

3.6 GEOLOGY AND SOILS

This section describes the environmental and regulatory setting for geology and soils. It also describes existing conditions and potential impacts related to geology and soils that would result from implementation of the Project, and mitigation for potentially significant impacts, where feasible.

SUMMARY OF IMPACTS

The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; however, with implementation of Mitigation Measure GEO-1, impacts would be less than significant.

Development of the residential component of the ORCC Specific Plan Project could result in discovery of undiscovered paleontological resources at depths greater than an estimated 5 feet due to the geologic units underlying the site. Specific impact findings associated with the development of the ORCC Specific Plan Project are being evaluated separately by the City in a standalone EIR.

3.6.1 Environmental Setting

Paleontological Resources

Fossils are evidence of ancient life, defined by the Society of Vertebrate Paleontology (SVP) (2010) as being over 5,000 years in age, or middle Holocene. While CEQA does not define a significance threshold for paleontological resources, the standards of the SVP (2010) are often used in the absence of a legal definition. The SVP defines scientifically important fossils as:

identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years). [SVP 2010: 11].

Using this definition, the concept of scientific importance is included in the definition of paleontological resources; thus, not all fossils are considered to be paleontological resources. The threshold for scientific importance varies with factors such as geologic unit, geographic area, the current state of scientific research, and may also vary between different agencies (Murphey et al. 2019). Paleontological studies have developed criteria for the assessment of scientific importance of fossil discoveries (e.g., Murphey et al. 2019, Scott and Springer 2003). In general, these studies assess fossils as scientifically important if one or more of the following criteria apply:

- The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct.



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- 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, through biochronology or biostratigraphy and the correlation with isotopic dating.
- The fossils provide ecological data, such as the development of biological communities, the interaction between paleobotanical and paleozoological biotas, or the biogeography of lineages.
- The fossils demonstrate unusual or spectacular circumstances in the history of life.
- The fossils provide information on the preservational pathways of paleontological resources, including taphonomy, diagenesis, or preservational biases in the fossil record.
- 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.
- The fossils inform our understanding of anthropogenic affects to global environments or climate.

A review of geologic mapping, the scientific literature, online collections data from the University of California Museum of Paleontology, and a records search from the Natural History Museum of Los Angeles County was conducted to identify the geologic units likely present at the surface or in the subsurface of the Project site and assess their potential for preserving paleontological resources (Appendix E).

This study indicates four geologic units are mapped at the surface of the Project site: beach and paralic estuarine deposits, which are assessed as having low paleontological potential; unit 2 of young alluvium which is assessed as having low-to-high paleontological potential, increasing with depth, and old shallow marine deposits on a wave-cut surface, which are assessed as having high paleontological potential. Additionally, older Pleistocene-aged marine formations with high paleontological potential such as the San Pedro Formation, Palos Verdes Sand, the Lomita Marl, and the Timms Point Silt may be present in the subsurface, underlying the other units.

3.6.2 Regulatory Setting

Federal

Paleontological Resources Preservation Act

The federal Paleontological Resources Preservation Act of 2002 limits the collection of vertebrate fossils and other rare and scientifically significant fossils to qualified researchers who have obtained a permit from the appropriate state or federal agency. Additionally, it specifies these researchers must agree to donate any materials recovered to recognized public institutions, where they will remain accessible to the public and to other researchers. This Act incorporates key findings of a report, Fossils on Federal Land and Indian Lands, issued by the Secretary of Interior in 2000, which establishes that most vertebrate fossils and some invertebrate and plant fossils are considered rare resources (DOI 2000).



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State

California Environmental Quality Act

CEQA (PRC Sections 21000 et seq) requires that before approving most discretionary projects, the Lead Agency must identify and examine any significant adverse environmental effects that may result from activities associated with such projects. As updated in 2016, CEQA separates the consideration of paleontological resources from cultural resources (PRC Section 21083.09). The Appendix G checklist (Title 14, Division 6, Chapter 3, California Code of Regulations 15000 et seq.) requires an answer to the question, “Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?” Under these requirements, Stantec has conducted a paleontological resources assessment to determine impacts of the proposed project on paleontological resources within the Project area.

California Public Resources Code Section 5097

PRC Section 5097.5 prohibits the destruction or removal of any paleontological site or feature from public lands without the permission of the jurisdictional agency.

California Penal Code Section 622.5

The California Penal Code (PC) Section 622.5 details the penalties for damage or removal of paleontological resources, whether from private or public lands.

California Coastal Act

The California Coastal Act (PRC Division 20) requires reasonable mitigation measures where development would adversely impact archaeological or paleontological resources that have been designated by the State Historic Preservation Officer (Section 30244).

