PALEONTOLOGICAL ASSESSMENT FOR THE POLARIS PLACE PROJECT

CITY OF ALISO VIEJO, ORANGE COUNTY, CALIFORNIA

APNs 623-481-49 to -53

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May 6, 2026

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Paleontological Database Information

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Report Title:	Paleontological Assessment for the Polaris Place Project, City of Aliso Viejo, Orange County, California, APNs 623-481-49 to -53
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Prepared for:	City of Aliso Viejo 12 Journey, Suite 100 Aliso Viejo, California 92656
Assessor's Parcel Numbers:	623-481-49 to -53
USGS Quadrangle:	Township 7 South, Range 8 West on the USGS *San Juan Capistrano, California* (7.5-minute) topographic quadrangle
Study Area:	Approximately 22.5 acres
Key Words:	Paleontological assessment; Monterey Formation; high paleontological sensitivity; monitoring recommended.

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I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the Polaris Place Project to comply with the California Environmental Quality Act (CEQA) and City of Aliso Viejo environmental requirements. The project is located at 1 through 5 Polaris Way, east of the intersection of Aliso Viejo Parkway and State Route 73, in the city of Aliso Viejo, Orange County, California (Figures 1 and 2). The approximately 22.5-acre project consists of five parcels (Assessor's Parcel Numbers [APNs] 623-481-49 to -53) and is situated within an unsectioned area of Township 7 South, Range 8 West, on the United States Geological Survey (USGS) *San Juan Capistrano, California* (7.5-minute) topographic quadrangle map (see Figure 2). The project is currently developed as Polaris Place, a commercial business park that includes five buildings, a courtyard, and a parking lot with associated landscape, hardscape, and infrastructure. The five buildings are associated with addresses 1 through 5 Polaris Way. As proposed, the project applicant plans to demolish the existing buildings for the construction of a new multi-family residential development, with associated hardscape, landscape, and infrastructure (Figure 3).

Zepeda et al. (2026) recommended the removal and recompaction of weathered and disturbed fill materials and near-surface bedrock as part of overall remedial grading at the project. In general, they anticipated remedial removals and/or over-excavations to be three feet below existing grades or below design grades, whichever is lower.

As the lead agency, the City of Aliso Viejo has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area, a review of the underlying geology, and recommendations to mitigate impacts to potential paleontological resources, if necessary. A paleontological survey of the project was not performed, since the parcels are completely developed.

II. REGULATORY SETTING

CEQA, which is patterned after the National Environmental Policy Act, is the overriding regulation that sets the requirement for protecting California's cultural and paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact on the environment, determine whether the impacts are significant, and provide recommendations, if necessary.

