

# RELATED BRISTOL, SANTA ANA, CALIFORNIA

## Paleontological Resources Assessment Report

Prepared for  
RCR Bristol, LLC  
18201 Von Karman Avenue, Suite 900  
Irvine, CA 92612

January 2023





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RCR Bristol, LLC  
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# EXECUTIVE SUMMARY

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## Related Bristol – Paleontological Resources Assessment Report

Environmental Science Associates (ESA) has been retained by RCR Bristol, LLC (Client) to conduct a paleontological resources inventory for Related Bristol Specific Plan (Project) pursuant to the California Environmental Quality Act (CEQA). The proposed Project would redevelop a 41.1-acre Project Site in Santa Ana for a walkable mixed-use neighborhood of residential, retail, hotel and senior living uses under a Specific Plan entitlement process in the City of Santa Ana (City). The Project area is bounded by South Bristol Street to the east, West MacArthur Boulevard to the north, Sunflower Avenue to the south, and South Plaza Drive to the west, in the City of Santa Ana, California. The Project site is identified in the Santa Ana's General Plan Land Use Element as being located within the South Bristol Street Focus Area. The Related Bristol Specific Plan will replace existing zoning districts, becoming the zoning for the property. Within the General Plan South Bristol Street Focus Area, the Project site is designated District Center-High (DC-5). The City is the lead agency pursuant to the California Environmental Quality Act (CEQA).

This paleontological resources inventory included a paleontological resources database search conducted by the Natural History Museum of Los Angeles County (LACM), geologic literature and map review, and review of available geotechnical reports. Due to the developed nature of the Project area, no field survey was conducted.

The paleontological resources database search was conducted by the LACM on August 14, 2022. The search entailed an examination of current geologic maps and known fossil localities within the proposed project and vicinity. A total of six recorded fossil localities (LACM VP 3802; LACM VP 3977, 3978, 3986, LACM IP 5867, 5092; LACM VP 4219, LACM IP 5062; LACM IP 4695; LACM IP 4929; and LACM VP 6370-6371) were identified in the general Project vicinity, however none of these were documented in the Project Area. The localities in the vicinity are associated with units mapped as uplifted older (Pleistocene) marine terraces (Qop).

Geologic literature and map review and review of geotechnical data indicate the majority of the Project area is overlain by young axial-channel deposits (Qya) dating from the Holocene to perhaps the Late Pleistocene (which date back to approximately 12,000 years ago). Based on the age, this unit has a low potential of yielding fossil resources at surface; however, that potential increases with depth. While there is a potential that older marine units may exist below the project area, the geotechnical report did not make note of marine sediments.

As a result of this paleontological resource inventory, there is potential for the ground disturbing activities to encounter paleontological resources at depth, and as such paleontological resources monitoring is recommended for ground disturbing activities that occur 20 feet or more below ground surface. As such, recommended mitigation measures, including the retention of a qualified paleontologist, paleontological monitoring, and procedures to be followed in the event of the discovery of paleontological resources are provided in the *Conclusions and Recommendations* section at the close of this report



# RELATED BRISTOL

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## Paleontological Resources Assessment Report

### Introduction

Environmental Science Associates (ESA) has been retained by RCR Bristol, LLC (Client) to conduct a paleontological resources assessment for Related Bristol Specific Plan (Project) pursuant to the California Environmental Quality Act (CEQA). The proposed Project would redevelop a 41.1-acre Project area in Santa Ana for a walkable mixed-use neighborhood of residential, retail, hotel and senior living uses under a Specific Plan entitlement process in the City of Santa Ana (City). The Project area is bounded by South Bristol Street to the east, West MacArthur Boulevard to the north, Sunflower Avenue to the south, and South Plaza Drive to the west, in the City of Santa Ana, California. The City is the lead agency pursuant to CEQA.

ESA personnel involved in the preparation of this report are as follows: Monica Strauss, M.A., RPA, Project Director; Russell Shapiro, PhD., Principal Paleontologist and primary report author; Salpi Bocchierian, M.A., RPA., researcher and report contributor; and Jaclyn Anderson, GIS specialist. Dr. Shapiro is a Qualified Paleontologist per the Society of Vertebrate Paleontology's (SVP's) guidelines. Resumes of key personnel are included in **Appendix A**.

