

Appendix E

Paleontological Report

Paleontological Resources
Assessment for the
130 West College Street Project,
Los Angeles, California

MARCH 2024

PREPARED FOR

**S&R Partners, LLC c/o Granite
Properties**

PREPARED BY

SWCA Environmental Consultants

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE 130 WEST COLLEGE STREET PROJECT, LOS ANGELES, CALIFORNIA

Prepared for

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EXECUTIVE SUMMARY

Purpose and Scope: S&R Partners, LLC (Applicant) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment (study) for the proposed commercial project (Project) located at 130 West College Street in the Chinatown neighborhood of Los Angeles, California (Project Site). The Project Site is approximately 2.24 acres and is associated with the following Los Angeles County Assessor Parcel Numbers: 5409-008-001, 5409-008-002, 5409-008-003, 5409-008-004, 5409-008-005, 5409-008-006, and 5409-008-015. The Project proposes to develop a five-story creative office development, comprised of a podium with one level of at-grade parking and one level of above-grade parking (both podium levels would be wrapped with active ground floor commercial uses along the Alameda Street, Bruno Street, and Main Street frontages), four levels of office uses above-ground, and one level of below-ground parking. Utility lines for water, sewer, and electric services will require excavation of up to seven trenches to complete installations that tie-into the nearest existing lines, which are beneath roads and sidewalks that are outside the direct footprint of the Project Site. The Project is subject to review under the California Environmental Quality Act (CEQA), and the City of Los Angeles (City) Department of City Planning (City Planning) is the lead CEQA agency.

This study was conducted to analyze any potential impacts to paleontological resources from the Project pursuant to CEQA. The study included a review of geologic maps, geotechnical subsurface data, scientific literature, and confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA). This study also includes mitigation recommendations to reduce any potentially significant paleontological impacts to less-than-significant levels, pursuant to CEQA. This study follows the guidelines of the Society of Vertebrate Paleontology (SVP) and best practices in mitigation paleontology.

Date of Investigation: SWCA reviewed the relevant maps and literature in November and December 2022, and received the results of a museum records search from the NHMLA on December 11, 2022.

Summary of Findings: SWCA determined that the Project Site and utility trenches are underlain by unmapped Recent (defined here geologically as the latest late Holocene that may include both historic and modern ages) artificial fill at the surface to depths of approximately 5 feet below ground surface (bgs) and is immediately underlain by late Pleistocene young alluvium, Unit 2 (Qya₂). Although not mapped at the surface, late Pleistocene old fan deposits, Unit 1 (Qof₁) may also be present and indistinguishable from late Pleistocene young alluvium, Unit 2 (Qya₂) at comparable depths. Early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) is also not mapped at the surface but occurs in the vicinity of the Project Site at moderate to deep depths (e.g., 70 feet bgs or greater).

The results of the NHMLA records search indicate that no fossil localities have been recorded from within the Project Site or utility trenches; however, several fossil localities have been noted in the Project Site's vicinity from comparable geologic units. Therefore, based on the SVP's 2010 guidelines, Recent artificial fill has low paleontological sensitivity and is unlikely to yield scientifically significant fossils. At depths greater than or equal to 5 feet bgs, "native" deposits of late Pleistocene young alluvium, Unit 2 (Qya₂) have a high paleontological sensitivity. If present, Late Pleistocene old fan deposits, Unit 1 (Qof₁) also have a high paleontological sensitivity. Early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) also has a high paleontological sensitivity, but is likely not present at the depths within the Project Site and utility trenches that would be subjected to earthwork activities for the construction of the Project, which is estimated to range from 13 to 17 feet deep.

Conclusions and Recommendations: Based on the results of this study, SWCA determined that Project-related ground-disturbing activities greater than or equal to 5 feet bgs that are within naturally deposited sediments may impact geologic units with the potential to yield significant paleontological resources,

which would be considered a significant impact under CEQA. However, implementation of appropriate mitigation measures described herein will ensure that potentially significant impacts paleontological resources, if encountered during Project-related ground-disturbing activities, will be reduced to less-than-significant levels, pursuant to CEQA. The recommended measures require the Project Applicant to retain a Qualified Professional Paleontologist, develop and implement a Worker Environmental Awareness Program training, monitor ground-disturbing activities for paleontological resources within sediments that have high sensitivity, and prepare a final monitoring report.

Disposition of Data: Copies of this report will remain on file with the Applicant, City Planning, and SWCA's Pasadena office.

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INTRODUCTION

S&R Partners, LLC (Applicant) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment (study) for the proposed commercial project (Project) located at 130 West College Street in the Chinatown neighborhood of Los Angeles, California. This study was conducted to analyze any potential for impacts to paleontological resources from the Project pursuant to the California Environmental Quality Act (CEQA). This study included a review of geologic maps, geotechnical subsurface data, scientific literature, and confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA). This study also includes mitigation recommendations to reduce potential impacts to less-than-significant levels. This study follows the guidelines of the Society of Vertebrate Paleontology (SVP) and best practices in mitigation paleontology (Murphey et al. 2019; SVP 2010). The Project is subject to review under the CEQA by City of Los Angeles (City), Department of City Planning (City Planning), who is the lead agency under CEQA.

