Appendix E.

Paleontological Resources Technical Memorandum

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TECHNICAL MEMORANDUM

To: Hai Nguyen, Associate Planner
City of Santa Clarita, Planning Division
23920 Valencia Boulevard, Suite 140
Santa Clarita, California 91355

From: Mathew Carson, M.S., Lead Paleontologist

Date: January 20, 2023

Re: **Paleontological Resources Technical Memorandum for the Riverview Development Project, City of Santa Clarita, Los Angeles County, California**

INTRODUCTION

On behalf of Riverview Owner LPV, LLC (Applicant), the City of Santa Clarita (City) retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment in support of the Initial Study/Mitigated Negative Declaration (IS/MND) for the proposed Riverview Development Project (proposed project) located in the city of Santa Clarita, Los Angeles County, California (Figure 1). This technical memorandum documents the methods and results of this assessment, including a review of geologic mapping, scientific literature, geotechnical data, and confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA); determines the potential for significant impacts to paleontological resources; and provides mitigation recommendations to reduce potential impacts to less-than-significant levels, pursuant to the California Environmental Quality Act (CEQA).

SWCA Lead Paleontologist, Mathew Carson, M.S., conducted the paleontological resources assessment presented herein and authored this technical memorandum. SWCA Principal Investigator of Paleontology, Russell Shapiro, Ph.D., provided senior-level technical review and quality assurance/quality control. SWCA Principal Environmental Planner, Hannah Gbeh, B.S., served as overall project manager and provided additional quality assurance/quality control. Figures were generated by SWCA Geographic Information System (GIS) Specialist, Marty Kooistra, M.A., Registered Professional Archaeologist (RPA). Copies of the report are on file with SWCA's Pasadena office.

PROJECT LOCATION AND DESCRIPTION

The proposed project is located along the south side of Soledad Canyon Road, directly east of the intersection with Commuter Way (Figure 2). The site encompasses 35.4 acres (project site or project area) and is located at 22500 Soledad Canyon Way, Assessor Parcel Number 2836-011-018, situated within Section 23 of Township 04 North, Range 16 West on the Newhall, California, U.S. Geological Survey 7.5-minute quadrangle map (Figure 3).