### Project Location

The 41.1-acre Project area is located within the south-central portion of the City of Santa Ana (**Figure 1**). The Project includes Assessor Parcel Numbers (APNs) 412-131-12 and 412-131-22 and is bounded by South Bristol Street to the east, West MacArthur Boulevard to the north, Sunflower Avenue to the south, and South Plaza Drive to the west. Specifically, the Project is located in an unsectioned portion of Township 5 South, Range 10 West on the Newport Beach, CA U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (**Figure 2**).

### Project Description

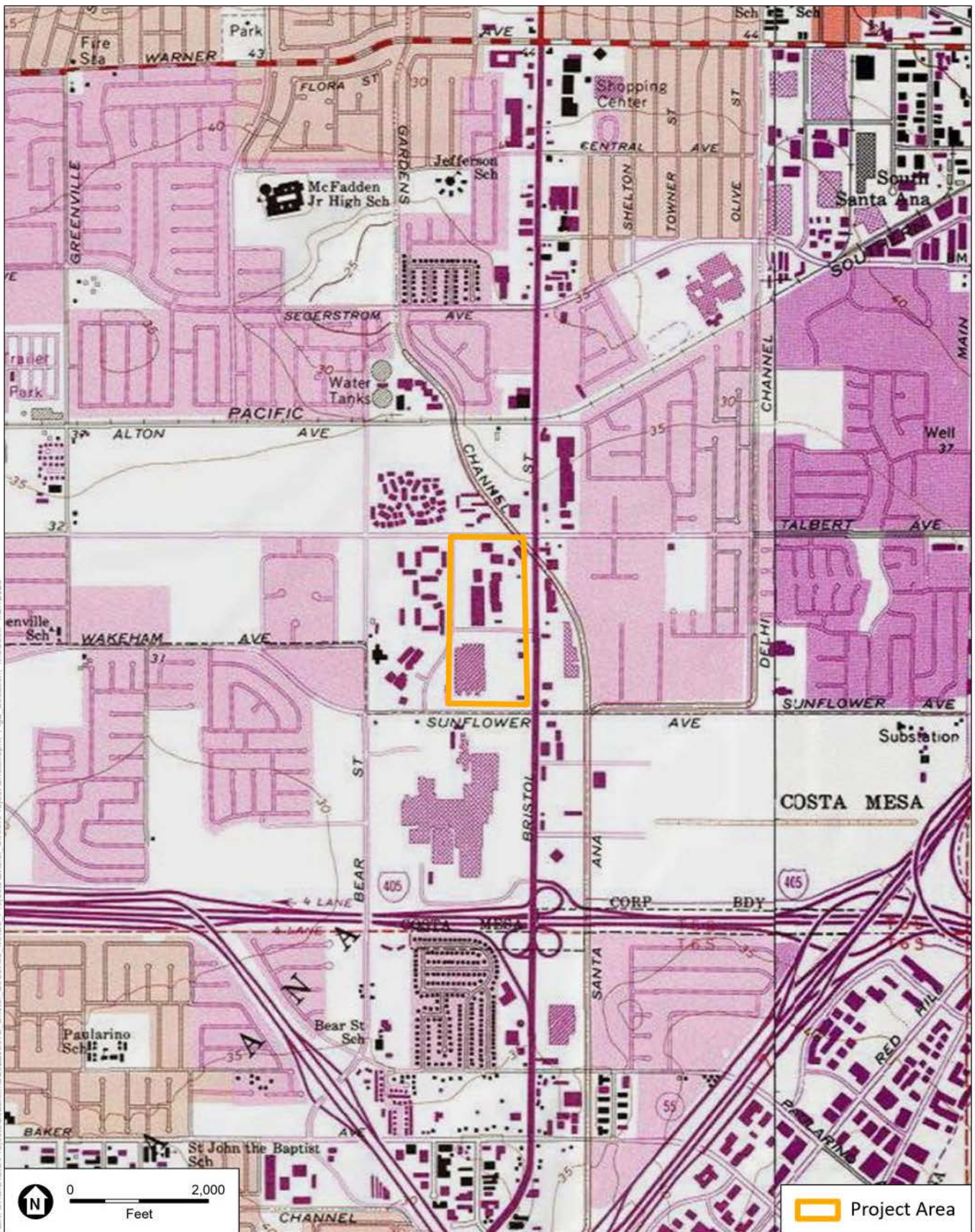
The Project proposes the redevelopment of an approximately 41.1-acre Project area bordered by MacArthur Boulevard to the north, Sunflower Avenue to the south, Bristol Street to the east, and Plaza Drive between MacArthur Boulevard and Callen's Common and by existing development between Callen's Common and Sunflower Avenue to the west. The Project area is a relatively flat and gently sloping area within the larger South Coast Metro area of Orange County (County), an intensive and urban mixed-use area. The Project area includes nine parcels (Assessor Parcel Numbers [APNs] 412-131-12, 412-131-13, 412-131-14, 412-131-16, 412-131-17, 412-131-22, 412-131-24, 412-131-25 and 412-131-26) and is developed with approximately 465,063 square



