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PALEONTOLOGY REPORT

SAN PEDRO WATERFRONT PROJECT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT (EIR/EIS) CITY OF LOS ANGELES LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

Chad R. Beckstrom
Jones & Stokes
17310 Red Hill Avenue, Suite 320
Irvine, CA 92614

Prepared by:

Department of PaleoServices
San Diego Natural History Museum
P.O. Box 121390
San Diego, California 92112

Thomas A. Deméré, Ph.D., Director

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INTRODUCTION

The Port of Los Angeles proposes to re-develop portions of the San Pedro Waterfront. The Area of Potential Effect (APE) includes approximately 418 acres from the Vincent Thomas Bridge to the federal breakwater within the property of the City of Los Angeles, Harbor Department. For planning purposes, the project area has been subdivided into six districts as follows: Piers District, Downtown Harbor District, Ports O' Call/S.P. Slip District, 22nd Street/Marina District, Beach District, and Outer Harbor/Warehouse District (Figure 1).

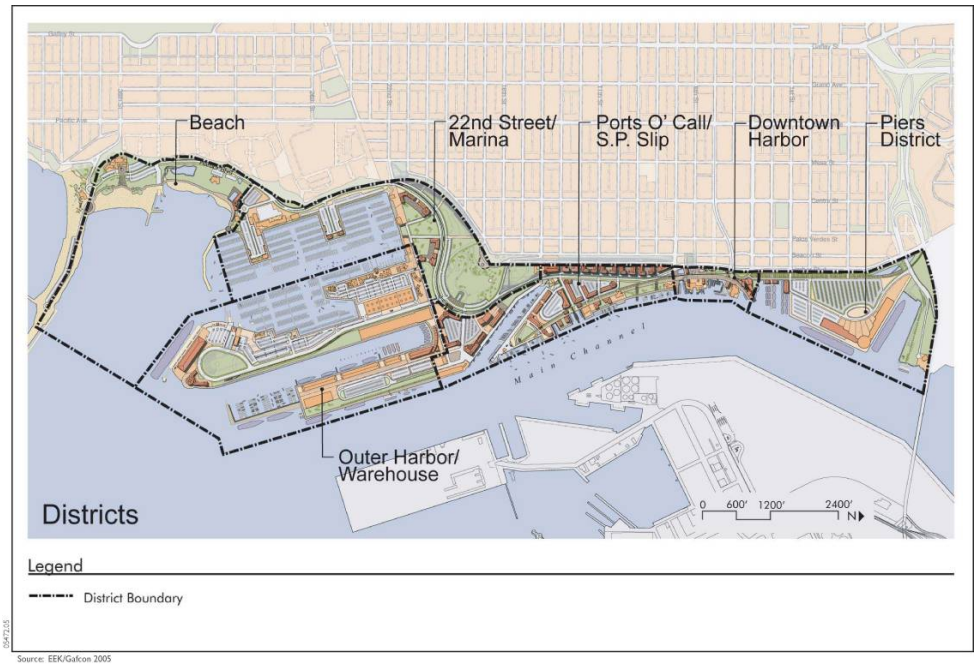

Figure 1. Map of the project area showing the six districts.

This technical report provides an assessment of issues related to paleontological resources within the project footprint. The purpose of this report is to assist Port of Los Angeles staff in planning and design efforts for the proposed project, as it relates to paleontological resource issues. Specifically, this report is intended to summarize existing paleontological resource data in the project area and vicinity; assess potential impacts to paleontological resources from implementation of the project; and identify mitigation measures to avoid or reduce project-related impacts wherever feasible. Additional discussion of report methodology is provided below. This report was prepared by Michael X. Kirby and Thomas A. Deméré of the Department of PaleoServices at the San Diego Natural History Museum, San Diego, California.

As defined here, paleontological resources (i.e., fossils) are the remains and/or traces of prehistoric plant and animal life exclusive of humans. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits (rock formations) within which they were originally buried. For the purposes of this report, paleontological resources can be thought of as including not only the actual fossil remains but also the collecting localities and the geologic formations containing those localities.