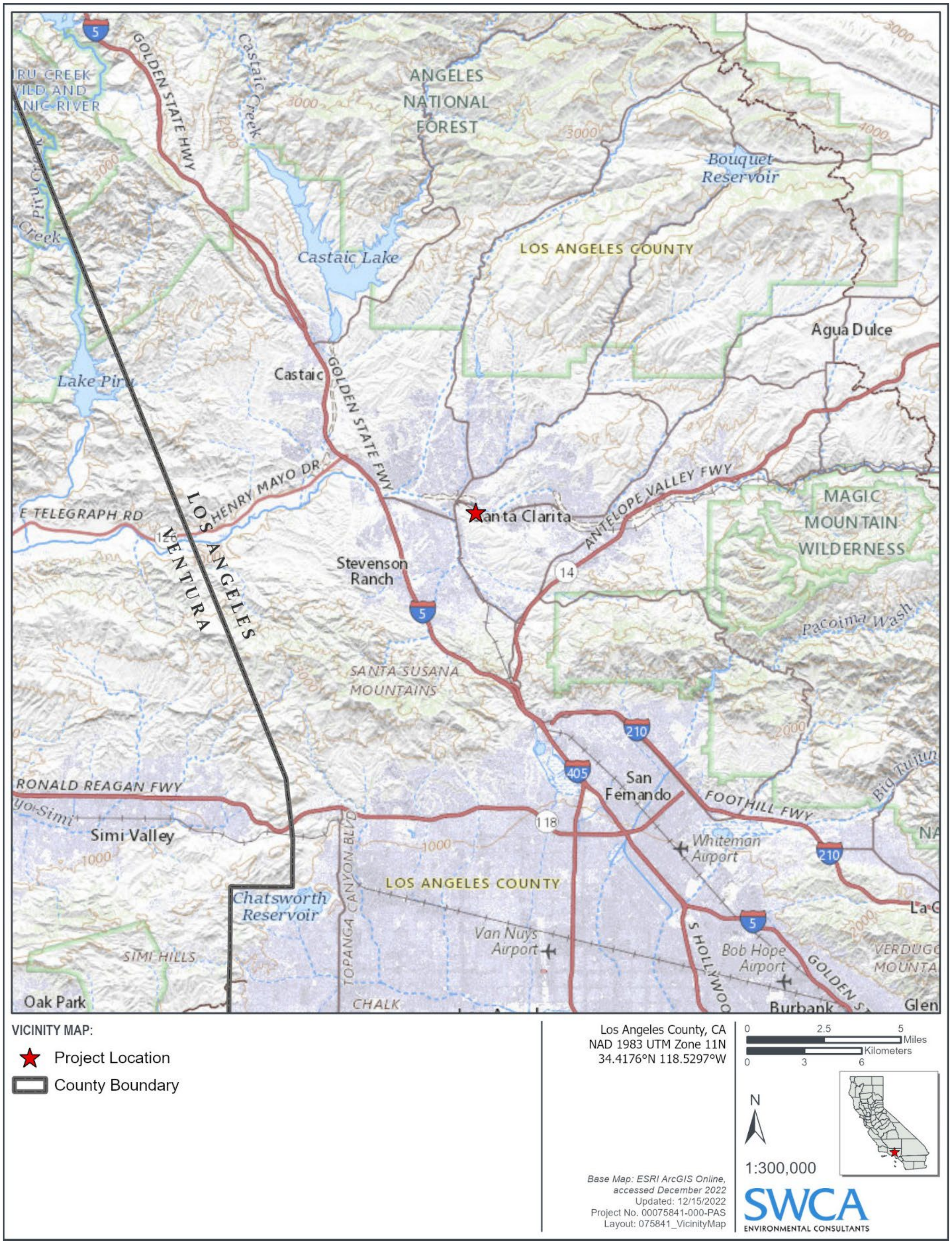

Figure 1. Project vicinity within the city of Santa Clarita, Los Angeles County.

Figure 2. Project site plotted on an aerial photograph.