SOURCE: ESA, 2022

Related Bristol

**Figure 1**  
Regional Location



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SOURCE: USGS 2022; ESA, 2022

Related Bristol

**Figure 2**  
Project Location



feet (sf) of retail and restaurant uses with some medical office, financial, and fitness uses. The site includes 3 multi-story buildings and 13 one-story buildings with single and multiple tenants. All parking is provided in surface parking areas located throughout the Project area. The Project would demolish this existing shopping center and related infrastructure to allow for development of a mixed-use development with up to 3,750 multi-family residential units, up to 350,000 sf of commercial uses, a hotel with up to 250 keys, a senior living/continuum of care use with up to 200 units, and approximately 13 acres of common open space. Parking would be provided by above- and below-ground parking structures providing shared parking. One and two levels of subterranean parking are proposed. Where two levels are excavated, subterranean excavation would extend up to approximately 27 feet below grade.

The Project area is identified in the Santa Ana’s General Plan Land Use Element as being located within the South Bristol Street Focus Area. Within the General Plan South Bristol Street Focus Area, the Project area is designated District Center-High (DC-5). The District Center-High is a mixed-use designation identified in the General Plan as including “Transit-oriented and high-density urban villages consisting of visually striking and dynamic buildings and spaces with a wide range and mix of residential, live-work, commercial, hotel, and employment-generating uses.”.

## Regulatory Framework

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value that are afforded protection under federal and state laws and regulations. The following section summarizes the applicable federal, 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**

### **City of Santa Ana General Plan**

The City of Santa Ana’s updated General Plan Update (GPU) (October 2021) specifies, under Chapter 5.6, the following policies addressing paleontological resources shall be implemented at appropriate stage(s) of planning, coordinated with the processing of a project application, as follows:

**Policy 1.4 Protecting Resources** - Support land use plans and development proposals that actively protect historic and cultural resources. Preservation tribal, archeological, and paleontological resources for their cultural importance to communities as well as their research and educational potential

In addition, the Program Environmental Impact Report (PEIR) for the city’s GPU states that development consistent with the GPU could impact paleontological resources and therefore the following mitigation measures have been established to reduce these impacts to a less than significant level:

**GEO-1 High Sensitivity.** Projects involving ground disturbances in previously undisturbed areas mapped as having “high” paleontological sensitivity shall be monitored by a qualified paleontological monitor on a full-time basis. Monitoring shall include inspection of exposed sedimentary units during active excavations within sensitive geologic sediments. The monitor shall have authority to temporarily divert activity away from exposed fossils to evaluate the significance of the find and, if the fossils are determined to be significant, professionally and efficiently recover the fossil specimens and collect associated data. The paleontological monitor shall use field data forms to record pertinent location and geologic data, measure stratigraphic sections (if applicable), and collect appropriate sediment samples from any fossil localities.

**GEO-2 Low-to-High Sensitivity.** Prior to issuance of a grading permit for projects involving ground disturbance in previously undisturbed areas mapped with “low-to-high” paleontological sensitivity (see Figure 5.6-3), the project applicant shall consult with a geologist or paleontologist to confirm whether the grading would occur at depths that could encounter highly sensitive sediments for paleontological resources. If confirmed that underlying sediments may have high sensitivity, construction activity shall be monitored by a qualified paleontologist. The paleontologist shall have the authority to halt construction during construction activity as outlined in Mitigation Measure GEO-3.

**GEO-3 All Projects.** In the event of any fossil discovery, regardless of depth or geologic formation, construction work shall halt within a 50-foot radius of the find until its significance can be determined by a qualified paleontologist. Significant fossils shall be recovered, prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility in accordance with the standards of the Society of Vertebrate Paleontology (2010). The most likely repository is the Natural History Museum of Los Angeles County. The repository shall be identified and a curatorial arrangement shall be signed prior to collection of the fossils.