Local

City of Seal Beach General Plan

The City’s General Plan is a comprehensive long-range general plan for the physical development of the City of Seal Beach (City of Seal Beach 2003). The General Plan contains the current Housing Element Update, which was adopted in 2022. The various elements within the General Plan include goals and policies for the physical development of the City. The City’s General Plan goals and policies applicable to paleontological resources are presented below:

Cultural Resources Element

The City’s Cultural Resources Element contains the following goals and policies related to cultural resources, specifically paleontological resources, that apply to the Project:

Goal 1: Preserve and protect historical, archaeological, and paleontological resources.



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Protect Significant Paleontological Resources

Assess development proposals for potential impacts to significant paleontological resources pursuant to Section 15064.5 of the California Environmental Quality Act. If the project involves earthwork, require a study conducted by a professional paleontologist to determine if palaeontologic assets are present and if the project will significantly impact the resources. If significant impacts are identified, either require the project to be modified to avoid impacting the palaeontologic materials or require measures to mitigate the impacts.

Development Services is the primary City department responsible for ongoing implementation, and funding is anticipated to be provided by development fees.

3.6.3 Environmental Impacts

This section analyzes the Project's potential to result in significant geology and soils impacts. When an impact is determined to be significant, mitigation measures are identified that would reduce or avoid impacts.

Methodology for Analysis

The following analysis is based on a review of documents pertaining to the Project site, including the General Plan and the Paleontological Resources Technical Report prepared by Stantec Consulting Services for the Project (Appendix E). The following impact discussions consider the effects of the Project related to geology and soils, specifically paleontological resources, in the City.

Thresholds of Significance

In accordance with the CEQA Guidelines' Appendix G Environmental Checklist, the following questions were analyzed and evaluated to determine whether the Project's geology and soils impacts are significant.

Would the Project:

- *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

The following issues were determined to have no impact or a less than significant impact during the NOP Scoping. These issues are summarized in Section 6.0, Effects Found Not to Be Significant, and are not discussed further in this section.

Would the Project:

- *Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:*
 - *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?*



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- *Strong seismic ground shaking?*
- *Seismic-related ground failure, including liquefaction?*
- *Landslides?*
- *Result in substantial soil erosion or the loss of topsoil?*
- *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*
- *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?*
- *Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?*

Impact Analysis and Mitigation Measures

Paleontological Resource or Geologic Feature

Impact GEO-1	The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
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Impact Analysis

As the Project does not include proposal of any specific developments or ground disturbing activities at this time, there are no direct adverse impacts to paleontological resources. However, future developments conducted as a result of the Project can be reasonably expected to include ground disturbance activities. New ground disturbance that occurs in geologic units with high paleontological potential may encounter paleontological resources. Should discovery of undiscovered paleontological resources occur during one of the resulting future development projects resulting from the Project, the damage or destruction of the resources would constitute an indirect adverse impact of this Project. Within the Project area, this could occur at any depth in the Housing Opportunity Sites 1, 3, 7, or Main Street Program area, and at depths greater than an estimated 5 feet at the Housing Opportunity Sites 2, 4, 5, 6, and 8. The differences in depths that discovery of undiscovered paleontological resources could occur at is based on the geologic units underlying the sites. Young alluvium is mapped throughout the northeastern portion of the Project area where Housing Opportunity Sites 2, 4, 5, 6, and 8 are located. Younger surficial sediments (alluvium, lacustrine, eolian, etc.) have low potential to preserve paleontological resources due to their age; yet sediments increase in age with depth and so these surficial deposits often overlay older units that have high paleontological potential. Therefore, the potential for undiscovered paleontological resources to occur within the geologic unit underlying Housing Opportunity Sites 2, 4, 5, 6, and 8 increases with depth.

Potential future developments would be required to comply with the federal Paleontological Resources Preservation Act that limits the collection of vertebrate fossils and other rare and scientifically significant



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fossils to qualified researchers who have obtained a permit from the appropriate state or federal agency and PRC Section 5097 that prohibits the removal of any paleontological site or feature from public lands without the permission of the jurisdictional agency. Ground-disturbing construction activities (e.g., grading and excavation) associated with potential future developments in the Project area could uncover fossilized remains of organisms from prehistoric environments that have not been recorded.

Implementation of Mitigation Measure GEO-1 which requires preparation of a paleontological monitoring program for each future development would ensure that potential impacts to undiscovered paleontological resources are reduced. As such, compliance with federal, state, and local regulations pertaining to paleontological resources, in addition to Mitigation Measure GEO-1, would ensure that potential future developments that results from implementation of the Project would not directly or indirectly cause substantial adverse effects to paleontological resources and impacts would be less than significant.