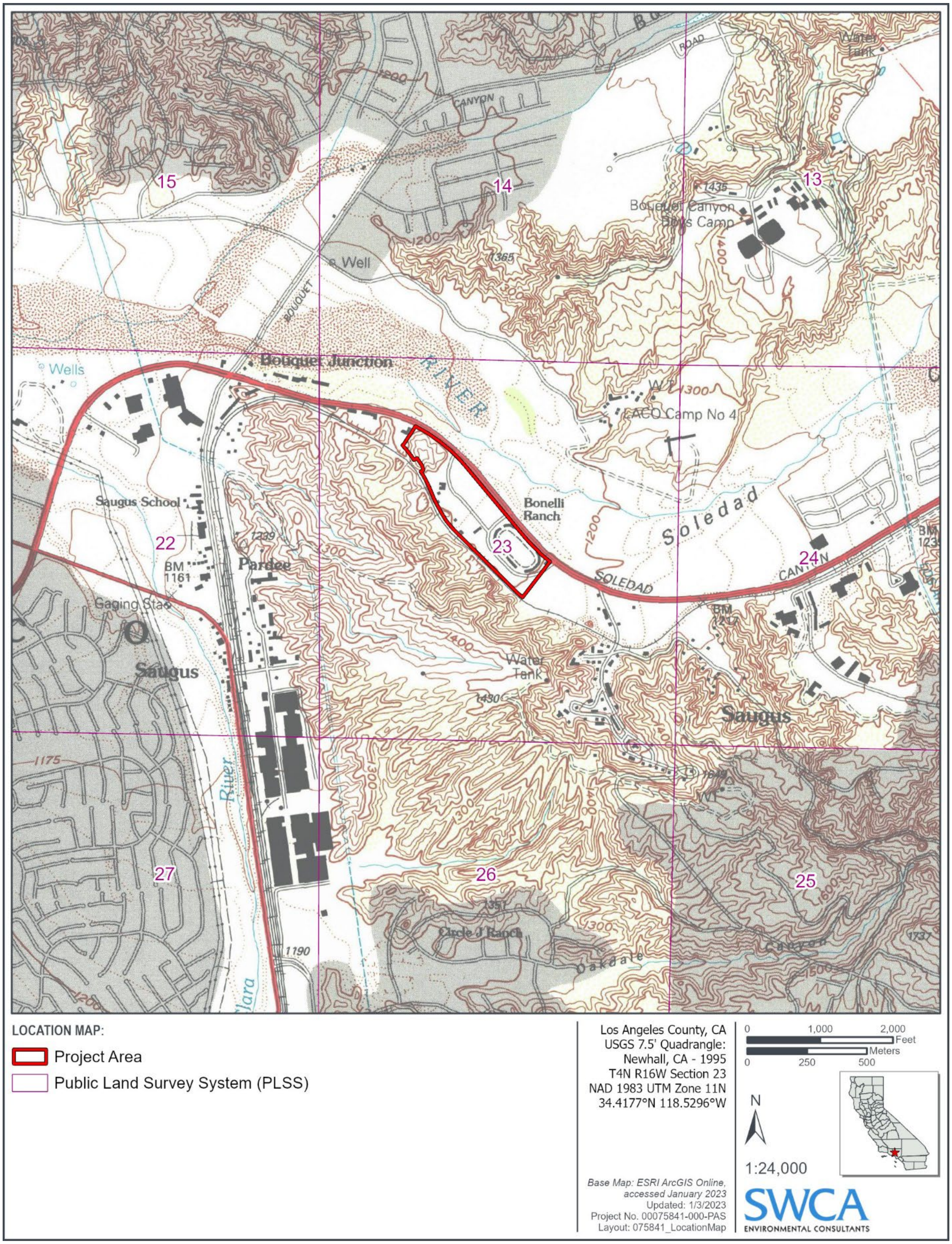

Figure 3. Project site plotted on the Newhall, California (1995), USGS 7.5-minute topographic quadrangle.

The proposed project includes a Tentative Tract Map that would subdivide the lot into five Planning Areas, including a residential component and a commercial component. As part of the proposed project, a total of 318 single-family attached and detached units would be constructed, along with 67,692 square feet (sf) of studio buildings and 2,000 sf of office space. A portion of the residential units would be considered low income. A total of 819 residential and 412 commercial parking spaces would be provided. Commercial areas would include studio buildings and office space. The proposed project would also involve construction of roadways internal to the project site. Improvements would be made to infrastructure along Soledad Canyon Road and Commuter Way during construction. Access to the project site would be provided by two access driveways along Soledad Canyon Road. One driveway would provide access to the commercial areas, and the other would be a driveway entrance off Commuter Way.

Ground-disturbing activities for the proposed project would require approximately 500,000 cubic yards of cut and approximately 420,000 cubic yards of fill. Equipment needed to complete the earthwork activities includes excavators, graders, rubber-tired dozers, scrapers, and tractors/loaders/backhoes. Based on the preliminary grading and drainage plans by Alliance Land Planning and Engineering, Inc. (2021), and the recommendations in the geologic and geotechnical engineering report by GeoSoils Consultants, Inc. (GSC) (2022), for the proposed project, grading activities will consist of lowering the isolated hill in the western portion of the project site by as much as 100 feet and subsequently raising the eastern portion of the project site with the graded material by approximately 10 to 11 feet. Over-excavation and subsequent backfilling with artificial fill would be required for the foundation of each building, varying in the maximum depth of ground disturbances between 5 feet below ground surface (bgs) and 15 feet bgs (or to the underlying Saugus Formation bedrock, present at depths as shallow as 30 feet bgs), depending on the final design and grading plans of the site improvements (GSC 2022).

PROFESSIONAL STANDARDS

The Society of Vertebrate Paleontology (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 closely 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 (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. 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.

REGULATORY SETTING

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

State Regulations

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects in the state and is codified at California Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine if 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 [CCR] 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.

California 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 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.

County of Los Angeles General Plan

The Conservation and Natural Resources Element of the *Los Angeles County General Plan 2035* (General Plan) (County of Los Angeles 2015) recognizes paleontological resources in Section VIII: Historic, Cultural, and Paleontological Resources, and aims to promote public awareness of their value and foster their public enjoyment. Therefore, the General Plan contains one goal (C/NR 14) aimed at the protection of historic, cultural, and paleontological resources, with the following four policies pertinent to paleontological resources:

- **Policy C/NR 14.1:** Mitigate all impacts from new development on or adjacent to historic, cultural, and paleontological resources to the greatest extent feasible.
- **Policy C/NR 14.2:** Support an inter-jurisdictional collaborative system that protects and enhances historic, cultural, and paleontological resources.
- **Policy C/NR 14.5:** Promote public awareness of historic, cultural, and paleontological resources.
- **Policy C/NR 14.6:** Ensure proper notification and recovery processes are carried out for development on or near historic, cultural, and paleontological resources.

METHODS

The following sections present an overview of the methodology used to analyze the potential for paleontological resources within the project site. This report conforms to industry standards as developed by the SVP (1995, 2010) and best practices in mitigation paleontology (Murphey et al. 2019).

Existing Data Analysis

SWCA conducted a review of geologic mapping, scientific literature, geotechnical data, and museum records search results. The geologic mapping used in this analysis (Campbell et al. 2014) is at a scale of 1:100,000 and is supplemented by scientific literature as well as the results of geotechnical investigations conducted by GSC (2022) for the project site. The museum records search was submitted to the NHMLA on December 12, 2022. The results of the museum records search (NHMLA 2022) were received on December 18, 2022, and are incorporated into the Results section of this technical memorandum and included in confidential Attachment A.