SWCA Lead Paleontologist Mathew Carson, M.S., and Paleontologist Kristina Akesson, B.S., conducted the study and authored this technical report. Copies of this report will remain on file with the Applicant, City Planning, and SWCA's Pasadena office.

PROJECT DESCRIPTION AND LOCATION

The Project Site consists of seven parcels between Alameda Street to the west, College Street to the north, North Main Street to the east, and Bruno Street to the south (Figure 1). The Project Site measures a total of approximately 2.24 acres and comprises seven parcels designated as Assessor's Parcel Numbers 5409-008-001 (117–119 West Bruno Street), 5409-008-002 (110–114 West College Street), 5409-008-003 (959–973 North Main Street), 5409-008-004 (953–955 North Main Street), 5409-008-005 (945–949 North Main Street), 5409-008-006 (943 North Main Street), and 5409-008-015 (130 West College Street) (Figure 2). The Project Site is in Section 22 and 27 of Township 1 South, Range 13 West, and is plotted on the U.S. Geological Survey (USGS) Los Angeles, California, quadrangle (Figure 3).

The Project includes a five-story creative office development, comprising a podium with one level of at-grade parking and one level of above-grade parking (both podium levels would be wrapped with active ground floor commercial uses along the Alameda Street, Bruno Street, and Main Street frontages), four levels of office uses above-grade, and one level of subterranean parking. Utility lines for water, sewer, and electric services will require excavation of up to seven trenches to complete installations that tie-into the nearest existing lines, which are beneath roads and sidewalks that are outside the direct footprint of the Project Site (Figure 4). For the electrical circuits, Project construction may require existing overhead lines to be placed below ground in trenches. The need for underground electrical circuits has yet to be confirmed as part of Project design but is included here with all other utility trenches as part of the analysis. This study, in general, and the impact analysis in particular analyzes the potential for impacts within the Project Site and utility trenches. Nonetheless, the term Project Site is used in some parts of this report to reference the general location of the Project.

Based on the Project's architectural designs plans, the maximum depth of ground disturbance would be about 17 feet below ground surface (bgs) for the one level of subterranean parking, which will require excavation up to this depth across the footprint of the Project Site. The utility trenches along the northern side of the Project Site, extending across Alameda Street, will include excavation for a water line placed 6 feet bgs, and a sewer line placed 14–15 feet bgs. The utility trenches excavated from the south side of the Project Site, extending across North Main Street, include a water line placed 3.5 feet below grade, and a sewer line placed 9–10 feet bgs. If the overhead electrical lines are required to be placed below ground, the underground lines would be placed in a 6-foot-wide trench, excavated 6 feet bgs. The underground electrical circuits would be installed beneath sidewalks and then extend northeast across College Street and southeast across North Main Streets in the two respective locations.



Figure 1. Project Site location vicinity.



Figure 2. Project Site plotted on an aerial photograph.



Figure 3. Project Site plotted on the USGS Los Angeles, California, 7.5-minute topographic quadrangle.



Figure 4. Project Site showing potential locations of utility trenches.

PROFESSIONAL STANDARDS

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and curation (SVP 1995, 2010). Most practicing professional mitigation paleontologists in California adhere to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

As defined by the SVP, significant 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 middle Holocene (i.e., older than about 5,000 radiocarbon years). (SVP 2010:11)

Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003). In general, these studies assess fossils as significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living, or extinct.
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein.
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas.
4. The fossils demonstrate unusual or spectacular circumstances in the history of life.
5. The fossils are in short supply and/or are in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation and are not found in other geographic locations.

Geologic units known to preserve significant fossils or fossil localities are likely to contain additional undiscovered and potentially significant fossils and are generally considered sensitive for paleontological resources throughout their areal and stratigraphic extent. The extent of sensitivity differs from that defined for archaeological resource sites as follows:

It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case. (SVP 1995:23)

Many archaeological sites contain features visually detectable on the surface. In contrast, fossils may be present at the surface or at depth within sediments or bedrock. Subsurface fossils would not be observable or detectable unless exposed by erosion or human activity. In the case of human activity,

such as project-related ground disturbances within geologic units with a high probability to yield significant fossils, direct or indirect adverse impacts to significant fossils may occur.

In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or anthropogenic exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of geologic units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area), a similar geologic unit, and whether the unit in question was deposited in a type of environment known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if such fossils are determined to be potentially significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

REGULATORY SETTING

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under State and local laws and regulations.