## Professional Standards

The following section provides a discussion of the professional standards employed by practicing paleontologists in determining the paleontological potential of geologic units and in assessing the significance of discovered fossils.

### Society of Vertebrate Paleontology Guidelines

The 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 and local regulatory agencies 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.
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. 2004).

## 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 tephtras), 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.

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.

## Geologic Setting

The proposed project lies at the southern end of the Los Angeles basin, a region of subsidence that has accumulated sediments from adjacent highland for millions of years (Yerkes et al., 1965). South of the project, bedrock exposures of the northern Peninsular Ranges—specifically the Santa Ana Mountains—display a crystalline core of Mesozoic-aged sediments and volcanics intruded by plutons. These sediments are overlain by a sequence of predominantly marine sediments ranging from the Cretaceous to the Pleistocene (Sylvester and O’Black Gans, 2016). Southwest of the project, these younger sediments are also exposed as uplifted and eroded marine terraces.

The project, specifically, lies immediately north of the San Joaquin Hills (marine terraces) in regions mapped as young Quaternary axial channel deposits (Qya). These regions merge into the flat valley floor composed of younger, recent alluvium (Qa) (Morton and Miller, 2006). Approximately, four miles south of the project, the landscape increases in elevation and the San Joaquin Hills and marine terraces expose bedrock of the Oligocene to Miocene Vaqueros, Sespe, and Topanga formations.



## Research

This report focuses on a desktop analysis of published geologic maps, geotechnical reports, and a review of paleontological resources records searches through the Natural History Museum of Los Angeles County (LACM). No pedestrian survey was carried out for the Proposed Project.

## Geological Review

The geological surface deposits in the Project area are depicted on the Morton and Miller (2006) geologic map of San Bernardino and Santa Ana quadrangles (**Figure 3**). It is clear from these maps that the entire project area lies on Holocene-aged axial channel deposits (Qya). These units are composed of slightly indurated silt, silt, and gravel (Morton and Miller, 2006). Adjacent to these units are deposits of Quaternary fans (Qyf) of similar lithology. Older, Pleistocene to Neogene deposits are not exposed within a few miles of the project area. However, as is often the case in the Los Angeles Basin, older alluvium may be found below the younger alluvium at depth. The Geotechnical Report (Group Delta, 2022) noted that in all five auger stem borings down to 30-70 feet below ground surface, only alluvium was encountered. Different horizons were delineated based on soil characteristics (e.g., 'lean clay.'). The report did not attempt to distinguish older early Holocene and late Pleistocene alluvium from younger deposits.