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. The SVP (2010:1–2) defines the following four categories of paleontological sensitivity for rock units:

> **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. 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.

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.

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 site is situated in the hills on the south side of Soledad Canyon next to the Santa Clara River along the border of the Ventura and Soledad basins within the greater Transverse Ranges Geomorphic Province (Transverse Ranges). The Transverse Ranges spans from Point Conception in Santa Barbara County eastward to the San Bernardino Mountains in San Bernardino County and consists of a complex series of young, east-west-trending mountain ranges and basins that contradict the general north-south orientation of California's other mountain ranges. The bedrock mountain ranges are separated by alluviated, broadly synclinal (i.e., folded) valleys, narrow stream canyons, and prominent faults (Norris and Webb 1990; Sylvester and O'Black Gans 2016). Structurally, the distribution and folding of the geologic units in the region have been widely influenced by movement and forces associated with the San Andreas Fault, as well as its former strands, resulting in the translation and rotation of the Transverse Ranges during the Miocene to Pleistocene (Campbell et al. 2014).

The western Ventura Basin and eastern Soledad Basin are separated by the San Gabriel Fault, which trends northwest-southeast along the eastern and southern borders of the project site. Combined, these basins span from the San Gabriel Mountains to the east and southeast, the Santa Monica Mountains and Simi Hills to the south, the San Andreas Fault to the northeast, and the Topatopa Mountains to the north (Campbell et al. 2014; Norris and Webb 1990). In general, these basins contain mainly middle and late Cenozoic nonmarine sedimentary rocks underlain by early Cretaceous and older crystalline basement rocks that extend from the San Gabriel Mountains to the south and metamorphic rocks from the Sierra Pelona to the north (Norris and Webb 1990). Both the Ventura and Soledad basins represent down-warped, large-scale synclinal structures characteristic of the Transverse Ranges that have been filled with thick accumulations of sediments throughout their geologic history (Winterer and Durham 1962).

During the Late Cretaceous to the middle Oligocene, subduction along the North American plate boundary resulted in deposition of marine sediments along a forearc basin in the area that would eventually become the Ventura and Soledad basins. During this time, the Ventura Basin lay under the sea and was dominated by marine sedimentary deposition, with the Soledad Basin representing a nonmarine extension of the Ventura Basin (Norris and Webb 1990). However, in the late Oligocene, the Soledad Basin was cut off from the Ventura Basin, resulting in the development of closed basins of saline lakes within the Soledad Basin (Norris and Webb 1990). Hills along the south side of the Santa Clara River Valley were also folded and uplifted during the Miocene due to movement along the San Gabriel and San Andreas Faults. By the close of the Miocene, connectivity to the seaway was reestablished, with the sea reaching into the western reaches of the Soledad Canyon and persisting until the early Pliocene (Norris and Webb 1990). At the end of the Pliocene, the sea had withdrawn, and terrestrial clastic sediments derived from the erosion of the neighboring ranges and tributaries of the Santa Clara River filled the basins during the Pleistocene and Holocene.

Local Geology and Paleontology

Geologic mapping by Campbell and others (2014) indicates the surficial sediments within the project site are Holocene and late Pleistocene young alluvium, undivided (Qya) and Pleistocene to late Pliocene Saugus Formation, undivided (QTs). Although not mapped at the surface within the project site by Campbell and others (2014), Holocene wash deposits (Qw) are mapped at the surface within the Santa Clara River channel immediately adjacent to the project site along its northern boundary; Pleistocene old alluvium, undivided (Qoa) is mapped at the surface approximately 0.5 mile northeast of the project site on the northside of the Santa Clara River; and middle Pleistocene Pacoima Formation (Qpa) is mapped at the surface on the southwest-facing slopes of the hills located near the southwestern boundary of the project site. Based on the stratigraphy of the geologic units, the location of their surface exposures in the immediate vicinity, the results of the geotechnical investigation, and the position of the San Gabriel Fault cutting through the southern project site, Qw and Qpa are unlikely to be encountered at the surface or at depth within the project site and are not discussed in further detail in this report. However, Qoa (or similar unspecified Pleistocene-age deposits) may be present at depth underlying Qya deposits and overlying QTs. Note that the geotechnical investigation of the project site by GSC (2022) cites geologic mapping by Dibblee and Ehrenspeck (1996). Because these two maps present similar geologic unit boundaries and geologic descriptions, SWCA has chosen to use the more recent mapping of Campbell and others (2014). Additionally, the results of the geotechnical investigation (GSC 2022) indicate the presence of Recent artificial fill (af in GSC [2022]) and Holocene and late Pleistocene landslide deposits (Qls in GSC [2022]) at the surface to shallow depths within the project site; however, af and Qls are not mapped at the surface within the project site or its immediate vicinity (i.e., 0.5-mile buffer) in Campbell and others (2014).