State Regulations

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at California Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine whether a proposed project would have a significant effect on the environment, including significant effects on paleontological resources. Guidelines for the Implementation of CEQA, as amended December 28, 2018 (Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section VII(f) of the Environmental Checklist (State CEQA Guidelines: Appendix G) asks whether a project would directly or indirectly destroy a unique paleontological resource and result in impacts to the environment.

Public Resources Code Section 5097.5

Requirements for paleontological resource management are included in PRC Division 5, Chapter 1.7, Section 5097.5, which states,

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.

These statutes prohibit the removal, without permission, of any paleontological site or feature from land under the jurisdiction of the State or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, local agencies are required to comply with PRC Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. PRC Section 5097.5 also establishes the removal of paleontological

resources as a misdemeanor and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (State, county, city, and district) land.

Local Regulations

City of Los Angeles General Plan

Section 3 (Archaeological and Paleontological) of the *City of Los Angeles General Plan Conservation Element* (Conservation Element) recognizes paleontological resources (page II-3) and contains an objective (page II-5) to protect the City's archaeological and paleontological resources for historical, cultural, research, and/or educational purposes (City of Los Angeles 2001). The Conservation Element includes the policy to "continue to identify and protect significant archaeological and paleontological sites and/or resources known to exist or that are identified during land development, demolition or property modification activities." The Conservation Element also states the following:

Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. If significant paleontological resources are uncovered during project execution, authorities are to be notified and the designated paleontologist may order excavations stopped, within reasonable time limits, to enable assessment, removal or protection of the resources. (City of Los Angeles 2001:II-5)

Section D:1 of the *L.A. CEQA Thresholds Guide* (City of Los Angeles 2006) specifies that the determination of significance for paleontological resources shall be made on a case-by-case basis, taking into consideration the following factors:

- Whether, or the degree to which, the project might result in the permanent loss of, or loss of access to, a paleontological resource.
- Whether the paleontological resource is of regional or statewide significance.

METHODS

The following sections present an overview of the methodology used to analyze the potential for paleontological resources within the Project Site and utility trenches. This report conforms to industry standards as developed by the SVP (1995, 2010) and best practices in mitigation paleontology (Murphey et al. 2019). The purpose of this analysis is to: 1) determine whether any previously recorded fossil localities occur in the Project Site and utility trenches at the surface or at depth; 2) if so, assess the potential for disturbance of these localities during construction; 3) evaluate the paleontological potential of the Project Site and utility trenches; and 4) evaluate the potential for adverse impacts to previously undiscovered significant paleontological resources that could be present within the Project Site and utility trenches to be adversely impacted by the Project.

Existing Data Analysis

SWCA conducted an analysis of available existing data pertinent to paleontological resources. This analysis included a review of geologic maps, geotechnical subsurface data, scientific literature, and museum records search results. The geologic mapping used in this analysis is from Campbell and others (2014) at a scale of 1:100,000. The museum records search request was submitted to the NHMLA on

November 29, 2022. The results of the museum records search were received on December 11, 2022, and are incorporated into the “Results” section of this report. Appendix A (confidential) provides a copy of the museum records search results.

Paleontological Potential Classification

Paleontological potential (“sensitivity”) is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010:1–2), the SVP defines four categories of paleontological sensitivity for rock units: high, low, undetermined, and no potential:

High Potential. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcanoclastic formations (e.g., ash or tephra), and some low-grade metamorphic rocks which contain 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 sandstone, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstone, fine-grained marine sandstone, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which 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 low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and 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.

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 if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

No Potential. Some rock units have no potential to contain significant paleontological resources, for instance 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. (SVP 2010:1–2)

RESULTS

Regional Geology

The Project is located in the northernmost portion of the Peninsular Ranges (sometimes classified as the southern extent of the Transverse Ranges) within the northern Los Angeles Basin. Norris and Webb (1990) characterize the Peninsular Ranges as a series of northwest-trending, fault-bound blocks, each of which contains uplifted ranges or subsided valleys. The Project is located within the northern-most Central Block of the Peninsular Ranges, immediately south of the Elysian Hills. The Central Block includes the low portions of the Los Angeles coastal plain from Beverly Hills to the Downey Plain within central Orange County (Norris and Webb 1990). More specifically, the Central Block is bounded by the Hollywood, Santa Monica, and Whittier faults on the north; the Whittier and Elsinore faults and Elysian and Repetto hills on the east; the San Joaquin Hills and Huntington and Newport mesas on the south; and the Newport-Inglewood Fault Zone and Dominguez and Baldwin hills on the west (Yerkes et al. 1965).