This EIR includes a discussion of the residential component of the ORCC Specific Plan Project based on the site location and proposed buildout of the 167 dwelling units that are included within the City's site inventory to meet its RHNA requirements. The residential component of the ORCC Specific Plan Project is located adjacent to Housing Opportunity Sites 4 and 5. As identified above, undiscovered paleontological resources could be discovered at depths greater than an estimated 5 feet at Housing Opportunity Sites 4 and 5. As the geologic units underlying the residential component of the ORCC Specific Plan Project is also identified as young alluvium similar to Housing Opportunity Sites 4 and 5, it is anticipated that undiscovered paleontological resources could be discovered at depths greater than an estimated 5 feet for the ORCC Specific Plan Project site. Specific impact findings associated with the development of the ORCC Specific Plan Project are being evaluated separately by the City in a standalone EIR.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM GEO-1: Paleontological Monitoring Program. Prior to the issuance of the first action and/or permit which would allow for site disturbance (e.g., grading permit), a paleontologist meeting professional standards as defined by Murphey et al. (2019) as a Principal Investigator shall be retained as the designated Project Paleontologist for each development, to review project-specific construction plans and develop a project-specific paleontological mitigation program. The mitigation program should be outlined in a Paleontological Monitoring and Mitigation Plan tailored to specific construction plans and geotechnical studies, should these be available, that identifies when or under what conditions paleontological monitoring should be implemented. The plan should include:

- A Worker's Environmental Awareness Program training developed by the Project Paleontologist that communicates requirements and procedures for the inadvertent discovery of paleontological resources during construction to be delivered by the paleontologist or their designated representative to the construction crew prior to the onset of ground disturbance.



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- Fulltime paleontological monitoring when work occurs in the geologic units assessed as having high paleontological potential, which is expected to occur when work exceeds 5 foot in depth in unit 2 of the young alluvium, or when work occurs at any depth in old shallow marine deposits on a wave-cut surface, the San Pedro Formation, the Paleo Verdes Sand, the Lomita Marl, and the Timms Point Silt. Work into previously disturbed sediments, beach deposits, paralic estuarine deposits, or the upper 5 feet of unit 2 of the young alluvium does not require monitoring. After the initiation of the monitoring work, the Project Paleontologist may reduce the frequency or depths of monitoring should low paleontological potential sediments be identified in the monitoring area.
- Procedures to follow in the event that paleontological resources are encountered during construction activities, including work stoppage in a safe radius of the finds, usually 50 feet, assessment by the Project Paleontologist, and, should the fossils be of scientific importance, collection and curation in an accredited repository along with associated data such as photographs, GPS coordinates, lithological descriptions, and depth data, as well as curation fees.
- A Paleontological Monitoring Report documenting the results of the mitigation program.

Level of Significance After Mitigation

Less Than Significant Impact with Mitigation.

3.6.4 Cumulative Impacts

CEQA requires that EIRs evaluate the potential cumulative impacts of a project. A project's environmental impacts are "cumulatively considerable" if the "incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (CEQA Guidelines Section 15065(a)(3)).

As discussed in Section 3.0, Environmental Analysis, CEQA Guidelines Section 15130 requires cumulative impact analysis in EIRs to consider a list of planned and pending projects that may contribute to the cumulative impacts of a project. Section 3.0, Table 3.0-3 identifies all past, present, and probable future residential projects in the City and surrounding areas that may impact the Project. As identified in Table 3.0-2 in Section 3.0, Environmental Impact Analysis, cumulative context for geology and soils impacts is the immediate project vicinity. However, the cumulative context for paleontological resources analyzed in this section is limited to the specific project site. The potential for impacts to occur to known and unknown paleontological resources is site-specific and cannot combine with cumulative projects to produce a larger impact and therefore, impacts related to paleontological resources does not contribute to cumulative impacts.

Potential impacts would be site-specific and would require evaluation on a case-by-case basis at the project level when future development is proposed. Unless exempt, each cumulative project would require separate discretionary approval and evaluation under CEQA, which would address potential



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impacts concerning geology, soils, and paleontological resources and identify necessary mitigation measures, where appropriate.

As identified above, the Project would not result in significant impacts to paleontological resources with the incorporation of the identified mitigation measure. Any future developments facilitated by the Project would be required to comply with this mitigation measure and cumulative developments would be anticipated to require implementation of similar mitigation measures to reduce potential impacts. Therefore, the Project's contribution to potentially cumulatively considerable impacts would be less than significant with the implementation of mitigation measures identified in this section and compliance with applicable federal, state, and local regulations.

3.6.5 References

- City of Seal Beach. 2003. City of Seal Beach General Plan Cultural Resources Element <https://www.sealbeachca.gov/Portals/0/Documents/Cultural%20Resources.pdf>. Accessed October 2024.
- Murphey, P., G. Knauss, L. Fisk, T. Demere, and R. Reynolds. 2019. Best practices in mitigation paleontology. *Proceedings of the San Diego Society of Natural History* 47: 43 pp.
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- Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the assessment and Mitigation of adverse impacts to paleontological resources. https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines.pdf. Accessed October 2024.
- U.S. Department of the Interior (DOI). 2000. Fossils on Federal & Indian Lands, Report of the Secretary of the Interior. https://www.blm.gov/sites/blm.gov/files/programs_paleontology_quick%20links_Assessment%20of%20Fossil%20Management%20on%20Federal%20%26%20Indian%20Lands%2C%20May%202000.pdf. Accessed November 2024.