The geologic units present at the surface or in the subsurface of the project site, including af, Qls, Qya, and QTs, are summarized below in youngest to oldest geochronological order and are shown in Figure 4.

Recent Artificial Fill (af)

Based on the results of geotechnical investigation (GSC 2022), exposures of af are present at the surface to shallow depths, particularly around the southwestern boundary of the project site along the base of the adjacent hillside. The artificial fill was likely deposited during construction of the Southern Pacific Railroad and Soledad Canyon Road on the southwest and northeast, respectively. GSC (2022) described the af as brown, loose to moderately dense, fine- to medium-grained silty sand, with asphalt and other debris, that is present from the surface to depths of 6 feet bgs; however, the logs from the geotechnical boreholes situated near the center of the project site indicate that af may be completely absent, with Qay deposits immediately below the 2-inch-thick asphalt in that area.

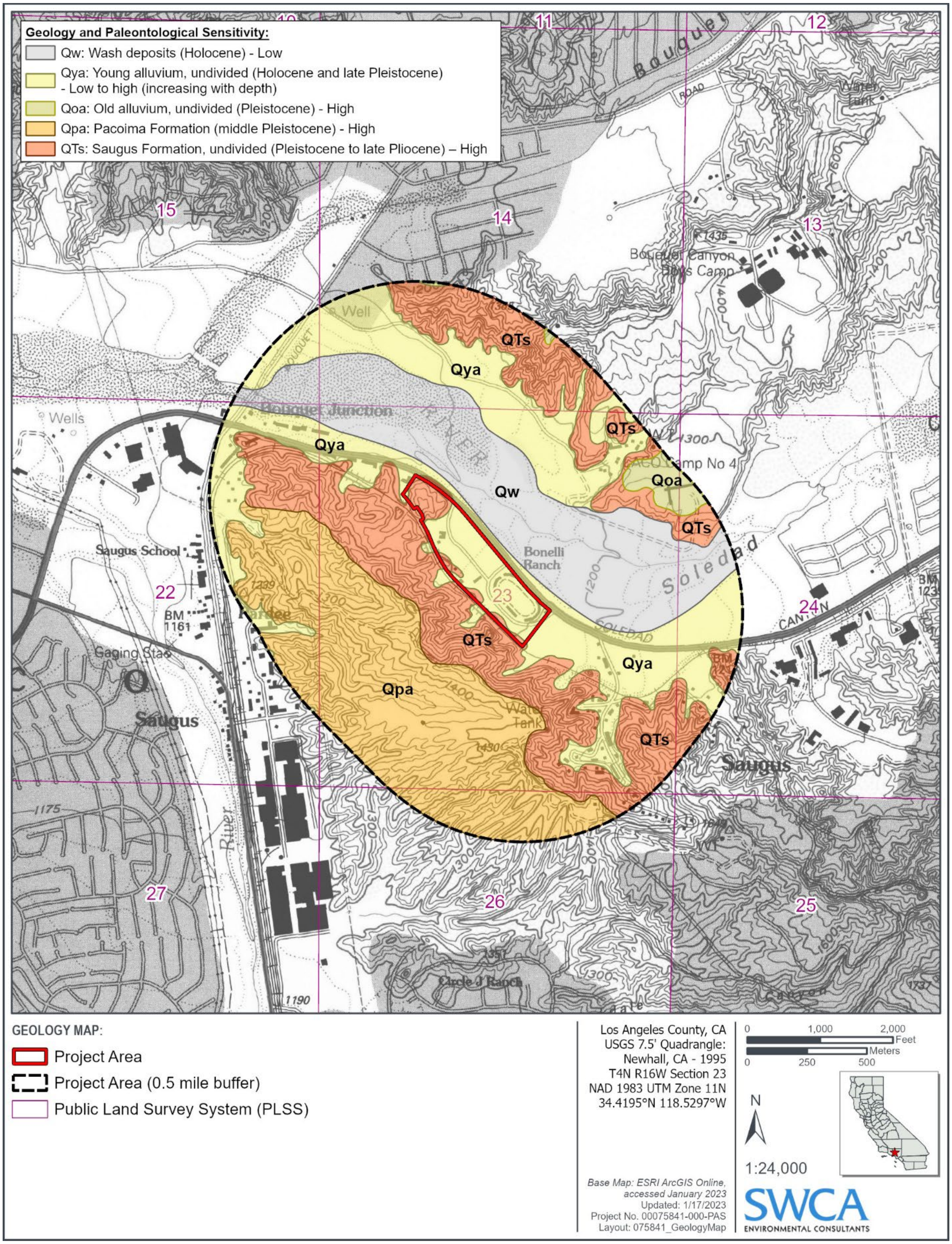

Figure 4. Geology and paleontological sensitivity of the project site.