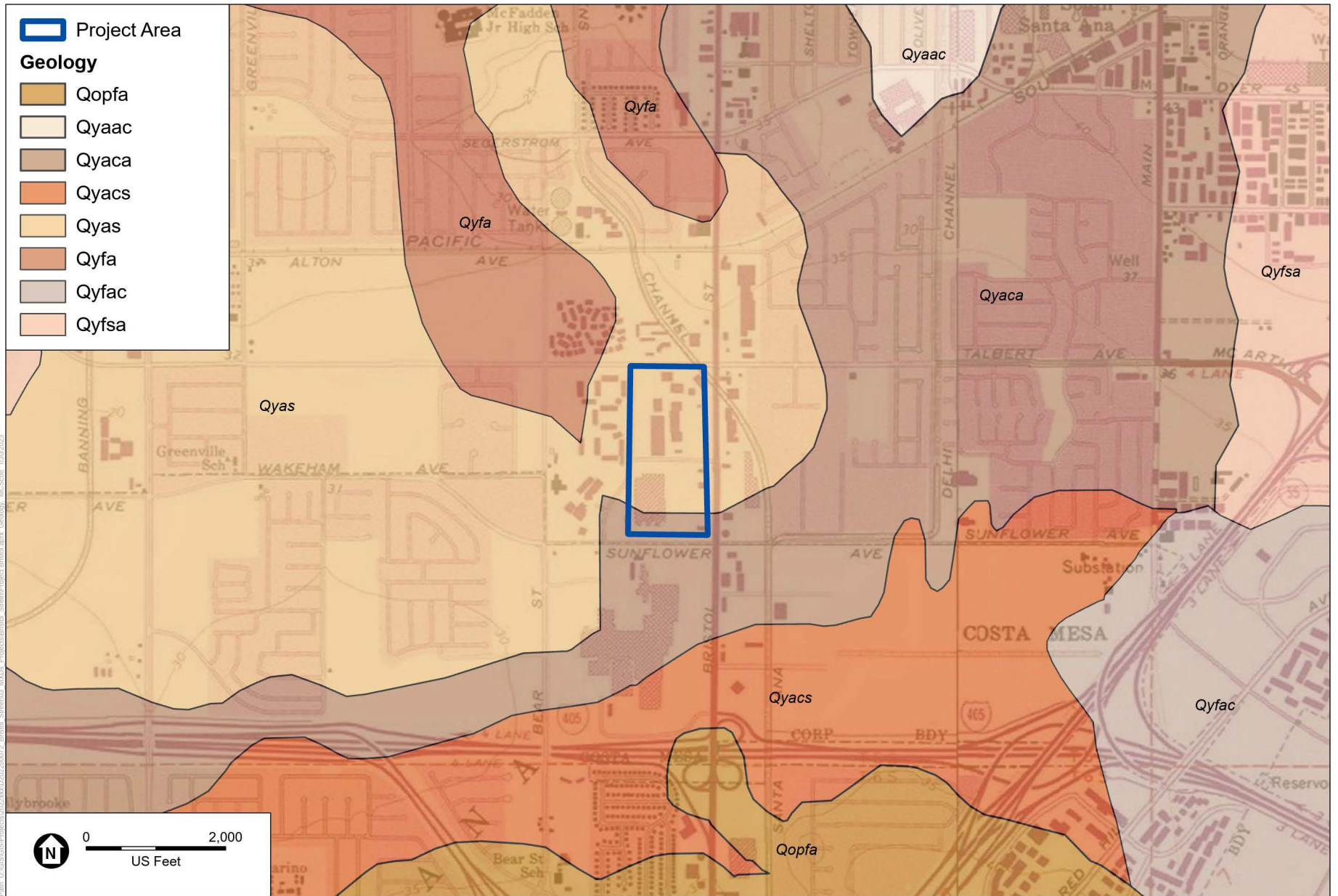
## Paleontological Resources Records Searches

### Natural History Museum of Los Angeles County

A paleontological resources database search was conducted by the LACM on August 14, 2022 (Bell, 2022). The search entailed an examination of current geologic maps and known fossil localities within the proposed project and vicinity. The purpose of the records search was to: (1) determine whether any previously recorded fossil localities occur in the proposed project area or vicinity; (2) assess the potential for disturbance of these localities during construction; and (3) assist in evaluating the paleontological sensitivity of the proposed project.

The LACM database search results indicate that no fossil localities have been recorded within the project area (**Appendix B**). However, there are fossil localities in the region from the same sedimentary deposits that occur in the project area, including LACM VP 3977, 3978, 3986, 3802, 4219, and 6370-6371 and LACM IP 4695, 4929, 5062, 5867, and 5092 (**Table 1**) (Bell, 2022). The LACM records search identified six fossil localities within the Project area's vicinity. Of these six fossil localities, four were identified within the Palos Verdes sands, one was identified within Pleistocene Terrace Deposits, and one was identified within the Fernando or Niguel Formations. The following paragraphs summarize these fossil localities by geologic unit.

Four fossil localities were identified within the Palos Verdes sands including LACM VP 4219 and LACM IP 4695, 4929, and 5062. Locality LACM IP 4695 is situated at the intersection of Bristol St. and Paularino Ave., Costa Mesa (approximately 0.75 miles south of the proposed project) and yielded fossil Invertebrates including clam (*Saxidomus*) and bryozoan (*Bryozoa indet.*, *Conopeum*) within Palos Verdes Sands at an unknown depth. Locality LACM IP 4929 is