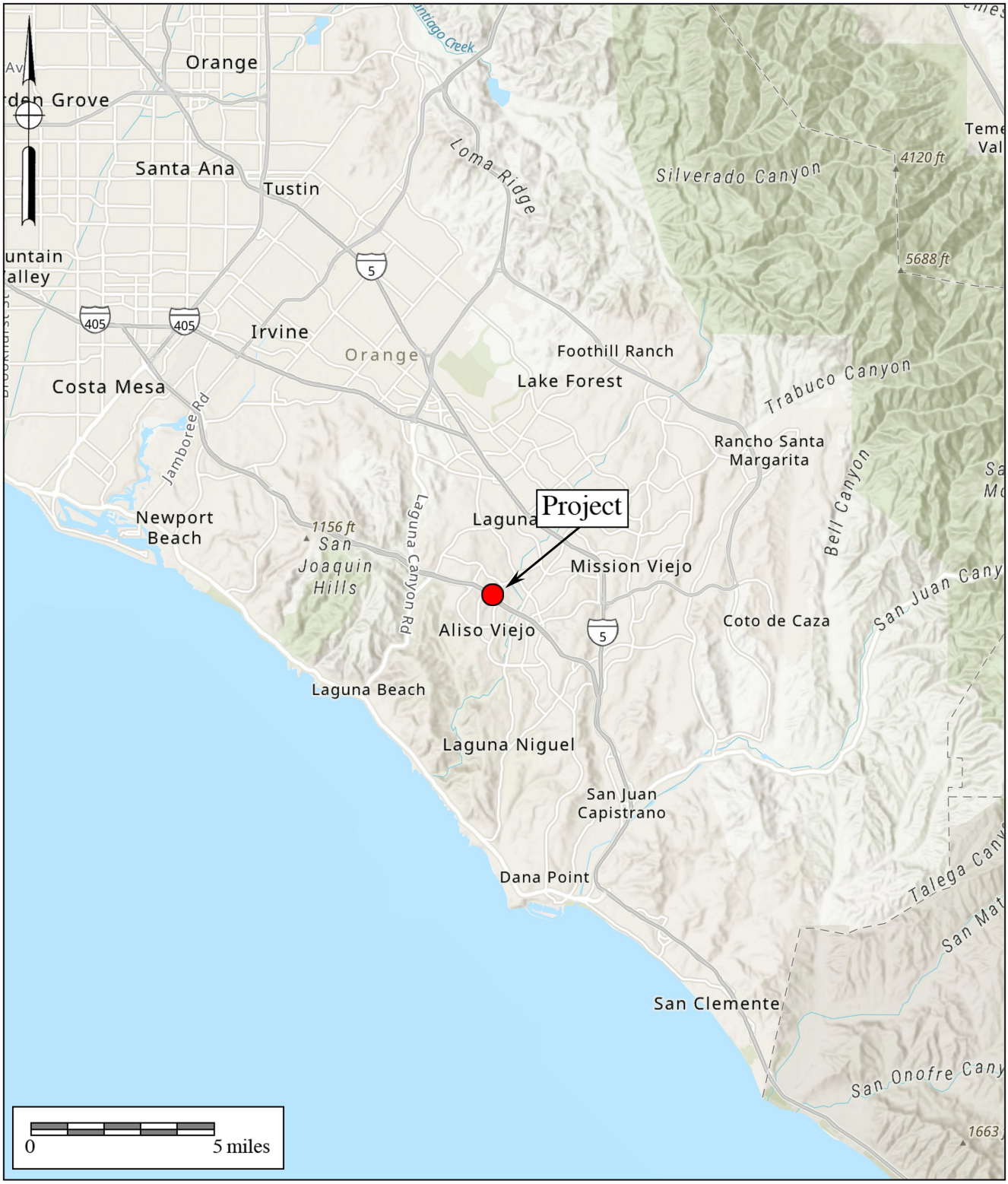

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Figure 1

General Location Map

The Polaris Place Project

Esri Street Map