Within the Central Block, sedimentary strata overlying basement rocks consist of mostly marine and nonmarine sedimentary rocks, with the geologic history of the strata spanning from the Cretaceous to the Pleistocene (Norris and Webb 1990; Yerkes et al. 1965). Beginning in the Cretaceous and early Paleogene, western North America was the site of a convergent margin where the Farallon Plate was actively subducted eastward beneath the North American Plate. Subduction continued throughout the Paleogene, but by the late Oligocene (i.e., latest Paleogene), a portion of the East Pacific Rise collided with the subduction zone initiating the development of the San Andreas Fault system (Saucedo et al. 2016). The Los Angeles Basin formed when fault-bound blocks of the Transverse Ranges were the translated and rotated away from the Peninsular Ranges due to movement along the San Andreas Fault system, with subsidence within the early Los Angeles Basin occurring during the middle to late Miocene (Critelli et al. 1995). Transtensional rifting that resulted in the formation of the Los Angeles Basin continued to enlarge the basin through the Pliocene, resulting in the deposition of thick shallow marine strata (Olson 2007). By the Pleistocene, changes in global sea level, tectonic subsidence, and rates of sedimentation resulted in the deposition of thick accumulations (maximum thickness of 35,000 feet thick) of coastal and terrestrial alluvial deposits within the Los Angeles Basin (Yerkes et al. 1965). Erosion and transportation of sediments away from the surrounding uplifted blocks (i.e., the San Gabriel and Santa Ana mountains) resulted in continued basin infilling during the late Pleistocene and Holocene, resulting in thick alluvial deposits within the present-day Los Angeles Basin that has yielded some of the best fossil sites in North America.

Local Geology and Paleontology

Geologic mapping by Campbell and others (2014) indicates the surface of the Project Site and utility trenches is mapped as late Pleistocene young alluvium, Unit 2 (Qya₂) (Figure 5). Although not mapped at the surface, late Pleistocene old fan deposits, Unit 1 (Qof₁) and early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) are also mapped at the surface within a half-mile radius of the Project Site, suggesting they may be present at depth within the Project Site and utility trenches. Holocene to late Pleistocene young alluvial-fan deposits, Unit 1 (Qyf₁) (see Figure 5) likely are not present at depth within the Project Site and utility trenches because they are stratigraphically younger than late Pleistocene young alluvium, Unit 2 (Qya₂) (Campbell et al. 2014). Additionally, previous development within the Project