Because af consists of reworked or imported sediments, it could contain fossils; however, any fossils that may be present (if intact) have lost their original stratigraphic, taphonomic, or paleoenvironmental contexts (i.e., provenance), making them scientifically of lesser value. Due to the lack of provenance, af is unlikely to contain scientifically significant paleontological resources. However, af is underlain by previously undisturbed “native” geologic units that may have the potential to contain significant paleontological resources.

Holocene and Late Pleistocene Landslide Deposits (Qls)

Although not mapped at the surface by Campbell and others (2014) or by Dibblee and Ehrenspeck (1996), within the project’s vicinity (0.5-mile buffer), GSC (2022) identified Qls at the surface in one small, isolated location along the western-most portion of the project site at the base of the east-facing slope (at the “notch” in the western project boundary). In general, Qls vary from poorly sorted and disrupted mixtures of rock fragments and soil to relatively intact bedrock slump blocks deposited as a result of debris flows and mass wasting. Because of the high-energy conditions in which Qls form, these deposits are unlikely to contain intact paleontological resources that have retained their provenance. Due to the lack of provenance, Qls is unlikely to contain scientifically significant paleontological resources. However, Qls is underlain by previously undisturbed “native” geologic units that may have the potential to contain significant paleontological resources. GSC (2022) does not provide an estimate of the thickness of this geologic unit (i.e., the depth to the underlying Qya deposits), but it is presumably thin (e.g., less than 5 feet thick) based on its finite extent at the surface, isolation along the base of the east-facing slope, and planned removal during earthwork activities.

Holocene and Late Pleistocene Young Alluvium, Undivided (Qya)

According to geologic mapping by Campbell and others (2014), Qya is mapped at the surface throughout most of the project site (see Figure 4). As previously mentioned, af is present to variable extents along the edge of the project site, varying from completely absent to present at the surface to depths of 6 feet bgs, underlain by Qya. Regionally, Campbell and others (2014) describe Qya as unconsolidated, generally friable, stream-deposited silt, sand, and gravel on floodplains, with local alluvial fans and streambeds. Locally, GSC (2022) refined this geologic description as interbedded yellow-brown, brown, or gray-brown silty sand, sand, and gravelly sand, extending to depths of 30 feet bgs near the southwestern boundary of the project site (closer to the hillside) to as much as 45 feet bgs near the center of the project site. GSC (2022) does not differentiate the age of (or subdivide) alluvial deposits as “young” (e.g., Qya) or “old” (e.g., Qoa), but it is possible that Qya transitions to Qoa at some depth between the surface and the underlying QTs present at depths 30 to 45 feet bgs (see below).

The age of Qya spans from the Holocene to late Pleistocene. Late Holocene (i.e., less than 5,000 years old) deposits are typically too young to contain significant fossils (SVP 2010); however, they may grade at depth to middle to early Holocene and/or Pleistocene deposits, or directly overlie discrete older geologic units that are of an appropriate age to contain significant fossils. The depth of this transition is unknown but may be as shallow as 5 feet bgs (where not overlain by af or Qls) based on the proximity to the adjacent hillside with surface exposures of QTs that extend at moderate depths (i.e., 30 to 45 feet bgs) below the Qya within the project site, as well as the presence of Qoa exposed at the surface on the northside of the Santa Clara River approximately 0.5 mile to the northeast of the project site (see Figure 4). In general, undifferentiated alluvial sediments of middle to early Holocene and Pleistocene age have a rich fossil history in southern California (Jefferson 1991a, 1991b; McDonald and Jefferson 2008; Miller 1971; Reynolds and Reynolds 1991; Springer et al. 2009). The most common fossils of this age include the bones or teeth of terrestrial taxa, such as mammoth, bison, deer, and small mammals, but also the remains of other taxa, including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, giant ground sloth, reptiles, snakes, frogs, and salamanders (Graham and Lundelius 1994; Hudson and Brattstrom 1977).