SOURCE: Morton, D.M., and Miller, F.K., 2006; ESA, 2021

Related Bristol

**Figure 3**  
Geology

**TABLE 1  
LACM FOSSIL LOCALITIES**

<b>Locality Number</b>	<b>Location</b>	<b>Formation</b>	<b>Taxa</b>	<b>Depth</b>	<b>Approximate Distance to Proposed Project</b>
LACM VP 3802	Newport Back Bay Cliffs, Vista del Oro	Fernando or Niguel Formation (Highly fossiliferous grey unconsolidated sand & consolidated silt; early Pleistocene)	Shark (Carcharodon sulcidena and Isurus oxyrinchus) and invertebrates (including Acmaea, Lottia, Euvola, Dendrostrea, Coronula)	Unknown	3 mi S
LACM VP 3977, 3978, 3986; LACM IP 5867, 5092	Southeast of the intersection of University Drive & MacArthur Boulevard, Costa Mesa	Fernando Formation (flat-lying; fine grained silty sand)	Turkey family (Meleagridae); Artiodactyla; Invertebrates (brachiopods, molluscs)	Roadcut 11-25 feet above roadbed	3 mi SE
LACM VP 4219, LACM IP 5062	SW end of the Newport Fwy between Santa Isabel Ave & 23rd St	Palos Verdes Sand (coarse poorly sorted friable sand)	Camel family (Camelidae), sea turtle (Cheloniidae); uncatalogued fish and birds; invertebrates	30 feet bgs	2.5 mi SW
LACM IP 4695	Bristol St. and Paularino Ave., Costa Mesa	Palos Verdes Sand	Invertebrates - clam (Saxidomus), bryozoan (Bryozoa indet., Conopeum)	Unknown	0.75 mi S
LACM IP 4929	Drainage channel, north of Irvine Avenue, Costa Mesa	Palos Verdes Sand	Invertebrates (Ostrea and Anomia)	Surface	3 mi SW
LACM VP 6370-6371	near the intersection of Superior Avenue & Pacific Coast Highway; Newport Beach	Terrace deposits (Pleistocene, silty sandstones)	Horse (Equus), other unspecified mammals; Invertebrates: clam (Tivela, Donax, Lucinisca), scaphopod (Dentalum, Antalis), marine gastropods (Glossaulax, Chlorostoma)	Unknown	6 mi SW

VP: Vertebrate Paleontology; IP: Invertebrate Paleontology; Bgs: Below ground surface

situated in a drainage channel, north of Irvine Avenue in Costa Mesa (approximately 3 miles southwest of the proposed project), which produced a fossil Invertebrates (*Ostrea* and *Anomia*) at surface in Palos Verdes Sand. Localities LACM VP 4219 and LACM IP 5062 are located at the southwest end of the Newport Freeway between Santa Isabel Avenue and 23rd Street (approximately 2.5 miles southwest of the proposed project) and yielded fossil Camel family (Camelidae), sea turtle (Cheloniidae); uncatalogued fish and birds; invertebrates at 30 feet bgs within Palos Verdes Sand (Bell, 2022).

Locality LACM VP 6370-6371 are situated near the intersection of Superior Avenue and Pacific Coast Highway in Newport Beach (approximately 6 miles southwest of the proposed project) and yielded fossils of Horse (*Equus*), other unspecified mammals, clam (*Tivela*, *Donax*, *Lucinisca*), scaphopod (*Dentalium*, *Antalis*), and marine gastropods (*Glossaulax*, *Chlorostoma*) within Pleistocene Terrace deposits at an unknown depth.

Localities LACM VP 3977, 3978, 3986 and LACM IP 5867, 5092 are located southeast of the intersection of University Drive and MacArthur Boulevard in Costa Mesa (approximately 3 miles southeast of the proposed project) and yielded fossils from the Turkey family (*Meleagridae*), Artiodactyla, brachiopods, and molluscs in a roadcut 11-25 feet above roadbed in the Fernando Formation. Locality LACM VP 3802 is located near the Newport Back Bay Cliffs in Vista del Oro (approximately 3 miles south of the proposed project) and produced fossil Sharks (*Carcharodon sulcidena* and *Isurus oxyrinchus*) and invertebrates (including *Acmaea*, *Lottia*, *Euvola*, *Dendrostrea*, *Coronula*) at an unknown depth the Fernando or Niguel Formations.

These localities are not from the same surficial deposit (Qya) as that mapped for the majority of the Project area, but rather are from units mapped as older Pleistocene terraces (Qop). This explains the predominance of marine invertebrates. While there is a potential that older marine units may exist below the project area, the geotechnical report did not make note of marine sediments.