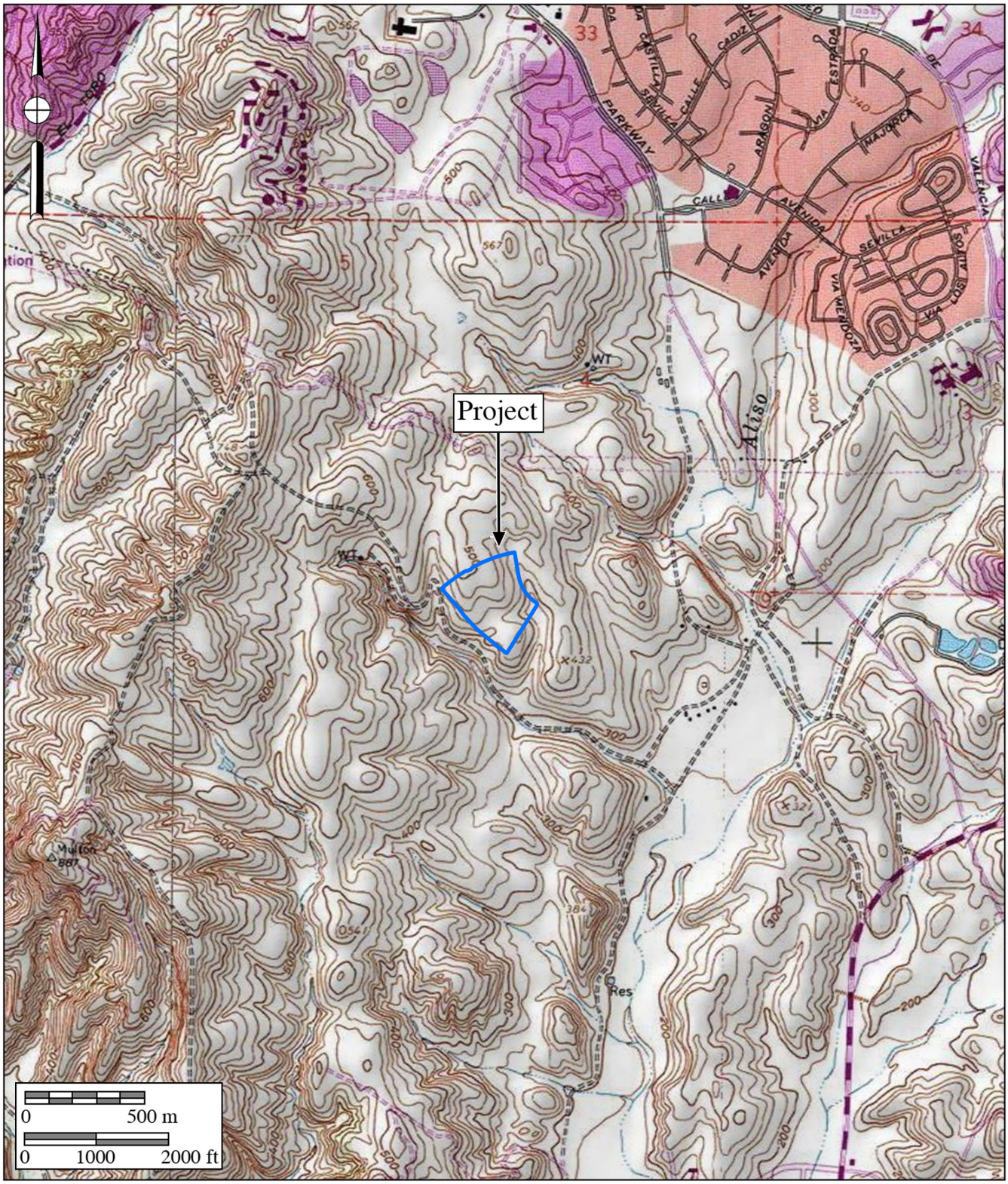

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Figure 2

Project Location Map

The Polaris Place Project

USGS *San Juan Capistrano* Quadrangle (7.5-minute series)