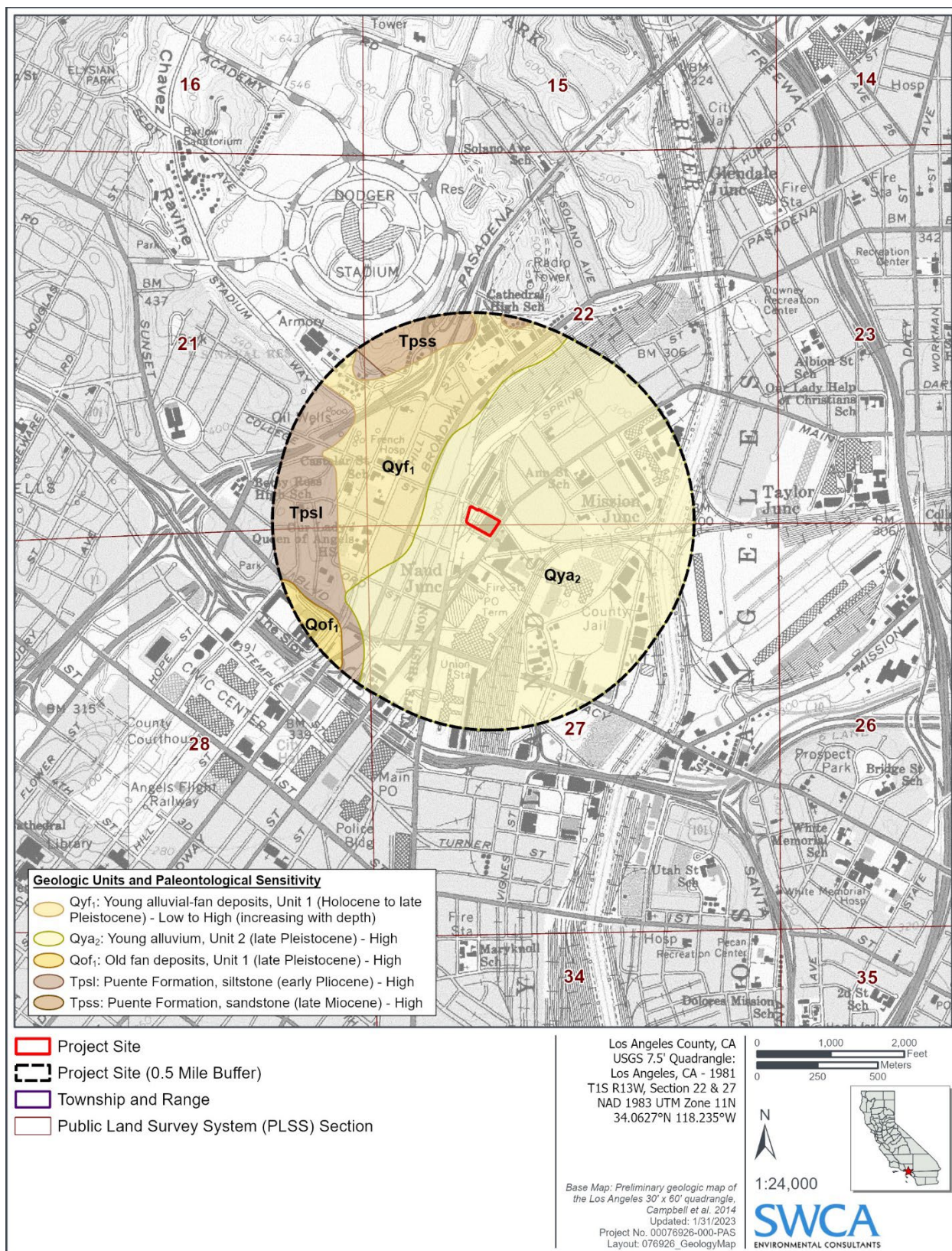


Figure 5. Geologic units and paleontological sensitivity within the Project Site and 0.5-mile buffer.

Site and the results of the geotechnical investigation by Langan Engineering and Environmental Services, Inc. (Langan) indicate that unmapped Recent artificial fill is present at the surface (Langan 2023), overlying (and likely partially replacing the uppermost strata of) the “native” surficial deposits of late Pleistocene young alluvium, Unit 2 (Qya₂). Therefore, unmapped Recent artificial fill, late Pleistocene young alluvium, Unit 2 (Qya₂), late Pleistocene old fan deposits, Unit 1 (Qof₁), and early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) are given consideration in this study. These geologic units are described in geochronological order (youngest to oldest) below.

Unmapped Recent Artificial Fill

Although unmapped at the surface by Campbell and others (2014), Langan (2023) notes the presence of Recent artificial fill within the Project Site, extending from the surface to depths of 1 to 5 feet bgs. Artificial fill consists of dark brown, silty sand and clayey sand, with variable amounts of gravel (Langan 2023). In general, artificial fill sediments typically consist of reworked and recompacted sediments originating from within a specific area during construction, or they consist of imported sediments delivered from other regions and recompacted. Previously disturbed sediments or artificial fill may contain fossils, but any such fossil from these deposits has been removed from its original stratigraphic, taphonomic, or paleoenvironmental context (provenance), making it scientifically nonsignificant. Therefore, unmapped Recent artificial fill in the Project Site and proposed utility trenches is unlikely to yield significant paleontological resources and has low paleontological potential (SVP 2010). However, artificial fill is likely underlain by previously undisturbed “native” sediments at very shallow depth (e.g., 5 feet bgs) that may have the potential to contain significant paleontological resources (see below).

Late Pleistocene Young Alluvium, Unit 2 (Qya₂) and Late Pleistocene Old Fan Deposits, Unit 1 (Qof₁)

Campbell and others (2014) map late Pleistocene young alluvium, Unit 2 (Qya₂) at the surface of the Project Site (see Figure 5). As noted above, the uppermost strata (e.g., from the surface to 5 feet bgs) have been partially replaced by unmapped Recent artificial fill (Langan 2023). According to the lithologic description by Campbell and others (2014), late Pleistocene young alluvium, Unit 2 (Qya₂) consists of unconsolidated, generally friable, stream-deposited silt, sand, and gravel deposited along flood plains, alluvial fans, and streambeds. Regionally (i.e., outside the bounds of the immediate vicinity or 0.5-mile buffer of the Project Site), at least four subunits are noted spanning the late Pleistocene to Holocene, distinguished by geomorphic relationships, relative degree of surface dissection, and soil formation (Campbell et al. 2014). Within the area sampled for the geotechnical investigation, Langan (2023) describes young alluvium (presumably from Unit 2) as brown, yellow-brown, and whitish brown; medium dense to very dense; fine- to coarse-grained sand, with variable amounts of silt and gravel. Based on the results of the geotechnical investigation, alluvial deposits extend to depths of at least 66.5 feet bgs, which is the total depth explored in the investigation (Langan 2023). Although mapped approximately 0.5 mile southwest of the Project Site, late Pleistocene old fan deposits, Unit 1 (Qof₁) may also be present within the Project Site and proposed utility trenches at depths within this range (i.e., 5 to 66.5 feet bgs, or deeper) based on Langan’s (2023) interpretation that these are mostly alluvial-fan deposits. Campbell and others (2014) describe late Pleistocene old fan deposits, Unit 1 (Qof₁) as slightly to moderate consolidated silt, sand, and gravel of similar lithology to that described for the late Pleistocene young alluvium, Unit 2 (Qya₂) deposits.