## Paleontological Sensitivity Analysis

The review of the geologic mapping and record search results from the LACM were used to assign paleontological sensitivity to the geologic units present in the Proposed Project following the guidelines of the SVP (2010) and are as follows:

- **Young axial-channel deposits (Holocene and late Pleistocene) (Qya)** – slightly to moderately consolidated clay, silt, sand, and gravel. These units are too young at the surface to host paleontological resources. However, older alluvium at depth may contain significant fossils if encountered. ***Low potential increasing with depth.***

The young axial-channel deposits (Qya) found in the majority of the Project area date from the Holocene to perhaps the Late Pleistocene (which date back to approximately 12,000 years ago). Based on the age, this unit has a low potential of yielding fossil resources at surface; however, that potential increases with depth. All of the nearby recorded LACM fossils are from geological units not found in the project area, but to the south along uplifted older (Pleistocene) marine terraces.

## Conclusions and Recommendations

Based on the available evidence from published geological maps and museum records searches, it is unlikely that excavation at the surface will impact fossil resources due to the young age. Known resources in the general area are largely confined to the uplifted marine terraces and it is not likely that similar deposits would be found in the subsurface of the immediate project area. However, the Los Angeles basin has been an actively subsiding basin for several million years so it is probable that older, Pleistocene age alluvium may exist below the younger axial channel deposits. Estimating the depth is difficult, so as an approximation for the Los Angeles area, an estimate of 20 feet below ground surface (bgs) is a realistic value. The geotechnical report notes a sedimentological shift to well-graded sands at 27 feet bgs in boring B-1 and B-3, and at 30-32 feet bgs in B-2 and B-4 (Group Delta, 2022). While it is not known if this is a shift to Pleistocene fossil-bearing strata, the sedimentologic shift does note an environmental change. Based on the information above, the following mitigation measures are recommended to reduce impacts to paleontological resources to less than significant. These measures are based on mitigation measures GEO-1 and GEO 3 from the City's GPU PEIR; however, they include additional requirements that are not mentioned in these or in other mitigation measures from the City's GPU PEIR.

### Recommended Mitigation Measures

**Mitigation Measure PALEO-1: Retention of a Qualified Paleontologist.** Prior to the start of excavation, the client shall retain a Qualified Paleontologist who meets the professional criteria established by the Society of Vertebrate Paleontology (SVP 2010) to oversee the implementation of all paleontological resources mitigation requirements for the Proposed Project.

**Mitigation Measure PALEO-2: Paleontological Resources Sensitivity Training.** Prior to the start of excavations, the Qualified Paleontologist, or their designee, shall conduct paleontological resources awareness training for onsite personnel. The training session shall focus on how to identify paleontological resources that may be encountered during excavations and the procedures to be followed in the event of their discovery. The City shall ensure onsite personnel are made available for and attend the training and retain documentation demonstrating attendance.

**Mitigation Measure PALEO-3: Paleontological Monitoring.** Paleontological resources monitoring shall be required for excavations below 20 feet below ground surface (bgs). Paleontological monitoring shall be conducted by a monitor who meets the professional criteria established by the Society of Vertebrate Paleontology (SVP 2010) working under the direct supervision of the Qualified Paleontologist. Monitoring can be reduced, or ceased entirely, if determined adequate by the Qualified Paleontologist. Recommendations for reduction or cessation of monitoring will be based on a more accurate understanding of the lithologic character and age of the sediments exposed during excavation. If deeper excavations continue to encounter younger, Holocene alluvium, monitoring shall be reduced from full-time to part-time monitoring or weekly inspections. If the Qualified Archaeologist determines, based on the lithologic character of the sediments, that there is very little likelihood of impacting Pleistocene marine sediments, paleontological monitoring shall cease entirely.

The paleontological monitor shall collect any identifiable fossils encountered during the excavations. If onsite personnel discover potential fossils during excavations when a paleontological monitor is not present, they shall cease excavation within 50 feet of the discovery and contact the Qualified Paleontologist. Construction activities may resume after the discovery is assessed by the Qualified Paleontologist and appropriate treatment measures have been implemented.

**Mitigation Measure PALEO-4: Paleontological Resources Treatment and Disposition.** Significant fossils shall be prepared to the point of identification and cataloged. Significant fossils shall be 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, then the fossils may be donated to a local museum, historical society, school, or other institution for educational purposes. Accompanying notes, reports, maps, and photographs shall also be filed with the final repository.

**Mitigation Measure PALEO-5: Paleontological Resources Monitoring Report.** Upon completion of the excavation phase of the project, the Qualified Paleontologist shall prepare a report summarizing the results of the monitoring efforts. The report shall be submitted to the City to signify the satisfactory completion of required paleontological mitigation measures. If significant fossils are discovered, the report shall also be submitted to the appropriate repositories.

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