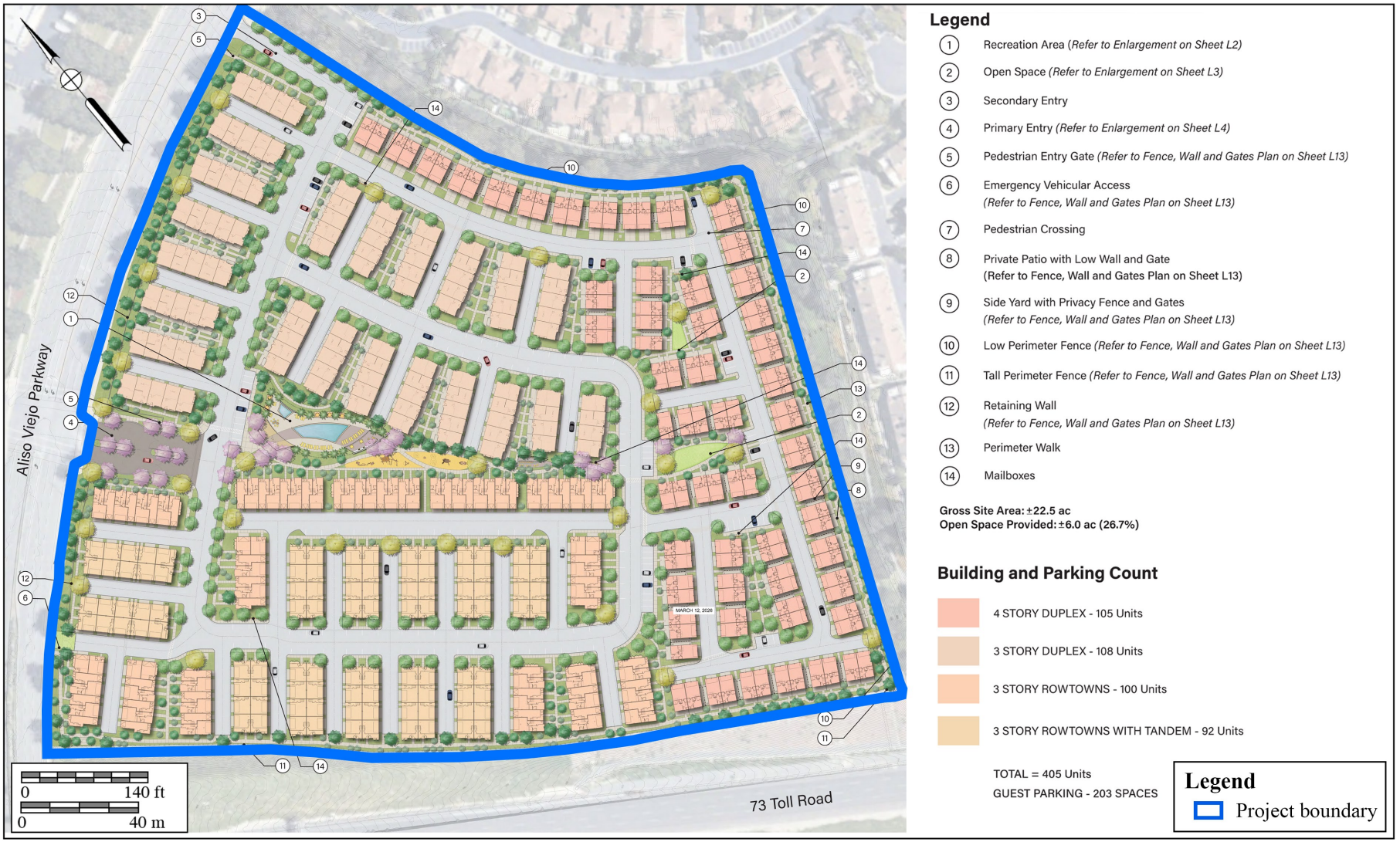

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Figure 3
Project Development Map
The Polaris Place Project

In CEQA's Environmental Checklist Form, a question to respond to is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law which protects nonrenewable resources, including fossils, paraphrased below:

a) A person shall not 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, rock art, 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.
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.
c) A violation of this section is a misdemeanor.

City of Aliso Viejo

According to the General Plan of the City of Aliso Viejo, "the City will review future development proposals to ensure that cultural and historic [and paleontological] resources are conserved in compliance with this Element and the requirements of the CEQA" (City of Aliso Viejo 2004: COS-23).

III. GEOLOGY

The project lies within the San Joaquin Hills, a low mountain range characterized by multiple, mostly marine, Cenozoic geologic formations. The project area slopes eastward from the San Joaquin Hills towards Aliso Creek, located east of the property. As a result of prior development, the majority of the property is relatively flat, with an average elevation of approximately 435 feet above mean sea level. The geologic unit mapped at the project is the Miocene-aged (approximately five- to 15-million-year-old) Monterey Formation, composed of siliceous and diatomaceous marine siltstones and sandstones ("Tm" in Figure 4, after Morton and Miller 2006). The Monterey Formation is fossiliferous (Eisentraut and Cooper 2002; Morton and Miller 2006; Kennedy and Tan 2007).