Pleistocene to late Pliocene Saugus Formation, Undivided (QTs)

According to geologic mapping by Campbell and others (2014), QTs is mapped at the surface within the northwestern-most portion of the project site and along its southwestern boundary (see Figure 4). Additionally, where the surface of the project site is mapped as Qya, GSC (2022) noted the presence of QTs at depths of 30 to 45 feet bgs, underlying Qya.

The age of QTs varies throughout its extent and may be as old as late Pliocene, especially along the eastern extent of the Ventura Basin (Campbell et al. 2014; Dibblee and Ehrenspeck 1996; Winterer and Durham 1962). In the hills within and surrounding the project site, QTs consists of reddish brown, brown, light gray, or yellowish gray; weakly to moderately cemented; thickly bedded, massive, fine- to coarse-grained sandstone interbedded with silty sandstone, clayey sandstone, any pebble conglomerate (Campbell et al. 2014; GCS 2022). Generally, QTs is moderately sorted and commonly cross-bedded and channeled, with interbedded poorly sorted sandy mudstone and local claystone seams (Campbell et al. 2014). Geologists consider QTs deposited mostly in a nonmarine depositional environment, with local shallow marine interbeds near its base (Winterer and Durham 1962). Clasts within QTs consist of plutonic, metamorphic, and volcanic rock fragments originating from the San Gabriel Mountains on the south, as well as metamorphic schist fragments originating from the Sierra Peloma on the northeast (Campbell et al. 2014; Norris and Webb 1990). Near the margins of the eastern Ventura Basin, QTs unconformably overlies strata of the older middle Pleistocene to Pliocene Pico Formation (not exposed at the surface with the project's immediate vicinity) and unconformably underlies Qpa, exhibiting distinct angular discordance with the latter (Campbell et al. 2014). Note that Qpa is mapped at the surface by Campbell and others (2014) on the southwest facing slope of the hills, situated along the southwestern border of project site. Based on the stratigraphy of the geologic units, the location of their surface exposures in the immediate vicinity, the results of the geotechnical investigation, and the position of the San Gabriel Fault cutting through the southern project site, Qpa is unlikely to be encountered within the project site underlying Qya and/or overlying QTs. The overall thickness of QTs varies considerably across its extent in the Ventura Basin, varying between approximately 200 feet thick near Camarillo to 12,000 feet thick near the San Fernando Pass (Campbell et al. 2014).

QTs contains numerous fossil localities yielding horse, tapir, deer, camel, canine, rabbit, rodent, bird, lizard, invertebrate, and plant fossils in the vicinity of the project site (Axelrod and Cota 1993; Geiger and Groves 1999; Groves 1991; NHMLA 2022; Oakeshott 1950; Paleobiology Database 2022; University of California Museum of Paleontology 2022; Winterer and Durham 1962; Yeats and McLaughlin 1970).

Museum Records Search

The NHMLA (2022) performed a museum records search for paleontological localities within the vicinity of the project site. Based on the results of the museum records search, the NHMLA (2022) does not contain records of paleontological resources from within the project site; however, several vertebrate fossil localities have been recorded within the vicinity of the project site from QTs. The results of the museum records search from the NHMLA (2022) are summarized in Table 1 and included in confidential Attachment A.

Table 1. NHMLA Fossil Localities near the Project Site from Relevant Geologic Units

Locality Number	Approximate Distance to the Project Site	Formation	Taxa	Depth (Below Ground Surface)
LACM VP 6804	1.75 miles	Saugus Formation	Horse (Equidae)	Surface
LACM VP 7988, 7989	1.85 miles	Saugus Formation	Packrat (*Neotoma*), squirrel (*Sciuridae*), deer mice (*Peromyscus*), kangaroo rat (*Heteromyidae*), finch (*Fringillidae*)	Unknown
LACM VP 6063	5.60 miles	Saugus Formation	Horse (*Plesippus*)	Unknown
LACM VP 6062	6.10 miles	Saugus Formation	Anguid lizard (*Gerrhonotus*); rabbit (*Leporidae*), pocket gopher (*Thomomys*), pocket mouse (*Perognathus*)	Unknown
LACM VP 5745	7.65 miles	Unspecified Pleistocene-age deposits	Mastodon (*Mammut*); horse (*Equus*)	Unknown
LACM VP 3397	13.60 miles	Unspecified Pleistocene-age deposits	Bison (*Bison*)	75 feet

Source: NHMLA (2022)