METHODOLOGY

A review was conducted of relevant published geologic reports, unpublished geotechnical reports, unpublished paleontological reports, and museum paleontological site records (San Diego Natural History Museum-SDNHM; Natural History Museum of Los Angeles County-LACM; University of California Museum of Paleontology). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic formations within which they are entombed. By knowing the geology of a particular area and the fossil productivity of particular formations that occur in that area, it is possible to predict where fossils will, or will not, be encountered.

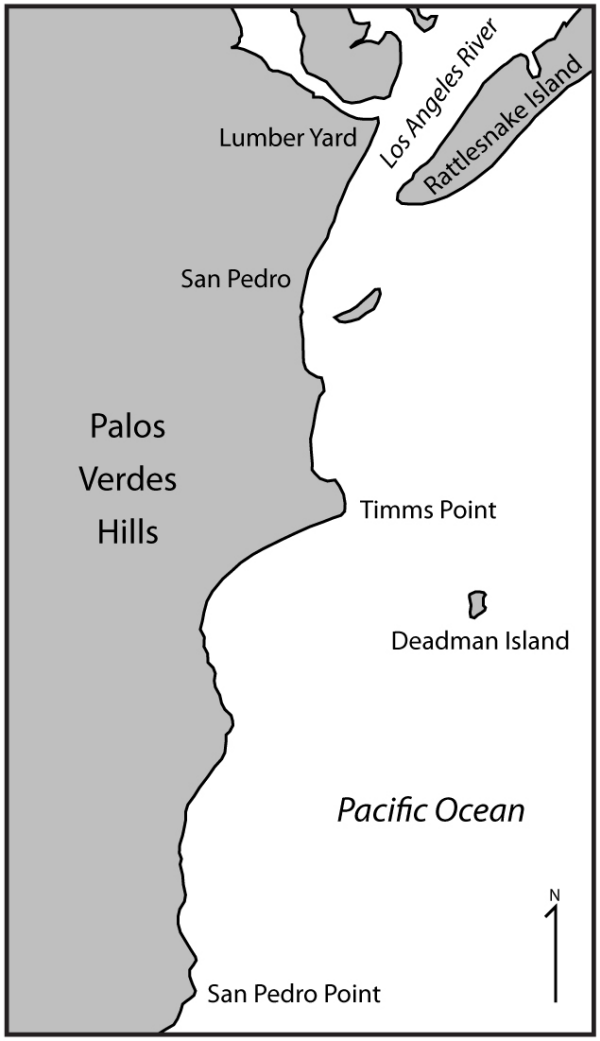

Figure 2. Locality map showing the original shoreline in 1859. Data from Ord et al. (1859)

In order to infer where bedrock may exist in the subsurface relative to artificial fill materials, we also examined ancient navigational charts that showed the original shoreline before development (Figure 2). Comparing the historical shoreline to the modern shoreline allowed us to infer what portions of the project area may have artificial fill materials relative to bedrock in the subsurface. Additional comparison with the geologic map of Woodring et al. (1946) allowed us to further infer where bedrock was formerly exposed during the 1940s. Figure 3 shows the historical shoreline present in 1859 superimposed onto the project area. The outline of pre-Holocene bedrock is also superimposed onto the project area. This figure permits inferences to be made as to the nature of the subsurface in any given area and will be used for the impact analysis.

EXISTING CONDITIONS

Physical Geological Setting

The San Pedro Waterfront project is located on the eastern-side of the Palos Verdes Hills within the southwestern portion of the Los Angeles Basin. The waterfront forms the western shore of the Los Angeles Harbor (Port of Los Angeles). The geology, stratigraphy, and paleontology of the Palos Verdes Hills area have been described by many researchers over the past hundred years (Arnold and Arnold, 1902; Arnold, 1903; Crickmay, 1929; Clark, 1931;

Woodring et al., 1946; Miller, 1971; Kennedy, 1975; Ponti, 1989; Ponti et al., 2007; Powell and Ponti, 2007) and hold an important place in the history of California geological investigations.