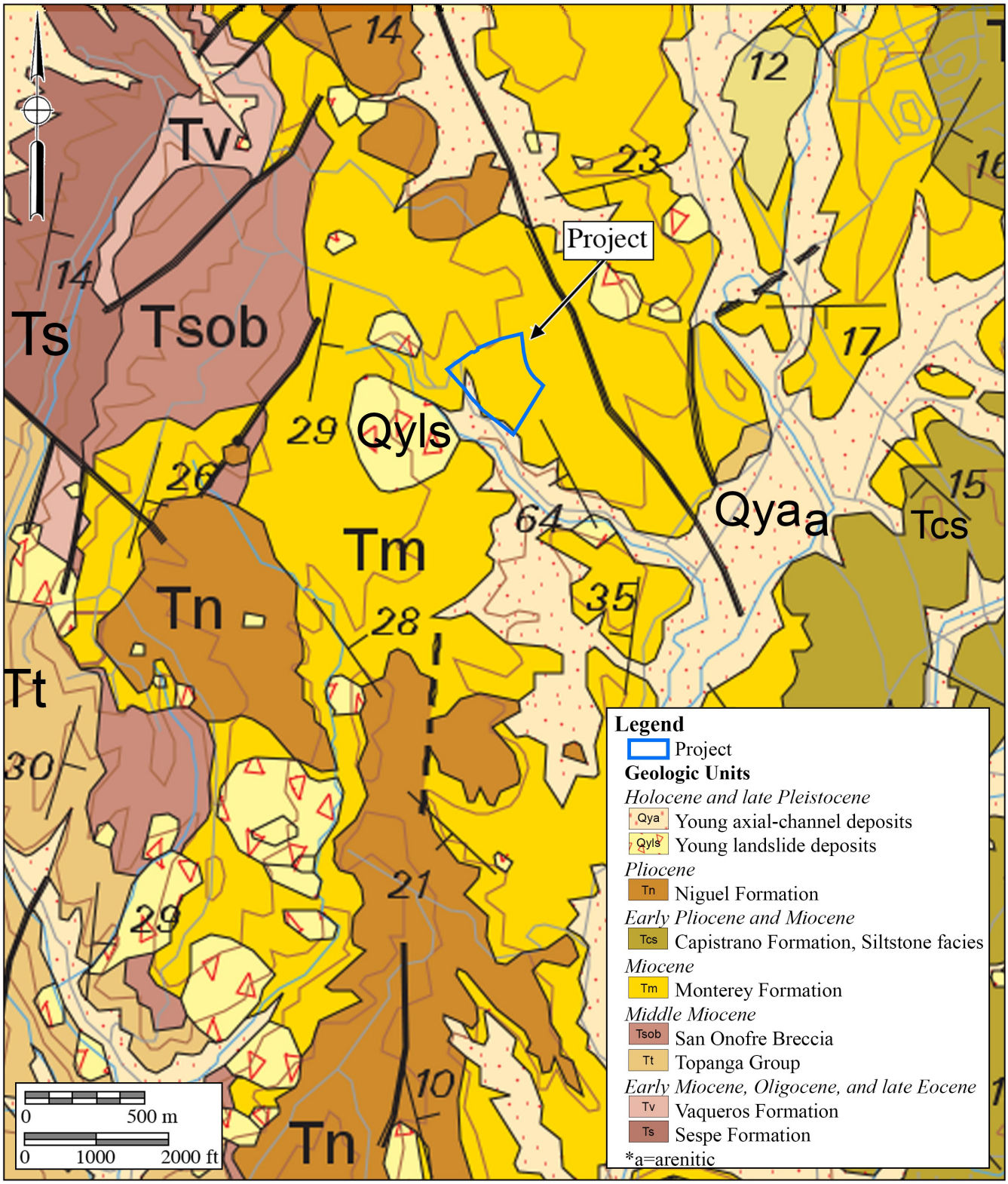

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Figure 4

Geologic Map

The Polaris Place Project

Geology after Morton and Miller (2006)

A geotechnical investigation for the project was recently completed by SA Geotechnical, Inc. (Zepeda et al. 2026). Their investigation indicated that "[t]he subject site is underlain by compacted artificial fill materials and bedrock of the Monterey Formation as a result of mass grading in the late 1980s. The north/northwestern portion of the site is underlain by Monterey Formation bedrock at or near existing grades. The south/southeastern portion of the site was brought to current grades with compacted fill (overlying bedrock), ranging in thickness from 2.5 to 47.5 feet thick. The Monterey Formation bedrock generally consisted of white, yellowish brown, gray, olive brown, and pale brown siltstone that was…. diatomaceous. Bedding was observed in the samples to be generally well bedded/laminated and highly variable across the site. The artificial fill materials generally consisted of olive gray, olive brown, reddish brown, yellowish brown, and brown clayey silt, silty clay, clayey sand, and silty sand…. The fine-grained fill materials are generally derived from the Monterey Formation and were found to be diatomaceous."

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2025) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat. Fossils are considered a nonrenewable resource under state and local guidelines (see Section II of this report).

Paleontological Resource Records Search

A paleontological locality and records search was conducted by the OC Parks Division of Orange County for a prior nearby project located at the southern side of Pacific Park Drive between Journey and Aliso Creek Road, about one mile to the south of the current project (Gelnaw 2025). The records search indicates that within one mile of the project, there are as many as 66 fossil localities with 3,613 cataloged fossils that represent mammals, birds, reptiles, and invertebrates from the Niguel, Monterey, and other formations. Many are associated with the construction of the State Route 73 toll road.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that may have become fossilized over time. The Monterey Formation has an extensive fossil record in Orange County and in the San Joaquin Hills (SCGS 2006; Rugh 2018; Parham et al. 2022; Gelnaw 2025).

Professional Standards

The Society of Vertebrate Paleontology (2025) has put forth the guideline criteria, a "Fossil Prediction Map System" (FPMS), which include six categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *5 = Very High Potential:* Highly fossiliferous geologic units that consistently and predictably preserve scientifically significant fossils.
- *4 = High Potential:* Highly fossiliferous geologic units that preserve scientifically significant fossils, but their concentrations vary and are less predictable than 5.
- *3 = Moderate Potential:* Fossiliferous geologic units that are often marine in origin and in which fossils may be common, but scientifically significant fossils are isolated or sparse.
- *2 = Low Potential:* Geologic units that are not likely to preserve fossils, including sedimentary deposits that are generally younger than 11,700 years before present, older sedimentary units that only rarely preserve fossils, or units that exhibit physical and chemical alteration (diagenetic changes) that make fossil preservation unlikely.
- *1 = Very Low Potential:* Geologic units that are not likely to contain recognizable fossils including Precambrian units and units that are igneous or metamorphic, excluding air-fall and reworked volcanic ash.
- *U = Undetermined Potential:* Geologic units that cannot be assigned an informed FPMS designation. This includes units that have not been subject to prior field surveys but that contain lithologies or preserve depositional settings that are known to be conducive to fossil preservation, units that have not been published in the scientific literature, and units in which reports of fossils have not been verified.

Based upon these criteria, the Monterey Formation mapped at the project has a high potential to contain paleontological resources. The artificial fill has no paleontological potential.

VI. CONCLUSIONS AND RECOMMENDATIONS

The Monterey Formation (bedrock) mapped at the project has a high potential to yield significant paleontological resources, based upon age, depositional environment, and extensive regional fossil records. Therefore, paleontological monitoring is recommended during earth disturbance activities within the bedrock, wherever it occurs beneath artificial fill soils. Monitoring grading within artificial fill or disturbed deposits is not recommended.

Based upon the conclusions and recommendations above, a Paleontological Resource Impact Mitigation Program (PRIMP) is warranted. The following PRIMP is suggested and, when approved by the City of Aliso Viejo and implemented, would reduce adverse impacts to potential paleontological resources to a level below significant.

Suggested PRIMP

1. All mitigation programs shall be performed by a qualified professional (project) paleontologist, defined as an individual with a master's or doctorate in paleontology or geology, who has proven experience and is knowledgeable in professional paleontological procedures and techniques. Fieldwork may be conducted by a qualified paleontological monitor, defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor shall always work under the direction of a qualified paleontologist.
2. Starting at one foot above the artificial fill/bedrock interface, full-time monitoring shall be conducted in areas of grading or excavation within the Monterey Formation. Monitoring grading within artificial fill or disturbed deposits that may be present is not required.
3. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays. The monitor must be empowered to temporarily halt or divert equipment to allow for the removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface or, if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. The monitor shall notify the project paleontologist, who will then notify any concerned parties of the discovery.
4. Paleontological salvage during trenching and boring activities is typically from the generated spoils and will not delay trenching or drilling activities. Fossils will be collected and placed in cardboard flats or plastic buckets and identified by field number, collector, and date collected. Before the site is vacated and the fossils are moved to a safe place, notes are taken on the map location and stratigraphy of the site. On mass grading projects, discovered fossil sites are protected by flagging to prevent them from being overrun by earthmovers (scrapers) before salvage begins. Fossils will be collected in a similar manner, with notes and photographs being taken before

removing the fossils. Precise location of the site is determined through the use of handheld Global Positioning System units. If a large terrestrial vertebrate, such as a large bone or a mammoth tusk, is too large to be easily removed by a single monitor, a fossil recovery crew shall excavate around the find(s), encase the find(s) within a plaster and burlap jacket, and remove the find(s) after the plaster is set. For large fossils, use of the contractor's construction equipment may be solicited to help move the jacket to a safe location.

5. In the laboratory, individual fossils will be cleaned of extraneous matrix, any breaks will be repaired, and the specimen, if needed, will be stabilized by soaking in an archivally approved acrylic hardener (*e.g.,* a solution of acetone and Paraloid B-72).
6. Recovered specimens will be prepared to a point of identification and permanent preservation (not display), including screen-washing sediments to recover small invertebrates and vertebrates. Preparation of individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.
7. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.,* the Orange County Parks' Cooper Center) shall be conducted. The paleontological program should include a written repository agreement prior to initiating mitigation activities. Prior to curation, the lead agency (the City of Aliso Viejo) will be consulted on the repository/museum to receive the fossil material.
8. A final report of findings and significance will be prepared, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). The report, when submitted to and accepted by the appropriate lead agency, will signify satisfactory completion of the project program to mitigate impacts to any potential nonrenewable paleontological resources (*i.e.,* fossils) that might have been lost or otherwise adversely affected without such a program in place.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief and have been compiled in accordance with CEQA criteria.



May 6, 2026

Todd A. Wirths, M.S., P.G. Date
Principal Paleontologist
California Professional Geologist No. 7588

VIII. REFERENCES

City of Aliso Viejo. 2004. City of Aliso Viejo General Plan: Conservation / Open Space Element. https://avcity.org/DocumentCenter/View/394/Conservation--Open-Space-Element-PDF.

Eisentraut, P.J. and Cooper, J.D. 2002. Final Report, Development of a model curation program for Orange County's Archaeological & Paleontological Collections. Unpublished report prepared for the County of Orange, Public Facilities and Resources Department, Harbors, Beaches and Parks, Santa Ana, California.

Gelnaw, W. 2025. Paleontological record search letter for the Journey and Pacific Park Drive Project. For BFSA Environnemental Services, Poway, California, by the OC Parks Division of Orange County.

Kennedy, M.P. and Tan, S.S. 2007. Geologic map of the Oceanside 30' X 60' quadrangle, California. U.S. Geological Survey, Regional Geologic Map Series, scale 1:100,000.

Morton, D.M. and Miller, F.K. 2006. Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey Open-File Report 06-1217, scale 1:100,000.

Parham, J.F., Barron, J.A., and Velez-Juarbe, J. 2022. Middle and late Miocene marine mammal assemblages from the Monterey Formation of Orange County, California, *in*, Aiello, I., Barron, J., and Ravelo, C., eds., Understanding the Monterey Formation and Similar Biosiliceous Units across Space and Time: Geological Society of America Special Paper 556.

Society of Vertebrate Paleontology. 2025. Best Practice Guidelines for Mitigation of Adverse Impacts on Paleontological Resources; by the SVP Government Affairs Committee. https://vertpaleo.org/wp-content/uploads/2025/10/SVP_Mitigation_Paleontology_Best_Practices_First_edition_October_2025.pdf.

SCGS (South Coast Geological Society). 2006. Geology of the Orange County Region, Southern California Field Trip Road Log, *in*, Bonsangue, J., and Lemmer, R., eds., Geology of the Orange County Region, Southern California. Annual Field Trip Guide No. 33, South Coast Geological Society, Inc., 331 p.

Rugh, N.S. 2018. A small invertebrate fauna from the middle Miocene Monterey Formation, including a possible new species of bivalve, in southern Orange County, California, *in*,

Miller, D.M., ed., Against the current: The Mojave River from Sink to Source. The 2018 Desert Symposium Field Guide and Proceedings, Desert Symposium, Inc.

Zepeda, A., Saberi, R., and Anderson, P. 2026. Geotechnical Subsurface Exploration and Preliminary Design Report, Proposed Residential Development, 1 through 5 Polaris Way, Vesting Tentative Tract Map No. 19477, City of Aliso Viejo, California. Prepared for Lennar, Irvine, California, by SA Geotechnical, Inc., Irvine, California.

APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

Principal Paleontologist

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Education

Master of Science, Geological Sciences **1995**

San Diego State University, California

Bachelor of Arts, Earth Sciences **1992**

University of California, Santa Cruz

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board Director, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2025 *Paleontological Monitoring Report for the Ontario Ranch Business Park Project, City of Ontario, San Bernardino County, California*. Prepared for Real Estate Developmental Associates, LLC.

2025 *Paleontological Assessment for the Irwindale Aggregates Project, 13550 Live Oak Avenue, Irwindale, Los Angeles County, California*. Prepared for Lilburn Corporation, Inc.

2025 *Paleontological Resource Impact Mitigation Program for the Canterwood 53 Project (BGR2400072; TTM 38332), Riverside County, California*. Prepared for KB Home Inland Empire Division.

2025 *Paleontological Monitoring Report for the Alberhill Tract 28214-9 Project, city of Lake Elsinore, Riverside County, California*. Prepared for Pulte Group.

2025 *Paleontological Assessment for the Quail Valley Nature Park Project, City of Menifee, Riverside County, California*. Prepared for EPD Solutions, Inc.

2025 *Paleontological Assessment for the Hesperia Gateway Project, City of Hesperia, San Bernardino County, California.* Prepared for T&B Planning.

2024 *Paleontological Resource Impact Mitigation Program for the 450 The Promenade North Project, City of Long Beach, Los Angeles County, California.* Prepared for JPI-West Region.

2024 *Paleontological Assessment for the Noble Creek Vistas SPA Project, Beaumont, Riverside County, California*. Prepared for EPD Solutions, Inc.

2024 *Paleontological Assessment for the High Desert Gas Station Project, Yucca Grove, San Bernardino County, California*. Prepared for Lilburn Corporation, Inc.

2024 *Paleontological Resource Impact Mitigation Program for the 424 Berry Way Project, Brea, Orange County, California*. Prepared for EPD Solutions, Inc.

2024 *Paleontological Monitoring Report for the Manchester Pacific Gateway/IQHQ RaDD Project, San Diego, California*. Prepared for Manchester Financial Group LP.

2024 *Paleontological Resource Impact Mitigation Program for the Vernola Ranch Project, Jurupa Valley, Riverside County, California.* Prepared for Lennar Homes of California.

2023 *Paleontological Assessment for the Kramer Junction Solar Project, Kramer Junction, San Bernardino County, California*. Prepared for San Bernardino CSG 3 LLC.

2023 *Paleontological Monitoring and Mitigation Plan for the Moss Street Beach Access Improvements Project, Moss Street Beach, City of Laguna Beach, California*. Prepared for the City of Laguna Beach.

2023 *Paleontological Monitoring Report for the 11th and Broadway Residential Towers Project, San Diego, California*. Prepared for Pinnacle International Development.

2023 *Paleontological Assessment for the Willow Street and Orange Avenue Project, City of Signal Hill, Los Angeles County, California*. Prepared for CenterPoint Properties.

2023 *Paleontological Resource Assessment Update for the Summerwind Ranch Specific Plan Amendment, Phases 2-5, Calimesa*. Prepared for Jen So Cal 2, LLC.

2023 *Paleontological Resource Impact Mitigation Program for the Palisade Temescal Canyon Project, Riverside County, California, PPT220036, BGR2300031, BGR2300032*. Prepared for North Palisade Partners, LLC.