Whether classified as late Pleistocene young alluvium, Unit 2 (Qya₂) or late Pleistocene old fan deposits, Unit 1 (Qof₁), the total thickness of late Pleistocene deposits in this region likely varies but is present at very shallow depths (e.g., 5 feet bgs, underlying artificial fill) based on the presence of Pleistocene-age fossils recorded during construction of storm drains approximately 1 mile east of Project Site (NHMLA 2022). Late Pleistocene alluvial deposits sediments have a rich fossil history in southern California,

especially in the Los Angeles Basin (Jefferson 1991a, 1991b; McDonald and Jefferson 2008; Miller 1971; NHMLA 2022; Reynolds and Reynolds 1991; Springer et al. 2009). The most common Pleistocene terrestrial mammal fossils include the bones of mammoth, bison, deer, and small mammals, but other taxa, including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth, have been reported (Graham and Lundelius 1994), as well as reptiles, snakes, frogs, and salamanders (Hudson and Brattstrom 1977). In addition to illuminating the striking differences between southern California in the Pleistocene and southern California today, this abundant fossil record has been vital in studies of extinction (e.g., Barnosky et al. 2004; Sandom et al. 2014; Scott 2010), ecology (e.g., Connin et al. 1998), and climate change (e.g., Roy et al. 1996). Therefore, late young alluvium, Unit 2 (Qya₂) and late Pleistocene old fan deposits, Unit 1 (Qof₁) both have a high paleontological sensitivity (SVP 2010).

Early Pliocene to Late Miocene Puente Formation (Tpsl, Tpss)

Although not mapped at the surface within the Project Site, early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) is known to underlie alluvial deposits within the central Los Angeles Basin and is well exposed along the Elysian Hills, located approximately 0.5 mile north of the Project Site (see Figure 5), and the Repetto Hills, located approximately 4 miles east of the Project Site (Campbell et al. 2014). Due to the proximity of the Project Site to the Elysian Hills, sediments or rocks of early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) would be expected to be present at unknown depth within the Project Site and proposed utility trenches.

The Puente Formation was originally named and described by Eldridge and Arnold (1907) and later subdivided by English (1926) into three units based on lithology. Later, Daviess and Woodford (1949) and Schoellhamer and others (1954) further subdivided the Puente Formation within the Puente Hills region into four members (from youngest to oldest): 1) Sycamore Canyon Member, 2) Yorba Member, 3) Soquel Member, and 4) La Vida Member, all of which have gradational contacts within the Puente Hills area and become uniform and indistinguishable westward in the Los Angeles Basin near the Elysian Hills. Because these units are indistinguishable in this portion of the Los Angeles Basin, Campbell and others (2014) do not differentiate the local sediments or rocks of the Puente Formation into any of these four members. Instead, they are divided into two informal units: a well-bedded, light gray siltstone (Tpsl), and a well-bedded, medium to light brown and light gray, well cemented, very fine- to very coarse-grained sandstone, with discoidal concretions (Tpss) (Campbell et al. 2014).

During the geotechnical investigation of the Project Site, which drilled borings to 66.5 feet bgs, Langan (2023) did not note the presence of sediments or rocks attributed to the Puente Formation. However, the NHMLA (2022) records search results indicate the presence of fossils from the Puente Formation in the immediate vicinity of the Project Site. For example, the nearest fossil locality is approximately 0.58 mile away near the Elysian Hills, from the surface to depths of approximately 50 feet bgs, with the next closest fossil locality from this same geologic unit located approximately 1.22 miles away, which yielded fossils from depths of approximately 102 to 105 feet bgs (NHMLA 2022). Therefore, the early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) may be present at moderate to deep depths (e.g., estimated to be 70 feet bgs or greater, or at least greater than the maximum depth explored by Langan [2023]) if projected into the subsurface within the Project Site, becoming relatively shallower in proximity to the Elysian Hills.

The Puente Formation (and all its members) has a history of preserving terrestrial fossil taxa, such as rhinoceros, mastodons, rabbits, rodents, and insects, and marine fossil taxa, such as pinnipeds, desmostylids, whales, sharks, bony fish, crustaceans, cephalopods, bivalves, sponges, and foraminifers (Barboza et al. 2017; Carnevale et al. 2008; David 1943; Feldmann 2003; Fritzsche 1980; Hilton and Grande 2006; Huddleston and Takeuchi 2006; Leatham and North 2017; Pajak 1992; Pierce 1945;

Pimiento 2014; Rigby and Albi 1996; Santos et al. 2016; Saul and Stadum 2005; Scherzer 2017). Therefore, early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) has a high paleontological sensitivity (SVP 2010).

Museum Records Search

The NHMLA (2022) performed a museum records search for paleontological localities within the Project Site and its vicinity from relevant geologic units. Based on the results of the museum records search, the NHMLA does not possess records of paleontological resources from within the Project Site and utility trenches; however, several fossil localities have been recorded in its vicinity from the same or similar geologic units. Table 1 (below) summarizes the results of the NHMLA (2022) museum records search. Appendix A (confidential) provides the results of the museum records search.