The Palos Verdes Hills consist of a Jurassic-age metamorphic basement complex (Catalina Schist) that is overlain by about 3000 feet of sedimentary rock formations of Miocene, Pliocene, and Pleistocene age (Woodring et al., 1946). As mapped by Woodring et al. (1946), the geologic deposits underlying the San Pedro Waterfront project area consist of artificial fill materials, Quaternary alluvium, non-marine terrace deposits, Pleistocene-age marine terrace deposits of the Palos Verdes Sand, Pleistocene-age offshore marine deposits of the San Pedro Sand and Timms Point Silt, and Miocene-age marine deposits of the Malaga Mudstone member of the Monterey Shale.

Artificial Fill Materials

Introduction. The geologic map of Woodring et al. (1946) indicates that artificial fill materials and/or Quaternary alluvium underlie most of the project area (unfortunately, these authors did not differentiate artificial fill materials from Quaternary alluvium). The location of the historical shoreline in 1859 indicates that much of the area mapped by Woodring et al. (1946) as artificial fill materials and/or Quaternary alluvium was land in 1859 (Figure 3). We, therefore, infer that artificial fill materials are only present in the areas between the original 1859 shoreline and the modern shoreline. Artificial fill materials were presumably used in these areas to enlarge port facilities. These artificial fill materials presumably were derived from earlier channel dredging operations and were placed in such a way as to provide topographically high areas for development. The thickness of these fill materials is uncertain and therefore depth of cover to buried bedrock deposits is not known.

Paleontology. No fossils of scientific interest are located in the artificial fill materials. Any contained organic remains have lost their original stratigraphic/geologic context due to the disturbed nature of the artificial fill materials.

Distribution in Project Area. The eastern portions of the Downtown Harbor, Ports O' Call/S.P. Slip, 22nd Street/Marina, and Beach districts are underlain by artificial fill materials. The Outer Harbor/Warehouse District is entirely underlain by artificial fill materials. Due to the loss of their stratigraphic/geologic context, any organic remains (e.g., fossil) occurring within the artificial fill materials are considered to possess essentially no paleontological resource sensitivity. Artificial fill materials overlie Quaternary alluvium and/or Pleistocene-age San Pedro Sand.

Quaternary Alluvium

Introduction. Quaternary alluvium in the project area primarily consists of silt, sand, and gravel transported and deposited by the Los Angeles River (Woodring et al., 1946). These deposits are assumed to be entirely Holocene in age (approximately 0 to 10,000 years old). Quaternary alluvium is underlain by marine sandstones of the Pleistocene-age San Pedro Sand and may be overlain in part by artificial fill materials.

Paleontology. Because of the recent age of the Quaternary alluvial deposits and their close association with modern drainages, any contained organic remains (e.g., sub-fossil) are too young to be considered paleontological resources.

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that portions of the Piers, Downtown Harbor, Ports O' Call/S.P. Slip, 22nd Street/Marina, and Beach districts are underlain by Quaternary alluvium. Due to the youthful nature of the Quaternary alluvial deposits, they are considered to possess essentially no paleontological resource sensitivity.

