, project impacts to scientifically significant paleontological resources would be reduced to a less than significant level.

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APPENDIX A

FOSSIL LOCALITY SEARCH RESULTS FROM 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
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NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

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9 April 2019

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614

Attn: Kelly Vreeland, Paleontologist

re: Paleontological Resources Records Check for the proposed One Metro West Project, LSA Project # RSE1901, in the City of Costa Mesa, Orange County, project area

Dear Kelly:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed One Metro West Project, LSA Project # RSE1901, in the City of Costa Mesa, Orange County, project area as outlined on the portion of the Newport Beach USGS topographic quadrangle map that you sent to me via e-mail on 26 March 2019. We do not have any vertebrate fossil localities that lie within the proposed project area boundaries, but we do have localities nearby from the same sedimentary deposits that may occur at depth in the proposed project area.

The entire proposed project has surface deposits of younger Quaternary Alluvium, derived as fluvial deposits from the Santa Ana River that currently flows immediately to the west of the proposed project area. We have no fossil vertebrate localities anywhere nearby from these younger Quaternary deposits and they are unlikely to contain significant vertebrate fossils, at least in the uppermost layers. Small hills and bluffs both east and west of the proposed project area, however, define the Santa Ana River floodplain drainage and are mapped as having exposures of marine Quaternary Terrace deposits. These or other older Quaternary deposits probably occur in the proposed project area at unknown depth.

Our closest vertebrate fossil locality from these Quaternary Terrace deposits is LACM 1339, just west of due south of the western portion of the proposed project area, east of the Santa Ana River near the top of the mesa bluffs along Adams Avenue, that produced fossil specimens of mammoth, *Mammuthus*, and camel, Camelidae, from sands approximately 15 feet below the top of the mesa that is overlain by shell bearing silts and sands. Further to the southeast of the proposed project area our locality LACM 4219, along the Newport Freeway near Santa Isabel Avenue, produced fossil specimens of sea turtle, *Chelonia*, and camel, Camelidae. Further south, but not as far east of the proposed project area, near the intersection of 19th Street and Anaheim Avenue, our locality LACM 3267 produced a specimen of a fossil elephant, Proboscidea, from these deposits. Farther still due south of the proposed project area, our locality LACM 6370, from the Hoag Hospital lower campus parcel near the intersection of Superior Avenue and the Pacific Coast Highway, produced a specimen of a fossil horse, *Equus*, in older Quaternary deposits.

Shallow excavations in the younger Quaternary Alluvium exposed throughout the proposed project area probably will not uncover significant vertebrate fossil remains. Deeper excavations that extend down into the older Quaternary deposits, however, may well encounter significant fossil vertebrate specimens. Any substantial excavations below the uppermost layers in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples from the finer-grained deposits should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. 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.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice