Appendix H

Paleontological Technical Report

ESA

Royal Vista Residential Project, Unincorporated Los Angeles County, California

Paleontological Resources Assessment

Prepared for
RV DEV, LLC
4 Park Plaza, Suite 700
Irvine, CA 92614

February 2023

ESA

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Project Director:
Monica Strauss, M.A., RPA

Principal Investigator and Author:
Russell Shapiro, Ph.D.

Project Location:
Yorba Linda (CA) USGS 7.5-minute Topographic Quad
Township 2 South, Range 9 West, Unsectioned

Acreage: Approx. 75.23 acres

Assessor Parcel Numbers: 8762-022-002, 8762-023-001, 8762-023-002, 8762-027-039, 8764-002-005, and 8764-002-006

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EXECUTIVE SUMMARY

Royal Vista Residential Project – Paleontological Resources Assessment

Environmental Science Associates (ESA) has been retained by RV DEV, LLC to prepare a paleontological resources assessment report for the Royal Vista Residential Project (Project) in support of an Environmental Impact Report (EIR). The proposed Project proposes to redevelop six parcels on a portion of the existing Royal Vista Golf Club golf course into four residential planning areas and two open space planning areas. Three of the residential planning areas (Planning Areas 1, 2, and 5) would include 200 detached single-family residential (SFR) units on individual lots and 88 duplex and triplex units. The fourth residential planning area (Planning Area 3) would include 72 townhouse units within 14 townhouse buildings. The County of Los Angeles (County) is the lead agency pursuant to the California Environmental Quality Act (CEQA).

No paleontological resources were identified within the Project Site. However, the geologic map review, literature review, and the paleontological resources records search revealed that the Project Site has exposures of the following fossiliferous geological formation/units: Younger Quaternary Alluvium the Yorba Member of the Monterey Formation (or Puente Formation), and the Soquel Sandstone Member of the Monterey Formation (or Puente Formation). Quaternary alluvium deposits have a Low-to-High Potential, increasing with depth. The exact depth at which the transition from Low to High Potential occurs is unknown in the Project Site, but depths of 5 to 10 feet are common in the region. The Yorba Member of the Monterey Formation (or Puente Formation) is a well-established fossil record, especially near the Project Site and the evidence justifies rating this unit as having High Potential for paleontological resources. As there is no clear substantiation of significant fossil resources in the Soquel Sandstone Member, this member is rated as having an Undetermined paleontological potential.

Based on the fossiliferous geologic formations that have been mapped within the Project Site and the abundance of fossil localities near of the Project Site, the potential to encounter fossiliferous deposits within the Project Site is considered high in the Yorba Member. As a result, ESA recommends Mitigation Measures PALEO-1 through PALEO-4. These measures include: retention of a qualified paleontologist and construction worker paleontological resources sensitivity training; paleontological monitoring of excavations exceeding 5 feet in Quaternary alluvium, and all excavations in the Yorba Member of the Monterey Formation regardless of depth; procedures to follow in the event of the discovery of paleontological resources, salvage and curation of significant fossil discoveries; and final reporting. With implementation of these measures, impacts to paleontological resources would be less than significant under CEQA.

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ROYAL VISTA RESIDENTIAL PROJECT

Paleontological Resources Assessment

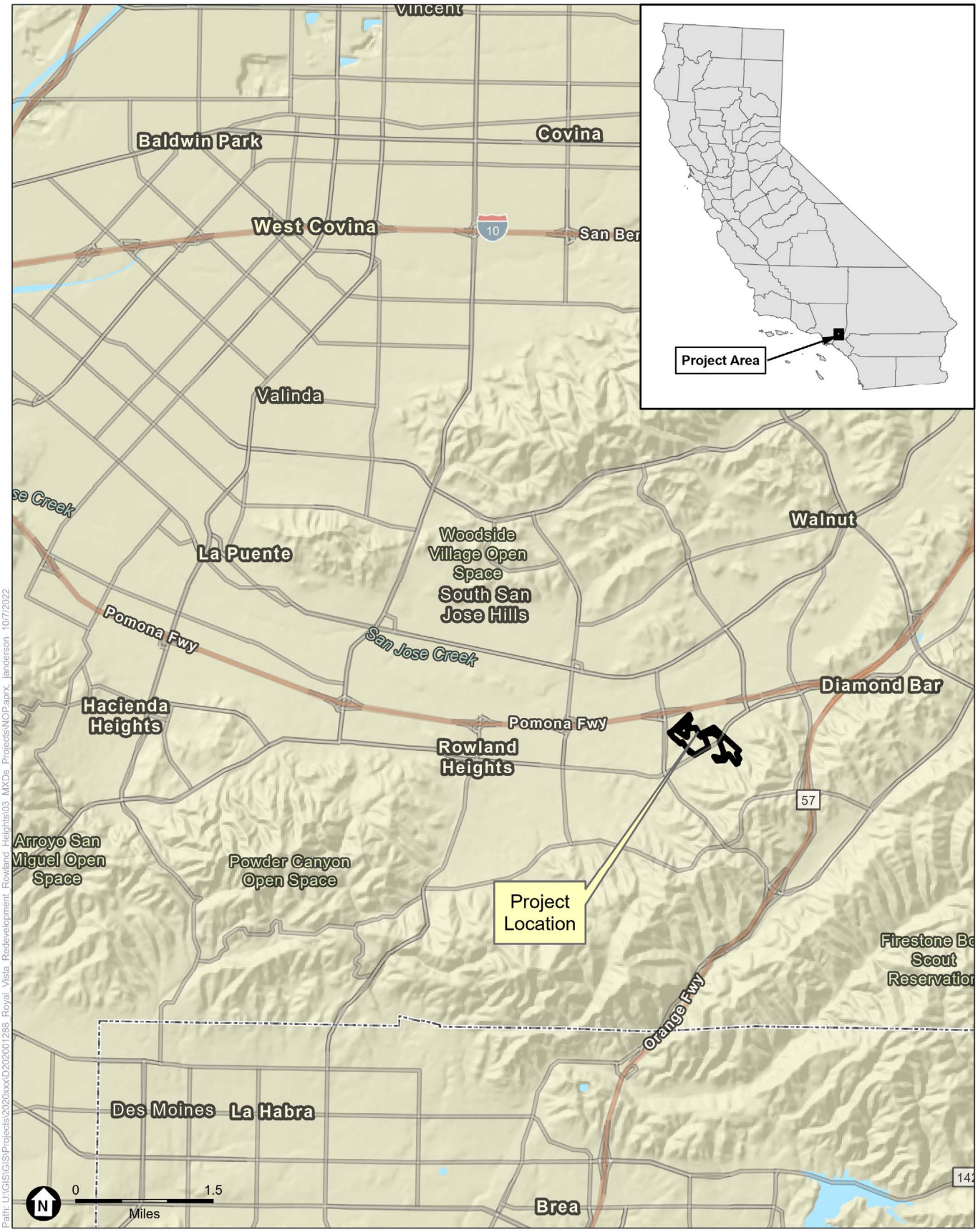
Introduction

Environmental Science Associates (ESA) has been retained by RV DEV, LLC to prepare a paleontological resources assessment report for the Royal Vista Residential Project (Project) in support of an Environmental Impact Report (EIR). The Project would develop 360 residential units on six planning areas, redeveloping four into residential planning areas and two open space planning areas. The County of Los Angeles (County) is the lead agency pursuant to the California Environmental Quality Act (CEQA).

ESA personnel involved in the preparation of this assessment include: Monica Strauss, M.A., RPA, Project Director; Russell Shapiro, Ph.D., Paleontological Principal Investigator and report author; Fatima Clark, B.A., surveyor and report contributor; Matheson Lowe, B.A., surveyor; and Jaclyn Anderson, GIS Specialist. Resumes of key personnel are provided in **Appendix A**.

Project Location

The Project is comprised of 75.64 acres (Project Site) and is located within the Royal Vista Golf Club located at 20055 Colima Road, Rowland Heights Community, in unincorporated Los Angeles County, California (**Figure 1**). The Project Site encompasses six non-contiguous parcels located both north and south of Colima Road, including Assessor Parcel Numbers (APNs) 8762-022-002, 8762-023-001, 8762-023-002, 8762-027-039, 8764-002-005, and 8764-002-006. The Project Site parcels generally constitute 13 holes and the driving range of the existing 27-hole golf club. The Project Site is bisected by Colima Road. The Project site is comprised of 52.96 acres and four parcels north of Colima Road, and 22.68 acres on two parcels south of Colima Road. The Project Site is bounded by E. Walnut Drive South on the north, and residential neighborhoods to the south, east, and west (**Figure 2**). The Project Site is located within an unsectioned portion of Township 2 South, Range 9 West on the Yorba Linda, CA U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (**Figure 3**).



SOURCE: ESRI

Royal Vista Residential Project

Figure 1
Regional Location Map

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SOURCE: Nearmap, 2021.

Royal Vista Residential Project

Figure 2
Local Vicinity Map

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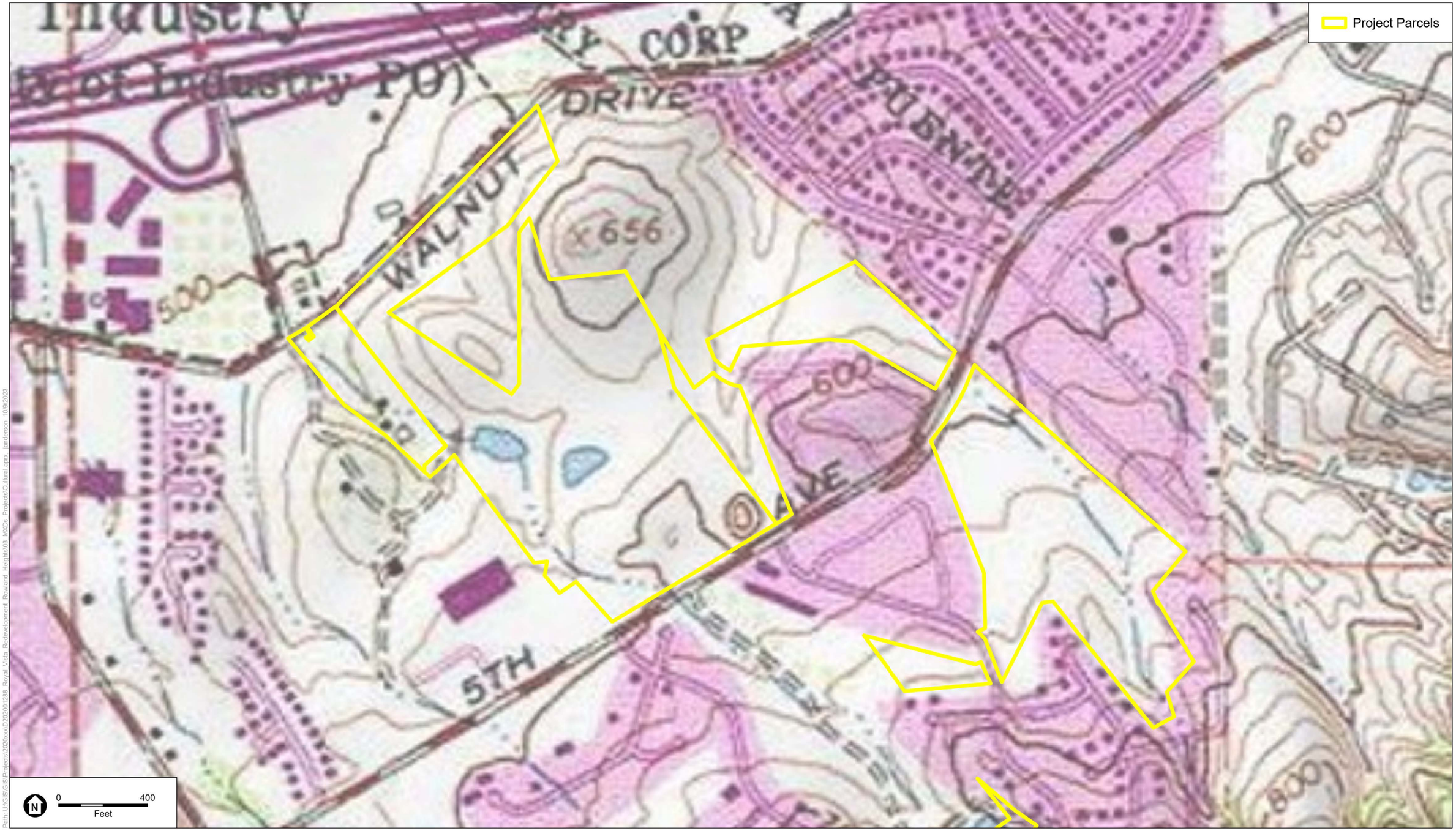

SOURCE: USGS Topographic Series (Baldwin Park, La Habra, San Dimas, Yorba Linda, CA); ESA, 2021.

Royal Vista Residential Project

Figure 3
Project Location

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Project Description

The Project would redevelop six parcels of the existing golf course into four residential planning areas and two recreational/open space planning areas, for a total of 360 dwelling units and an open space and trails system. Planning Areas 1, 2, and 5 would include 200 detached single-family residential (SFR) units on individual lots, 88 duplex and triplex units on 34 lots, 13 open space lots which include trails and open space. Planning Area 3 would include 72 condominium units within 14 townhome buildings on 1 lot. 72 townhouse units and 10 additional units scattered among the triplex units (equaling 82 (23%) of the total units), will be dedicated for sale to middle to moderate-income households, consistent with the County's inclusionary affordable housing ordinance. Refer to Table 1, Proposed Development. The Project would include approximately 28.0 acres of onsite retained open space. Refer to **Figure 4, Conceptual Site Plan**.

The Royal Vista Golf Clubhouse and other portions of the Royal Vista Golf Club are not part of the proposed Project.

TABLE 1
PROPOSED DEVELOPMENT SUMMARY

Planning Area	Gross Size (Acres)	Residential Development (Acres)	Number of Residential Units	Unit Type	Affordable Units	Open Space (Acres)
1	31.61	19.76 SFR 4.71Duplex/Triplex	168	SFR (116) Duplex (34) / Triplex (18)	6 Units	7.14
2	9.55	6.36	32	SFR	0 Units	3.19
3	6.0	4.39	72	Townhouse	72 Units	1.61
4	5.81	--	0	Open Space	0 Units	5.81
5	21.09	9.12 SFR 3.0 Duplex/Triplex	88	SFR (52) Duplex (24) / Triplex (12)	4 Units	8.97
6	1.59	--	0	Open Space	0 Units	1.59
Total	**75.65**	**47.34**	**360**		**82 Units**	**28.31**

SOURCE: KTGY Architecture and Planning, 2023.

All activities associated with the Project would occur within the Project Site. Building demolition of existing structures, infrastructure construction, and remedial grading would take place within the Project Site. Project grading will require approximately 387,100 cubic yards of cut and approximately 253,400 cubic yards of fill, with a net export of approximately 133,700 cubic yards for the Project Site. Over excavation and re-compaction of up to 1,544,500 cubic yards each is anticipated. The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course. During Project excavation the 1,544,500 cubic yards would be temporary stockpiled on site and when the site is ready for re-compaction, the 1,544,500 cubic yards soil would be redistributed on site and compacted to create roadways and the residential lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards).[1] Export

[1] Cut and fill, over-excavation and export grading quantities are rounded up and may differ slightly from quantities used for the tentative tract map review and air quality modeling assumptions. The numbers in the final geotechnical report provided in Appendix G of the Draft EIR may differ slightly from the numbers provided as part of the consultation process, but such differences are not material for consultation purposes.

D2020012880.00 - Royal Vista Redevelopment. Rowland Heights\05 Graphics-GIS-Modeling

SOURCE: KTGY, 2023

Royal Vista Residential Project

Figure 4
Conceptual Site Plan

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materials will be hauled to the closest landfill, which is expected to be the Olinda Landfill in the City of Brea. The haul route is expected to be the SR-60 Freeway East from the Project Site using Colima Road and Fairway Avenue, to the SR-57 Freeway South, and then exiting at Lambert Road (approximately ten miles away).

Regulatory Framework

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value that are afforded protection under state laws and regulations. The following section summarizes the applicable state and local laws and regulations, as well as professional standards.

State

California Environmental Quality Act

The State CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations, Section 15000 et seq.), define the procedures, types of activities, individuals, and public agencies required to comply with CEQA. As part of CEQA's Initial Study process, one of the questions that must be answered by the lead agency relates to paleontological resources: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (State CEQA Guidelines, Appendix G, Section VII, Part f).

The loss of a significant paleontological resources which includes any identifiable fossil that is unique, unusual, rare, uncommon, diagnostically or stratigraphically important, and/or those that add to an existing body of knowledge in specific areas – stratigraphically, taxonomically, and/or regionally, would be a significant environmental impact. Direct impacts to paleontological resources primarily concern the potential destruction of nonrenewable paleontological resources and the loss of information associated with these resources. This includes the unauthorized collection of fossil remains. If potentially fossiliferous bedrock or surficial sediments are disturbed, the disturbance could result in the destruction of paleontological resources and subsequent loss of information.

The CEQA threshold of significance for a significant impact to paleontological resources is reached when a project is determined to "directly or indirectly destroy a significant paleontological resource or unique geologic feature" (State CEQA Guidelines Appendix G, Section VII, Part f). In general, for project sites that are underlain by paleontologically sensitive geologic units, the greater the amount of ground disturbance, the higher the potential for significant impacts to paleontological resources.

Public Resources Code Section 5097.5 and Section 30244

Other state requirements for paleontological resource management are included in PRC Section 5097.5 and Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of

adverse impacts to paleontological resources from developments on public (state, county, city, district) lands.

Local

County of Los Angeles General Plan

The Conservation and Natural Resources Element (the Element) of the County's General Plan indicates that "… paleontological resources are an important part of Los Angeles County's identity" (Los Angeles County General Plan, 2015:163). The Element provides the following goal and policies for the treatment of paleontological resources:

Goal C/NR 14: Protect historic, cultural, and 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.

Professional Standards

Society of Vertebrate Paleontology

The Society of Vertebrate Paleontology (SVP) Guidelines (SVP, 2010) outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological resource-specific Laws, Ordinances, Regulations, and Standards (LORS) accept and use the professional standards set forth by the SVP.

Paleontological Resources Significance Criteria

As defined by the SVP (2010:11), significant nonrenewable paleontological resources are:

> *Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).*

Numerous paleontological studies have further developed criteria for the assessment of significance for fossil discoveries (e.g., Eisenstraut and Cooper, 2002; Murphey and Daitch, 2007; Scott and Springer, 2003, etc.). 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; or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

In summary, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important (Eisenstraut and Cooper, 2002; Murphey and Daitch, 2007; Scott and Springer, 2003). Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer, 2003; Scott et al., 2003).

Paleontological Potential

Paleontological potential is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, the past history of the geologic unit in producing significant fossils, and the fossil localities recorded from that unit. Paleontological potential is derived from the known fossil data collected from the entire geologic unit and not just from one specific survey. In its "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources," the SVP (2010) defines four categories of paleontological sensitivity (potential) 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. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcanoclastic formations (e. g., ashes or tephras), 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 sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).

- **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 nor impact mitigation measures relative to paleontological resources. [SVP, 2010; 1-2].

For geologic units with High Potential, full-time monitoring is generally recommended during any project-related ground disturbance. For geologic units with Low Potential, monitoring will not generally be required. For geologic units with Undetermined Potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontological potential of the rock units present within the study area.

Environmental Setting

Natural Setting

The Project Site is located in a predominantly residential community in an unincorporated area of the Rowland Heights Community. The State Route (SR) 60 is located approximately 0.05 miles north of the Project Site and the SR 57 approximately 0.75 miles east. The Project Site slopes slightly to the northwest. Surface elevation of the Project Site is approximately 710 feet above mean sea level (amsl) on the southern area of the golf course. Near Walnut Drive the elevation is approximately 505 feet amsl.

The Project Site is developed with fairways, water features, sand traps, and a maintenance facility located to the north of the club house.[2] "Golf course maintenance equipment is repaired at the facility and includes an approximately 2,000 square foot metal and wood barn with an office addition on the east side of the building, areas of hazardous materials storage, used oil containers,

[2] The golf club house is not part of the Project.

flammable storage, parts washer, and an above ground storage tank" (PlaceWorks, 2020: 31). Storm drains and catch basins can be found throughout the Project Site (PlaceWorks, 2020).

Geologic Setting

The Project Site is situated at the northern end of the Peninsular Range province. The Peninsular Range is characterized by a well-defined geologic and physiographic unit which extends southeastward from Los Angeles to the southern tip of Baja California for a distance of 900 miles (Jahns, 1954). This province is described by a southeast to northwest structural grain that is best illustrated by a series of faults connected with the San Andreas fault system (consisting of the Whittier fault and the Newport-Inglewood fault in the Los Angeles basin) and by northwest-trending folds (made up of the Santa Ana Mountains and the Puente and Coyote Hills) (Sylvester and O'Black Gans, 2016). Movement along these faults from the Miocene (approximately 18 million years ago) to the present, led to uplift of older crystalline rocks and the sediments deposited atop the basement. Typically, in coastal southern California, the older basement is composed of metamorphosed rocks intruded by Mesozoic-age granites. The overlying sediments record mostly ocean sedimentation up until the Pliocene, then there is a shift to more terrestrial deposits.

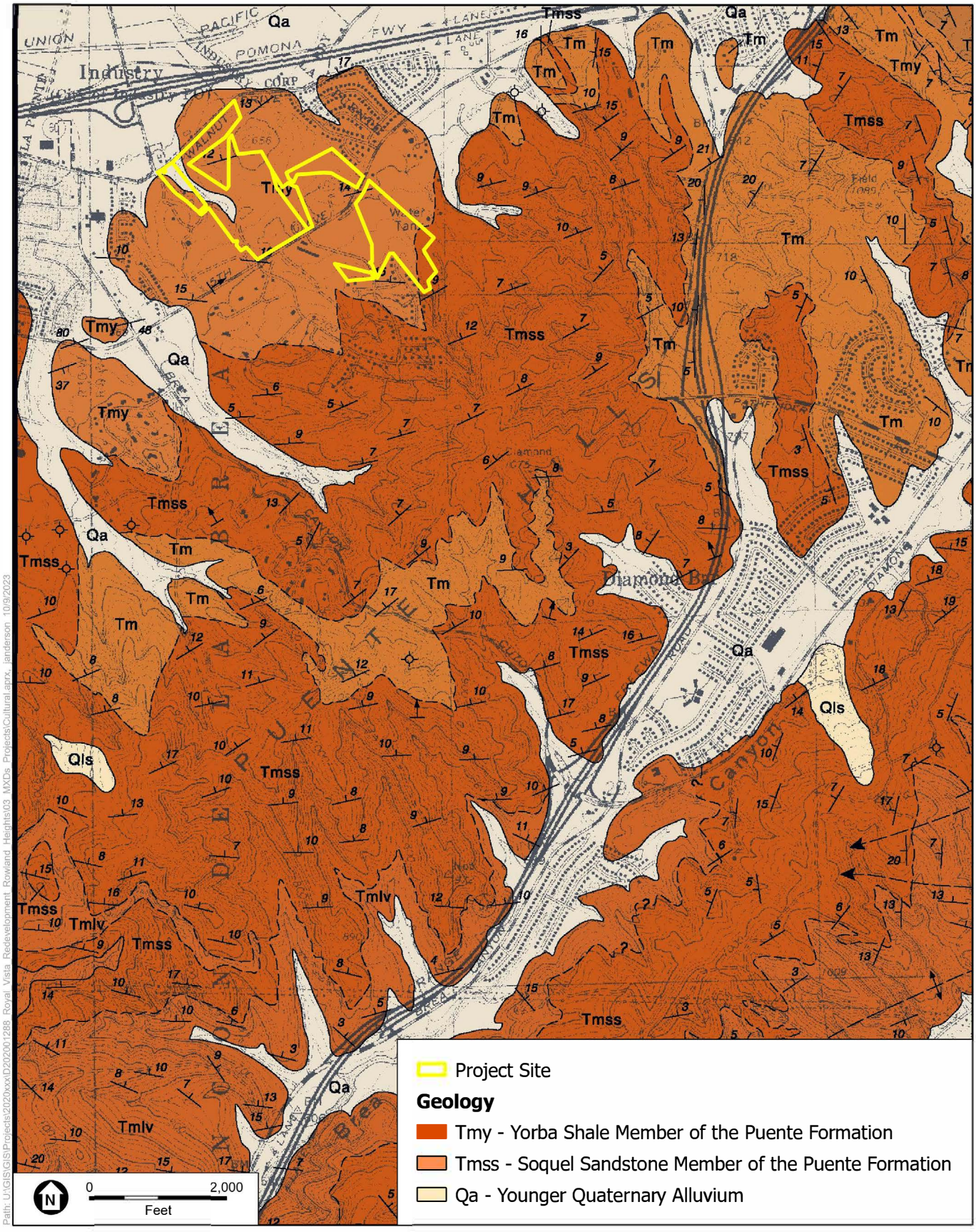
Specific to the Project Site, the local area is underlain by tilted exposures of Miocene-age marine sediments of the Monterey Formation (also referred to as the Puente Formation by some authors), dissected and infilled with young alluvium (Dibblee and Ehrenspeck, 2001). The Middle Miocene experienced the highest sea levels (Haq et al., 1987) and the warmest global temperatures in the last 23 million years (Zachose et al., 2001). The ocean covered coastal California as far east as Corona. In the Project Site, the Miocene ocean record is recorded in the Yorba Shale (Tmy) and Soquel Sandstone (Tmss) members of the Monterey/Puente Formation. While the Yorba Shale is dominated by thin-bedded siliceous silt and minor dolostone, the Soquel Sandstone records more active conditions in coarser-grained sandstone (Yerkes, 1972).

Archival Research

Geological Map Review

Geological mapping of the Yorba Linda and Prado Dam quadrangles (eastern Puente Hills) by Dibblee and Ehrenspeck (2001) indicate that the surface of the Project Site is mainly mapped as located within the Yorba Shale Member (Tmy) and Soquel Sandstone Member and facies (Tmss) of the Miocene Puente Formation (also referred to as the Monterey Formation in this area). However, a very small portion of the Project Site (within Planning Areas 1 through 3) is also mapped as located within Quaternary alluvium (Qa) (11,700 years ago to present, although deeper deposits may be older) deposits (**Figure 5**).

The Puente/Monterey Formation consists of marine sandstone, siltstone, and shale that dates from the early Pliocene to the Miocene (Critelli et al. 1995, Morton and Miller 2006). The units have a history of preserving both invertebrate and vertebrate marine fossils, such as cephalopods (Saul and Stadum 2005), fishes (Carnevale et al. 2008, David 1943, Hilton and Grande 2006, Huddleston and Takeuchi 2006), and other marine and terrestrial vertebrates (Leatham and North 2017).



SOURCE: USGS Topographic Series (Baldwin Park, La Habra, San Dimas, Yorba Linda, CA); ESA, 2021.

Royal Vista Residential Project

Figure 5
Geology Map

ESA

The Yorba Member (Tmy) dates to the Miocene and consists of primarily siltstone with some sandstone (Morton and Miller 2006). Dibblee and Ehrenspeck (2001) describe the member as "[thin bedded, light gray, white weathering, platy, siliceous to semi-siliceous to silty, locally includes thin layers of yellowish-gray, hard dolomite, and thin layers of fine-grained sandstone". The Soquel Sandstone Member (Tmss) is described as "[m]ostly bedded sandstone, light gray, weathers tan, mostly medium-grained, arkosic, locally coarse and pebbly; with minor biotite; includes minor silty clay shale" (Dibblee and Ehrenspeck 2001).

Geotechnical Report Review

Review of the Geotechnical Evaluation and Feasibility Study (geotechnical study) (LGC Geotechnical, Inc. 2021) indicates that a total of seven hollow stem borings (HS-1 through HS-7) were excavated in the Project Site using an 8-inch-diameter hollow-stem augers with depths ranging from approximately 10 to 26.5 feet below existing grade. Five large-diameter borings (BA-1 through BA-5) were also drilled to depths of up to approximately 45 feet below existing grade. Review of the Geotechnical Map found attached to the geotechnical study shows that boring HS-1 was placed within Planning Area 2, boring HS-2 within Planning Area 3. Borings BA-1, BA-2, BA-3, and HS-3 through HS-5 were placed within Planning Area 1. Borings HS-6, HS-7, BA-4, and BA-5 were placed within Planning Area 5. No borings were placed within Planning Areas 4 and 6.

The geotechnical study states that based on the findings of their evaluation, the low-lying portions of the Project Site contain undocumented artificial fill extending from the surface to 25 feet below existing grade. The fill was placed in 1963 during the original golf course construction. Additionally, review of the boring logs in the geotechnical study indicates that the Puente Formation (listed as Tp and consistent with previous Tmy descriptions by Dibblee and Ehrenspeck 2001) was identified at shallow depth on the site slopes and at depth in the low-lying areas of the site, beneath the undocumented fill (LGC Geotechnical, Inc. 2021). LACM Database Search.

A paleontological resources database search was conducted by the Natural History Museum of Los Angeles County (LACM) on February 28, 2021 (**Appendix B**). The search entailed an examination of current geologic maps and known fossil localities within the Project Site and vicinity. The purpose of the records search was to: (1) determine whether any previously recorded fossil localities occur in the Project Site or vicinity; (2) assess the potential for disturbance of these localities during construction; and (3) assist in evaluating the paleontological sensitivity of the Project Site.

The paleontological resources database search results indicate that no fossil localities exist within the Project Site, but that numerous fossil localities (LACM IP 4919, 5674, 31237, 34968; LACM VP 6907, 6908, 6170, and 7930–7933) exist nearby within the same sedimentary deposits (Puente and Monterey Formations) that occur in the Project Site, either at surface or at depth (**Table 2**) (Bell, 2021).

TABLE 2
LACM FOSSIL LOCALITIES

Locality Number	Formation	Taxa	Depth
LACM IP 4919, 5674, 31237; LACM VP 6907	Puente Formation (White diatomaceous earth interbedded with soft grey siltstone)	Topsmelt (*Atherinops*), shortfin mako (*Isurus oxyrinchus*), cod (*Eclipes*), drumfish (*Lompoquia*), mackerel scads (*Decapterus*), bristlemouths (*Cyclothone*), viperfish (*Chauliodus*), flatfish (Pleuronectiformes), Lanternfish (Myctophidae), queenfish (*Seriphus*), snake mackerel (*Thyrsocles*), marine mammal (Cetacea), coprolites with bones; Invertebrates, including Goosenecked barnacles (*Pedunculata*)	Unknown
LACM VP 6908	Puente Formation (White diatomaceous earth interbedded with soft grey siltstone)	Leftvents (*Acentrophryne longidens*)	Surface, collected in stream bed
LACM VP 6170	Puente Formation (white diatomites)	Fish (Osteichthyes)	Unknown
LACM IP 34968	Puente Formation (medium brown to light greenish-brown shale interbedded with white to yellowish or light orange sandstone)	Herring/sardine (Clupeidae), snail (gastropod)	Unknown, but 499–501 feet above mean sea level
LACM VP 7933	Monterey Formation, Yorba Shale Member (grayish shale)	Topsmelt (*Atherinops*)	Unknown, collected during trenching for a pipeline
LACM VP 7930–7932	Monterey Formation, Yorba Shale Member (sandstone and Diatomaceous shale)	Osteichthyes; Herring/sardine (Clupeidae)	6.5–7 feet bgs

VP: Vertebrate Paleontology
IP: Invertebrate Paleontology

Localities LACM IP 4919, 5674, 31237, and LACM VP 6907 are within the Monterey Formation, and yielded numerous fish fossils, as well as a cetacean, and invertebrate fossils including Goose-necked barnacles (*Pedunculata*) at an unknown depth. The fossils were found in white diatomaceous earth interbedded with soft grey siltstone (Yorba Member according to Huddleston and Takeuchi, 2006).

Puente Formation localities include LACM VP 6908 produced leftvents fossils (in white diatomaceous earth interbedded with soft grey siltstone) at the surface of a stream bed. LACM VP 6170 yielded a fossil fish (Osteichthyes) in white diatomite at an unknown depth. LACM IP 34968 produced herring/sardine (Clupeidae) and snail (gastropod) fossils at an unknown depth. LACM VP 7933 yielded a topsmelt fossil (*Atherinops*) at an unknown depth. Localities LACM VP 7930-7932 produced Osteichthyes and Herring/sardine (Clupeidae) fossils between 6.5 and 7 feet below ground surface (Bell, 2021).

Literature Review

ESA conducted a literature review of published sources to determine whether paleontological resources have been identified in the particular geologic units that are mapped within the Project Site. The results of the literature review are provided below and are listed by their respective geologic unit.

Paleontology of Quaternary deposits: Paleontological literature rarely distinguishes between Quaternary alluvium, Younger Quaternary alluvium and Older Quaternary alluvium. If the organisms are older than about 10,000 radiocarbon years or if the fauna includes species known to have become extinct at the end of the Pleistocene, then the deposit or fauna is considered to belong to the Pleistocene Epoch. Neither of Jefferson's compilation of Pleistocene vertebrate localities (Jefferson, 1991a, b) list any localities near the Project Site. Nonetheless, there are many sites in the eastern Los Angeles Basin where Quaternary alluvium has produced Pleistocene vertebrate fossils. It not known at what depth the Quaternary alluvium at the Project exceeds 5,000 radiocarbon years before present (SVP age threshold).

Paleontology of the Puente Formation (Monterey Formation of Dibblee and Ehrenspeck, 2001): The Puente Formation of Eldridge and Arnold (1907) contains three Members. Dibblee and Ehrenspeck (2001) recognizes these members, but assigns them to the Monterey Formation. The majority of the project lies within the Yorba Member and the south easternmost Project Site crosses into the overlying Soquel Sandstone Member.

The Yorba Member is well-known for its significant, deep marine vertebrate fossils. "Chalk Hill", or "Fossil Hill" to the locals, has long been sought after as a very rich site for collecting whole fossil fish in the vicinity of the Project Site (e.g., Cooper, 1973). Collections from the Yorba Member have provided important insight to the evolution of deep-water fishes (Huddleston and Takeuchi, 2006; Carnevale and Pietsch, 2009) as well as constraining the depth of sea water at the time of deposition (Carnevale et al., 2008). In addition, the fish fauna, the Yorba Member contains very rare and well-preserved invertebrates, such as hexactinellid sponges (Rigby and Albi, 1996).

A search specific to the Soquel Sandstone Member did not yield any significant fossils. However, this may be in part due to the nomenclature changes between the older Puente Formation, the Monterey Formation, and the classification of members.

Paleontological Resources Survey

Methods

On April 12, 2021, ESA staff Fatima Clark, B.A., and Matheson Lowe, B.A., conducted a paleontological resources pedestrian survey of the Project Site in order to identify surface evidence of paleontological resources and to assist in assessing the potential for the Project Site to contain buried resources. Approximately 5 percent of the Project Site was subject to a systematic pedestrian survey using transect intervals spaced at no more than 5 meters (approximately 16 feet) apart in areas with visible ground surface. Approximately 90 percent of the Project Site was

subject to a windshield survey to identify any areas of visible ground surface (see **Figure 6** for survey coverage). The windshield survey utilized golf carts to efficiently cover the Project Site and to reduce the exposure from the golfing activity and safety hazards presented by the active golf environment (i.e. flying golf balls). Approximately 5 percent of the Project Site could not be surveyed since this portion of the Project Site (driving range) was actively in use.

Results

APN 8762-022-002 (Planning Area 2)

This parcel includes portions of the golf course (fairway, putting green, sand traps, and paved concrete paths), a dirt road, one building, and an associated maintenance yard. One building (Barn/Maintenance Shed) was identified in the southern portion. The majority of the parcel (approximately 80 percent) is covered with grasses for the golf course and dense vegetation, which yielded 0 to 5 percent ground surface visibility (the greatest visibility was observed along the base of trees and along small patches of land where grass is dead, or not growing). The area surrounding the Barn/Maintenance Shed yielded approximately 50-75 percent ground surface visibility. The area along the road and behind the Barn/Maintenance Shed yielded approximately 95 to 100 percent ground surface visibility. A small surface exposure (measuring approximately 2-foot-wide by 2-foot-long) of sandstone was observed along the northernmost portion of the parcel. A pile of sandstone sediments intermixed with concrete rubble were also observed in the southern portion of the maintenance yard **(Figures 7 and 8)**. No paleontological resources were encountered.

SOURCE: Nearmap, 2021.

Royal Vista Residential Project

Figure 6
Survey Coverage Map

ESA

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Royal Vista Residential Project

SOURCE: ESA

Figure 7

Overview of Maintenance Yard and Intermixed Soils (Sandstone and Concrete Rubble) along Southern Portion of Planning Area 2, View East

Royal Vista Residential Project

SOURCE: ESA

Figure 8

Close Up of Sandstone Sediments Observed in Southern Portion of Planning Area 2, Facing Down

APN 8762-023-00, 8762-023-002 (Planning Areas 1 and 3)

These planning areas includea portion of the golf course (fairway, putting green, sand traps, two ponds, paved concrete paths, and a driving range). Only 95 percent of the planning areas were surveyed and it yielded approximately 0 to 5 percent ground surface visibility. The greatest visibility was observed along the base of trees and along small patches of land where grass is dead, or not growing. A small surface exposure (measuring approximately 4-foot-long by 4-foot-wide) of sandstone was observed along the northern portion of Planning Area 1. A storm drain channel was observed along the eastern portion of Planning Area 1. The driving range in the southernmost portion (covering approximately 5 percent of the parcel) was in use during the survey, and as such, this area could not be surveyed (**Figures 9 and 10**). No paleontological resources were encountered.

Royal Vista Residential Project

SOURCE: ESA

Figure 9

Overview of Planning Area 1 (North of Driving Range), View Northeast

Royal Vista Residential Project

SOURCE: ESA

Figure 10
Overview of Northern Portion of Planning Area 1 Where Sandstone Exposure Was Observed, View North

APN 8762-027-039 (Planning Area 4)

These parcels include portions of the golf course. Ground surface visibility ranged from approximately 0 to 5 percent. No paleontological resources were encountered.

APN 8764-002-006 and -005 (Planning Areas 5 and 6)

This parcel (located south of Colima Road) includes a portion of the golf course. Ground surface visibility ranged from approximately 0 to 10 percent. Additionally, two small areas of the parcel yielded surface exposures of sandstone surrounded by grass (**Figures 11, 12, and 13**). No paleontological resources were encountered.

Royal Vista Residential Project

SOURCE: ESA

Figure 11

Overview of Northern Portion of Parcel Where Sandstone Sediments Were Observed, View Northeast

Royal Vista Residential Project

SOURCE: ESA

Figure 12

Close Up of Sandstone Sediments in Northern Portion of Parcel

Royal Vista Residential Project

SOURCE: ESA

Figure 13
Overview of Southern Portion of Parcel Where Sandstone Sediments Were Observed, View Northwest

Paleontological Sensitivity Analysis

The review of the scientific literature, geologic mapping, record search results from the LACM, and the pedestrian survey were used to assign paleontological sensitivity to the geologic units present at the surface and in the subsurface of the Project Site, following the guidelines of the SVP (2010) and are as follows:

- **Younger Quaternary Alluvium (Qa)** – Surficial sediments: Low-to-High Potential, increasing with depth. The exact depth at which the transition from Low to High Potential occurs is unknown in the Project Site, but depths of 5 to 10 feet are common in the region.
- **Soquel Sandstone Member of the Monterey Formation (Puente Formation) (Tmss)** – There is no clear substantiation of significant fossil resources in the Soquel Sandstone Member. However, given the age and depositional setting, it is very likely that fossil might be found during excavation. Based on the evidence, this member is rated as Undetermined paleontological potential
- **Yorba Member of the Monterey Formation (Puente Formation) (Tmy)** – There is a very well established fossil record for the Yorba Member, especially near the Project Site. The evidence justifies rating this unit as having High Potential for paleontological resources.

Summary and Recommendations

ESA has identified the Yorba Member of the Monterey (Puente) Formation as being of high paleontological potential within the Project Site. The underlying Soquel Sandstone Member is of Undetermined potential. The small valleys underlain by younger Quaternary alluvium is assigned low-to-high paleontological sensitivity, increasing with age and potential at depth.

Since Project-related excavation is expected to extend to 25 feet below existing surface, ESA recommends Mitigation Measures PALEO-1 through PALEO-4. These measures include retention of a qualified paleontologist, construction worker paleontological resources sensitivity training, paleontological monitoring of excavations exceeding 5 feet in Quaternary alluvium and all excavations in the Yorba Member of the Puente Formation regardless of depth, procedures to follow in the event of the discovery of paleontological resources, salvage and curation of significant fossil discoveries, and final reporting. With implementation of these measures, impacts to paleontological resources would be less than significant under CEQA.

Recommended Mitigation Measures

Mitigation Measure PALEO-1: Prior to grading permit issuance, the subdivider shall retain a paleontologist who meets the Society of Vertebrate Paleontology's (SVP, 2010) definition for qualified professional paleontologist (Qualified Paleontologist) to carry out all mitigation related to paleontological resources and provide a copy of the retainer to the LA County Planning. Prior to the start of ground-disturbing activities, the Qualified Paleontologist or their designee shall conduct construction worker paleontological resources sensitivity training for all construction personnel. Construction personnel shall be informed on how to identify the types of paleontological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of paleontological resources, and safety precautions to be taken when working with paleontological monitors. The subdivider shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.

Mitigation Measure PALEO-2: Paleontological monitoring shall be conducted by a qualified paleontological monitor (SVP, 210) working under the direct supervision of the Qualified Paleontologist for the three formations along the following lines: during all ground-disturbing activities below 5 feet in Quaternary alluvium; at all depths within the Yorba Member of the Puente Formation; and initial excavations into the Soquel Sandstone Member of the Monterey Formation. Monitoring within the Soquel Sandstone Member of the Monterey Formation may be discontinued or extended based on geologic conditions at surface at depth. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting sediment samples to wet or dry screen to test promising horizons for smaller fossil remains. If the Qualified Paleontologist determines that full-time monitoring is no longer warranted, based on the specific geologic conditions at the surface or at depth, the Qualified Paleontologist may recommend that monitoring be reduced to periodic spot-checking or cease entirely.

Mitigation Measure PALEO-3: If a potential fossil is found, the paleontological monitor shall be allowed to temporarily divert or redirect grading and excavation

activities in the area of the exposed fossil to facilitate evaluation of the discovery. An appropriate buffer area shall be established around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. At the monitor's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock/sediment samples for initial processing and evaluation. If a fossil is determined to be significant, the Qualified Paleontologist shall implement a paleontological salvage program to remove the resources from their location, following the guidelines of the SVP (2010). Any fossils encountered and recovered shall be prepared to the point of identification, catalogued, and curated at a public, non-profit institution with a research interest in the material and with retrievable storage, such as the Natural History Museum of Los Angeles County, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, and photographs shall also be filed at the repository and/or school.

If construction personnel discover any potential fossils during construction while the paleontological monitor is not present, regardless of the depth of work or location, work at the discovery location shall cease in a 50-foot radius of the discovery until the Qualified Paleontologist has assessed the discovery and recommended and implemented appropriate treatment as described earlier in this measure.

Mitigation Measure PALEO-4: At the conclusion of paleontological monitoring and prior to the release of the grading bond, the Qualified Paleontologist shall prepare a report summarizing the results of the monitoring and salvage efforts, the methodology used in these efforts, as well as a description of the fossils collected and their significance. The subdivider shall submit the report to the LA County Planning and the Natural History Museum of Los Angeles County.

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Appendix A
Personnel

Monica Strauss, RPA

Director, Southern California Cultural Resources Group

EDUCATION

M.A., Archaeology, California State University, Northridge

B.A., Anthropology, California State University, Northridge

AA, Humanities, Los Angeles Pierce College

19 YEARS EXPERIENCE

SPECIALIZED EXPERIENCE

Treatment of Historic and Prehistoric Human Remains

Archaeological Monitoring

Complex Shell Midden Sites

Groundstone Analysis

PROFESSIONAL AFFILIATIONS

Register of Professional Archaeologists (RPA), #12805

Society for California Archaeology (SCA)

Society for American Archaeology (SAA)

QUALIFICATIONS

Exceeds Secretary of Interior Standards

CA State BLM Permitted

Monica has successfully completed dozens of cultural resources projects throughout California and the greater southwest, where she assists clients in navigating cultural resources compliance issues in the context of CEQA, NEPA, and Section 106. Monica has extensive experience with archaeological resources, historic buildings and infrastructure, landscapes, and Tribal resources, including Traditional Cultural Properties. Monica manages a staff of cultural resources specialists throughout the region who conduct Phase 1 archaeological/ paleontological and historic architectural surveys, construction monitoring, Native American consultation, archaeological testing and treatment, historic resource significance evaluations, and large-scale data recovery programs. She maintains excellent relationships with agency staff and Tribal representatives. Additionally, Monica manages a general compliance monitoring team who support clients and agencies in ensuring the daily in-field compliance of overall project mitigation measures.

Relevant Experience

County of Los Angeles, Department of Public Works, Rancho Los Amigos South Campus EIR, Downey. CA. *Project Manager*. The County of Los Angeles (County) proposes redevelopment of a portion of the Rancho Los Amigos (RLA) South Campus which is located in the City of Downey. The 74-acre RLA South Campus was the home of the "Los Angeles County Poor Farm" that was established in 1880s to provide room and board to indigent citizens in exchange for agricultural labor, then served as an infirmary and later evolved into a hospital facility in 1932. The RLA South Campus functioned as a major hospital complex from 1956 to the 1990s, when it was abandoned. The RLA South Campus is currently unoccupied and has been designated as the RLA Historic District in the National Register of Historic Places. The County is proposing redevelopment of a 21-acre portion of the RLA South Campus with County uses, including a Sheriff's Station Crime Laboratory, Internal Services Department Headquarters, and Probation Department Headquarters. The project will include supporting parking and installation of utilities and other features on a site that has been abandoned for nearly 30 years. Building demolition and/or repurposing or relocation of existing buildings will be required. ESA is leading the CEQA process on behalf of the County, including preparation of all technical studies in support of a full-scope EIR for the RLA South Campus Project. This includes a Historic District Evaluation, archaeological surveys, traffic, water supply, arborist services, and all other CEQA-required topics. ESA is also serving in an Executive Consultant role to the County, to advise on other potential future projects at the RLA Campus.

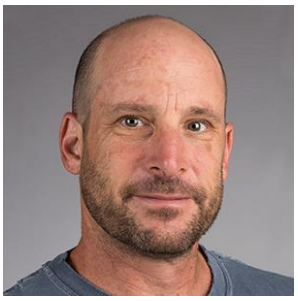
County of Los Angeles, Department of Public Works, Arroyo Seco Bike Path Phase I Cultural Resources Evaluation, Los Angeles, CA. *Project Director.* Working for the County of Los Angeles, Department of Public Works in connection with a project to make improvements to the Arroyo Seco Channel, Monica

managed all aspects of Section 106 review in accordance with Caltrans Cultural Resources Environmental guidelines. Monica and her team evaluated the Arroyo Seco Channel, identified character-defining features, informed the design of channel improvements to retain such features, and addressed the channels' potential for eligibility as part of a larger Los Angeles Country water management district. She developed the research strategy, directed the field teams, and prepared cultural resources assessment documentation for approval by Caltrans and FHWA, as well as the cultural resources section for a Mitigated Negative Declaration.

Los Angeles Department of Water and Power La Kretz Innovation Campus, Los Angeles County, CA. *Project Director.* The project involved the rehabilitation of the 61,000-square-foot building located at 518-524 Colyton Street, demolition of the building located at 537-551 Hewitt Street, and construction of an open space public plaza and surface parking lot, and involved compliance with Section 106 of the National Historic Preservation Act and consultation with the California State Historic Preservation Officer. ESA is providing archaeological monitoring and data recovery services and is assisting LADWP with meeting their requirements for Section 106 of the National Historic Preservation Act. Monica is providing oversight to archaeological monitors and crew conducting resource data recovery and laboratory analysis, and is providing guidance to LADWP on meeting Section 106 requirements.

Los Angeles Unified School District (LAUSD) Florence Nightingale Middle School Historic Architectural Review, Los Angeles County, CA. *Cultural Resources Project Director*. Monica managed the historical analysis of the LAUSD Florence Nightingale Middle School. The analysis included a cultural resources survey that photo-documented buildings that would be affected by the project. The project includes HVAC replacement to a 1967 Classroom Buildings, kitchen upgrades within the 1937 Domestic Science/Cafeteria Building, and improvements to the 1965 chiller yard. Florence Nightingale Middle School was previously recommended eligible for listing in the California Register.

Viewpoint School, Tennis Courts and Park, Calabasas, CA. *Cultural Resources Project Director.* ESA is working with the City of Calabasas to prepare an IS/MND to support the development of the proposed Viewpoint School Tennis Courts and Parking Lots project, which includes the development of three sites (Peters, Brown, and Castle Oak) that would become part of the school campus property. Improvements entail installation of six tennis courts (including an accessory building), additional campus parking in three areas, and the renovation of two existing residential structures, one to accommodate offices for school administration and the second to provide a primary residence to the school principal. The project would remove the Peter's property building and appurtenant structures, redevelop the interior of the Castle Oaks property to accommodate the administrative offices, and update the Brown residence to accommodate the principal's primary residence. ESA is preparing three technical studies to support the IS/MND, including air quality, cultural resources, greenhouse gas emissions, and noise. ESA peer reviewed the biological resource reports and traffic study that were prepared to support the document. Monica provided technical and compliance oversight to the cultural resources staff.



Russell S. Shapiro, PhD

Principal Investigator

EDUCATION

Ph.D., Geological Sciences, University of California, Santa Barbara, 1998
B.S., Geology, Humboldt State University, 1992

25 YEARS EXPERIENCE

CERTIFICATIONS/ REGISTRATION

U.S. Fish and Wildlife Cultural Resources Use Permit
U.S. Forest Service Cultural Resources Use Permit
Bureau of Land Management Cultural Resources Use Permit
Wilderness and Remote First Aid (Red Cross Certified)

PROFESSIONAL AFFILIATIONS

Geobiology Society; Treasurer
Society for Sedimentary Geology (SEPM); Vice-President
Society for Vertebrate Paleontology

As a Principal Investigator, Dr. Shapiro has been involved in review of paleontological resource reports and evaluating proposed mitigation plans. Dr. Shapiro researches and prepares environmental impact reports regarding cultural resources (fossils), conducts field (geological and paleontological) surveys, and oversees ground disturbance at construction sites for Environmental Quality compliance (CEQA, NEPA, and the Paleontological Resources Preservation Act). As a Qualified Paleontologist, Dr. Shapiro has also reviewed resource planning documents for several counties in California and was the lead on the Bureau of Land Management's assessment of fossil resources of Northern California.

In his academic role as Professor of Geology, Dr. Shapiro teaches several paleontology courses including "Applied Paleontology" which is a modified "Cultural Resources" course, focusing on budgeting, CEQA and NEPA regulations, field surveys, GIS projections, fossil recovery, and curation. He also teaches in the annual Field Camp courses and manages the rock preparation lab and maintains the microscopes.

Relevant Experience

ReneSola Gentry Solar Project, Paleontological Resource Assessment Report, Lincoln, California. *Principal Investigator, Mapping*. Literature, geological map, and museum review for fossil resources. Field mapping of entire property. Final product included a mitigation and monitoring plan.

Paleontological Sensitivity Analysis Report, Elk Grove, California; Pacific Gas and Electric. *Principal Investigator.* Literature, geological map, and air photo archival report on the potential fossil yield for a proposed pipeline. Recommendations based on searches of museum collections of relevant geological formations. Deliverables consisted of a sensitivity report and appendix of known fossil occurrences by taxa and location.

Mojave Solar Project Cultural Services; San Bernardino County, California; CH2M Hill. *Principal Investigator.* Reviewed technical report; advised on scientific analyses.

El Camino Real Bridge Replacement Environmental Services; San Luis Obispo County, California, Quincy Engineering. *Principal Investigator*. Reviewed technical report for CEQA/NEPA documentation, technical studies, and permitting, for the replacement of the El Camino Real bridge over Santa Margarita Creek in Atascadero.

San Bernardino County General Plan Update: Paleontological Resources Technical Report. *Primary Reviewer***.** External reviewer for general plan update. Involved assessing all geological formations in San Bernardino County and museum records of significant fossils.

Recent Significant Excavations

Miocene Vertebrates of the Sheldon Wildlife National Refuge. Oversaw operations to conduct significant collection of Miocene-age fossils from volcanic sediments for the U.S. Fish and Wildlife Service. Duties included field collection and high-resolution GPS mapping, fossil preparation and identification, curation at the Gateway Science Museum.

Eocene Horses from Black Butte Lake Reservoir. Field jacketing and preparation of fossil horse skull material from the reservoir under the direction of the U.S. Army Corps of Engineers. Fossils were prepared, identified, and returned to the Army Corps for public display.

Pleistocene Camelid from Nevada. This project grew out of a paleontological resource assessment field survey. During the survey, a semi-articulated rear leg of a late Pleistocene camelid was collected and prepared. A manuscript was published in 2016.

Publications and Presentations

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Appendix B

LACM Database Search (Confidential)