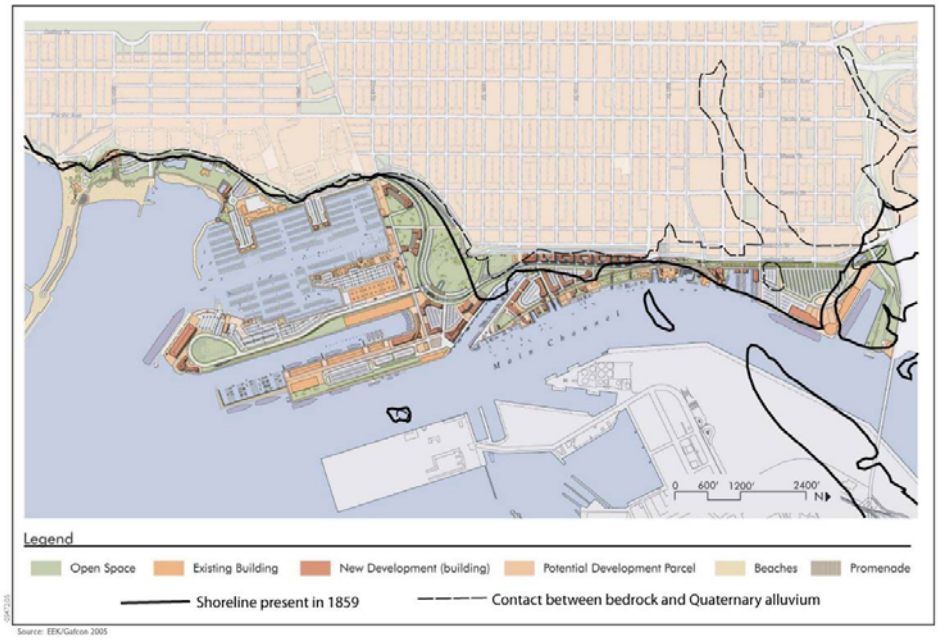

Figure 3. Map of the project area showing the original shoreline in 1859 and the contact between bedrock and Quaternary alluvium. Data from Ord et al. (1859) and Woodring et al. (1946).

Non-marine Terrace Deposits

Introduction. Non-marine terrace deposits consist of poorly sorted sand and gravel that overlie marine deposits on terraces in the Palos Verdes Hills area (Woodring et al., 1946). They represent cliff talus, stream fan and channel, and slope wash, and are thought to be late Pleistocene to Holocene in age. Non-marine terrace deposits overlie deposits of the Pleistocene-age Palos Verdes Sand, San Pedro Sand, and Timms Point Silt, and the Miocene-age Malaga Mudstone member.

Paleontology. Land mammals have been reported from the non-marine terrace deposits in the Palos Verdes Hills. Woodring et al. (1946) described several fossil localities containing ground sloth, horse, camel, bison, and mammoth.

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that non-marine terrace deposits once existed in the southwestern and northwestern corners of the Piers District. Their map also indicates that non-marine terrace deposits were present at the northern-end of the 22nd Street/Marina District at Timms Point. These deposits also border the western margin of the Beach District. Due to the presumed Pleistocene age and known occurrence of "Ice Age" mammals, the non-marine terrace deposits are considered to possess a moderate paleontological resource sensitivity.

Palos Verdes Sand

Introduction. Woodring et al. (1946) designated the marine deposits on the youngest marine terrace in the San Pedro area as the Palos Verdes Sand. Although the original type locality described as "at the north end of the San Pedro Bluff near the lumber yard" (Arnold, 1903) no longer exists, Woodring et al. (1946) regarded the waterfront and adjoining region in San Pedro as the "type region." The Palos Verdes Sand is lenticular in geometry and may be locally absent, ranging in thickness from a few inches to 15 feet. It typically consists of coarse-grained sand, silty sand, and gravel of late Pleistocene age (Woodring et al., 1946). The gravel contains mostly limestone cobbles, but granitic and schist pebbles are locally abundant. In southern San Pedro, the Palos Verdes Sand was exposed only in a few localities along the coast south of Timms Point, such as on the north-side of a ravine at the northeastern corner of the former Fort McArthur-Lower Reservation (Woodring et al., 1946). The Palos Verdes Sand also occurred on Deadman Island before its destruction in 1928 (Powell and Ponti, 2007). In the northern part of San Pedro, the Palos Verdes Sand was formerly exposed in numerous street cuts and in some natural exposures along the seaward edge of the terrace (Woodring et al., 1946). According to Kennedy (1975), "… there presently exists no abundantly fossilifereous outcrops of the Palos Verdes Sand along the San Pedro waterfront which could be considered equivalent to the type exposures of the "upper San Pedro series."" The Palos Verdes Sand was deposited during the last major period of global warming approximately 130 and 85 ka (Ponti, 1989; Powell and Ponti, 2007). The Palos Verdes Sand is underlain by marine deposits of the Pleistocene-age San Pedro Sand and Timms Point Silt, and is overlain by non-marine terrace deposits.