Table 1. NHMLA Fossil Localities near the Project Site

Locality Number	Approximate Distance from the Project Site	Formation	Taxa	Approximate Depth (bgs)
LACM VP 7990	0.58 mile	Puente Formation (Yorba Member)	Teleostei (viperfish [<i>Chauliodus</i>], cod [<i>Gadiformes</i>], herring/shad/sardines [<i>Clupeidae</i>], mackerel/tuna/bonito [<i>Scombridae</i>], slickheads [<i>Alepocephalidae</i>], smelts [<i>Bathylagidae</i>], herring smelt [<i>Argentinidae</i>], scaly dragonfish [<i>Stomiidae</i>], bristlemouths [<i>Gonostomidae</i>])	Unknown (estimated to be 0 feet to 50 feet based on depth of fossils and mean sea level)
LACM VP 5961	0.80 mile	Puente Formation	Bristlemouth (<i>Cyclothone</i>)	Unknown
LACM VP 1023	1.20 miles	Unspecified Pleistocene deposits	Sabertoothed-cat (<i>Smilodon</i>), horse (<i>Equus</i>), deer (<i>Odocoileus</i>), turkey (<i>Meleagris</i>)	Unknown (presumed shallow based on excavation of storm drain)
LACM VP 2032	1.22 miles	Unspecified Pleistocene deposits	Mastodon (<i>Mammut</i>)	20-35 feet
LACM VP 7507	1.22 miles	Puente Formation (equivalent to the Monterey Formation elsewhere in Southern California)	Fish (<i>Thyrsoctes kriegeri</i>)	102-105 feet
LACM VP 1755	2.20 miles	Unspecified Pleistocene deposits	Horse (<i>Equus</i>)	43 feet

Source: NHMLA (2022)

IMPACT ASSESSMENT

In summary, unmapped Recent artificial fill is likely present at the surface and extending to depths of up to 5 feet bgs within the Project Site, and at least this much but potentially deeper where the proposed utilities trenches will be placed within or otherwise intersect previously excavated utility trenches. Recent artificial fill is unlikely to contain significant fossils due to its recent age and level of prior disturbance. Therefore, artificial fill has a low paleontological sensitivity but may be underlain by late Pleistocene young alluvium, Unit 2 (Qy_{a2}), which has a high paleontological sensitivity. Additionally, although not mapped at the surface of the Project Site or utility trenches, late Pleistocene old fan deposits, Unit 1 (Qof₁), which may be indistinguishable from late Pleistocene young alluvium, Unit 2 (Qy_{a2}), may also be present at depths greater than or equal to 5 feet bgs and also have a high paleontological sensitivity.

Finally, early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) may also be present at unknown depths within the general vicinity of the Project Site and has a high paleontological sensitivity. Based on the results of the records search by the NHMLA (2022) and the results of the geotechnical investigation by Langan (2023), early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) is likely only present at moderate to deep depths (e.g., estimated to be 70 feet bgs or greater) within the Project Site. Therefore, although early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) has a high paleontological sensitivity, it is not likely present at relevant depths within the Project Site and utility trenches that would be subjected to earthwork activities for the construction of the Project of approximately 17 feet bgs at the deepest excavation points.

SWCA conducted this study to analyze the potential for adverse impacts to significant paleontological resources resulting from Project construction. Based on the Project design, the maximum anticipated depth of excavation is 17 feet bgs for the construction of the subterranean parking level and utility trenches. Therefore, ground-disturbing activities greater than or equal to 5 feet bgs and outside of artificial fill may result in potentially adverse impacts to significant paleontological resources. Any fossils encountered during ground disturbances at this depth threshold or deeper in previously undisturbed sediments would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA.

CONCLUSIONS AND RECOMMENDATIONS

SWCA reviewed geologic maps, geotechnical subsurface data, scientific literature, and museum records to determine the potential for adverse impacts to significant paleontological resources. SWCA determined that the Project Site and proposed utility trenches are underlain by unmapped Recent artificial fill at the surface to depths of at least 5 feet bgs and is immediately underlain by late Pleistocene young alluvium, Unit 2 (Qya₂). Fill may be deeper where it is within previously excavated utility trenches beneath the public right-of-way outside the direct footprint of the Project Site. Although not mapped at the surface of the Project Site, late Pleistocene old fan deposits, Unit 1 (Qof₁) may also be present at depths greater than 5 feet bgs and may be indistinguishable from the late Pleistocene young alluvium, Unit 2 (Qya₂). Early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) is estimated to be present at moderate to deep depths (e.g., 70 feet bgs or greater) within the vicinity of the Project Site; however, it is unlikely to be encountered during Project-related ground-disturbing activities based on the maximum depth of excavation of 17 feet bgs proposed for the Project.