Paleontological Potential of the Project Site

Based on the results of this assessment, SWCA assigned paleontological sensitivity classes to the geologic units within the project site. Although capable of preserving fossils, af has a low paleontological sensitivity since any fossil discovered would lack provenance (SVP 2010). Likewise, Qls also has a low paleontological sensitivity since fossils recovered from landslide clasts would lack provenance and/or may be destroyed during mass wasting (SVP 2010). However, both af and Qls may be directly underlain by “native” geologic units capable of preserving fossils (see above). Qya may be too young (e.g., late Holocene, less than 5,000 years) in its uppermost sediments to yield scientifically significant fossils but may transition at shallow depth (e.g., 5 feet bgs where not overlain by af or Qls) to middle to early Holocene and/or Pleistocene deposits (either middle to early Holocene- and late Pleistocene-aged Qya and/or Pleistocene-aged Qoa) that are capable of preserving significant fossils. Therefore, Qya has a low to high (increasing with depth) paleontological sensitivity (SVP 2010). QTs whether present at/near the surface along the hills or at moderate (e.g., 30 feet bgs) depth, is known for yielding scientifically significant paleontological resources. Therefore, QTs has a high paleontological sensitivity (SVP 2010).

IMPACT ASSESSMENT

SWCA conducted this assessment to determine the potential for significant impacts to paleontological resources resulting from ground-disturbing activities associated with the project’s implementation or construction. Ground-disturbing activities for the proposed project would require approximately 500,000 cubic yards of cut and approximately 420,000 cubic yards of fill. Additionally, grading activities will consist of lowering the isolated hill in the western portion of the project site by as much as 100 feet, subsequently raising the eastern portion of the project site with the graded material by approximately 10 to 11 feet. Over-excavation and subsequent backfilling with artificial fill would be required for the foundation of each building, varying in the maximum depth of ground disturbances between 5 feet bgs and 15 feet bgs (or to the underlying QTs bedrock, present at depths as shallow as 30 feet bgs), depending on the final design and grading plans of the site improvements (GSC 2022).

Based on the results of this study, ground disturbances in af, in previously disturbed sediments, or in scant Qls deposits, regardless of depth, are unlikely to result in adverse effects. However, ground-disturbing activities in previously undisturbed sediments at depths greater than or equal to 5 feet bgs in areas mapped as Qya, or in previously undisturbed sediments at any depth in areas mapped as QTs at the surface (see Figure 4), may impact geologic units of relatively high paleontological sensitivity and result in adverse effects to significant paleontological resources. Should significant fossils be encountered during ground-disturbing activities, they would be at risk for damage or destruction, which would constitute an impact under CEQA.

CONCLUSIONS AND RECOMMENDATIONS

SWCA conducted this paleontological resources assessment to determine the potential for adverse effects to significant paleontological resources. Based on the results of this study, ground-disturbing activities in af, previously disturbed sediments, and Qls (regardless of depth), or sediments less than 5 feet bgs in areas mapped as Qya, are unlikely to result in adverse effects. However, ground-disturbing activities greater than or equal to 5 feet bgs in areas mapped at the surface as Qya may result in adverse effects to significant paleontological resources. Moreover, ground-disturbing activities in areas mapped at the surface as QTs (regardless of depth) may also result in adverse effects to significant paleontological resources. Should significant fossils be encountered during ground-disturbing activities in these areas, they would be at risk for damage or destruction and would constitute an 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 have been developed in accordance with and incorporate 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:** A Project Paleontologist, defined as one who meets the SVP standards for a qualified professional paleontologist, should be retained to carry out all regulatory compliance measures and protocols related to paleontological resources.
2. **Conduct Worker Training:** The Project 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 ground-disturbing work commences and should include handouts to be given to new workers as needed.
3. **Monitor for Paleontological Resources:** Full-time monitoring should be required in areas mapped as Qya when ground-disturbing activities impact previously undisturbed sediments greater than or equal to 5 feet bgs, or in areas mapped as QTs (regardless of depth). Monitoring should not be required when ground-disturbing activities impact only af, previously disturbed sediments, and Qls (regardless of depth), as well as in areas mapped as Qya at depths less than 5 feet bgs.

   Monitoring should be conducted by a paleontological monitor who meets the standards of the SVP (2010) and should be supervised by the Project Paleontologist, who 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 Project Paleontologist in consultation with the Applicant and the City. 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 ground-disturbing activities, the Project Paleontologist overseeing paleontological monitoring should prepare a final paleontological resources 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 report and any associated data pertinent to the curated specimen(s) should be submitted to the designated repository. A copy of the final report should be filed with the City.

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ATTACHMENT A

Natural History Museum of Los Angeles County
Paleontological Records Search

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