Based on SVP (2010) guidelines, Recent artificial fill has low paleontological sensitivity and is unlikely to yield scientifically significant fossils; however, at depths greater than or equal to 5 feet bgs, late Pleistocene young alluvium, Unit 2 (Qya₂) and/or late Pleistocene old fan deposits, Unit 1 (Qof₁) (if present) both have high paleontological sensitivity. Although unlikely to be encountered during ground-disturbing activities associated with the Project, early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) also has a high paleontological sensitivity.

Based on the results of this study, SWCA determined that Project-related ground-disturbing activities greater than or equal to 5 feet bgs that are within naturally deposited sediments may impact geologic units with the potential to yield significant paleontological resources. Therefore, ground disturbances impacting previously undisturbed sediments greater than or equal to 5 feet bgs should be monitored full-time by a qualified paleontological monitor. Ground disturbances less than 5 feet bgs should not be monitored. Additionally, if only geologic units of low paleontological sensitivity, such as previously disturbed sediments, Recent artificial fill, or sediments observed in the field to be too young (i.e., less than 5,000 years old) to yield fossils, are impacted when ground disturbances exceed 5 feet bgs, then the level of paleontological monitoring should be modified, such as reducing or ceasing as appropriate.

Any fossils encountered during ground-disturbing activities greater than or equal to 5 feet bgs and in undisturbed sediments would be at risk for damage or destruction from such activities, which would constitute a potentially significant impact under CEQA. The implementation of appropriate mitigation measures will ensure that fossils, if encountered, are assessed for significance and, if significant, salvaged and curated with an accredited repository. These actions will reduce impacts to paleontological resources to less-than-significant levels, pursuant to CEQA. Accordingly, SWCA recommends the following mitigation measures, which incorporate and have been developed in accordance with the performance standards of the SVP (1995, 2010), state and local regulations, and best practices in mitigation paleontology (Murphey et al. 2019).

1. **Retain a Qualified Professional Paleontologist:** The Project Applicant should retain a Qualified Professional Paleontologist (Qualified Paleontologist/Project Paleontologist/Principal Paleontologist), who meets or exceeds the SVP definition, to carry out all regulatory compliance measures and protocols related to paleontological resources. The Qualified Paleontologist should obtain a curatorial arrangement with a qualified repository (e.g., NHMLA) prior to Project construction in the event of significant paleontological resource discoveries during construction.
2. **Conduct Worker Training:** The Qualified Paleontologist should develop Worker Environmental Awareness Program training to educate the construction crew on the legal requirements for preserving fossil resources, as well as the procedures to follow in the event of a fossil discovery. This training program should be given to the crew before Project ground-disturbing work commences and should include handouts to be given to new workers as needed.
3. **Monitor for Paleontological Resources:** Full-time paleontological monitoring should occur during Project ground-disturbing activities at depths greater than or equal to 5 feet bgs that impact previously undisturbed sediments that have high paleontological sensitivity, including late Pleistocene young alluvium, Unit 2 (Qya₂) and/or late Pleistocene old fan deposits, Unit 1 (Qof₁). In the unlikely event that early Pliocene to late Miocene Puente Formation (Tpsl, Tpss) is encountered at depth, these deposits should also be subject to full-time paleontological monitoring. Monitoring should not be required when ground-disturbing activities are less than 5 feet bgs, or when impacting only previously disturbed sediments and/or Recent artificial fill regardless of depth. Monitoring should be conducted by a qualified paleontological monitor who meets the standards of the SVP (2010) and who should be supervised by the Qualified Paleontologist. The Qualified Paleontologist may periodically inspect construction activities to adjust the level of monitoring in response to subsurface conditions. Monitoring efforts can be increased, reduced, or ceased entirely if determined adequate by the Qualified Paleontologist. Paleontological monitoring should include inspection of exposed sedimentary units during active excavations within sensitive geologic sediments. The monitor should have authority to temporarily divert activity away from exposed fossils to evaluate the significance of the find and, should the fossils be determined significant, professionally and efficiently recover the fossil specimens and collect associated data. The monitor should record pertinent geologic data and collect appropriate sediment samples from any fossil localities. Recovered fossils should be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological repository (e.g., NHMLA).
4. **Prepare a Paleontological Resources Monitoring Report:** Upon conclusion of Project ground-disturbing activities, the Qualified Paleontologist overseeing paleontological monitoring should prepare a final monitoring report that documents the paleontological monitoring efforts for the Project and describes any paleontological resources discoveries

observed and/or recorded during the life of the Project. If paleontological resources are curated, the final monitoring report and any associated data pertinent to the curated specimen(s) should be submitted to the designated repository. A copy of the final monitoring report should be filed with City Planning.

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APPENDIX A

**Natural History Museum of Los Angeles County
Paleontological Records Search**

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This confidential report is on file with
the Department of City Planning.