Paleontology. Fossil localities are locally common in the Palos Verdes Sand and have been recorded from a number of coastal sites in the Palos Verdes Hills. Woodring et al. (1946) described 38 fossil localities from the Palos Verdes Sand. There are fossils from 165 localities at the Natural History Museum of Los Angeles County (Kennedy, 1975; LACM online database). Fossils collected from these sites primarily consist of well-preserved remains of nearshore marine invertebrates that include sponges, coral, worms, barnacles, crustaceans, snails, bivalves, tusk shells, and echinoids (Woodring et al., 1946; Kennedy, 1975). Also recovered from these localities are fossil vertebrates that include shark, ray, bony fish, amphibian, reptiles, birds, pinnipeds, whale, antelope, mammoth, mastodon, dire wolf, cat, sea otter, rabbits, rodents, ground sloths, horse, deer, camels, and bison (Woodring et al., 1946; Miller, 1971; Kennedy, 1975). The land mammal fossils found indicate a Rancholabrean age (Miller, 1971; Kennedy, 1975).

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that bedrock deposits of the Pleistocene-age Palos Verdes Sand once existed in a portion of the southwestern and northwestern corners of the Piers District. Their map also indicates that the formation was present in the western-middle portion of the 22nd Street/Marina District near the northeastern corner of the former Fort McArthur Lower Reservation.

San Pedro Sand

Introduction. Woodring et al. (1946) assigned formation rank to the San Pedro Sand, which is found throughout the San Pedro area wherever the Pleistocene strata are exposed. They regarded the San Pedro waterfront as the type locality of the San Pedro Sand. The formation is up to 175 feet in thickness at the surface and as much as 300 feet thick in the subsurface (Woodring et al.,

1946). The San Pedro Sand consists of planar to cross-bedded, friable sandstone, as well as gravel, silty sandstone, and siltstone. According to Woodring et al. (1946), the San Pedro Sand was underlain by the Timms Point Silt at Deadman Island. Powell and Ponti (2007), however, concluded that the San Pedro Sand was missing from Deadman Island, as they could find no evidence for its existence within the fossil collections made prior to the island's destruction in 1928. The San Pedro Sand was deposited during the middle Pleistocene between approximately 500 and 200 ka (Ponti, 1989; Powell and Ponti, 2007). The San Pedro Sand is underlain by Pleistocene-age Timms Point Silt and Lomita Marl, and the Miocene-age Malaga Mudstone member. The San Pedro Sand is overlain by the Palos Verdes Sand, non-marine terrace deposits, and Quaternary alluvium.

Paleontology. Fossil localities are locally common in the San Pedro Sand and have been recorded from a number of coastal sites in the Palos Verdes Hills. Woodring et al. (1946) described 18 fossil localities from the San Pedro Sand, one of which is in the project area. There are fossils from 71 localities at the Natural History Museum of Los Angeles County (Kennedy, 1975; LACM online database). Fossils collected from these sites primarily consist of well-preserved remains of nearshore marine invertebrates that include crustaceans, snails, bivalves, tusk shells, and echinoids (Woodring et al., 1946; Kennedy, 1975). Also recovered from these localities are fossil vertebrates that include shark, ray, bony fish, amphibian, reptiles, birds, pinnipeds, whale, antelope, mammoth, dire wolf, rodents, ground sloths, horse, deer, and bison (Woodring et al., 1946; Kennedy, 1975). The land mammal fossils found indicate a Rancholabrean age (Kennedy, 1975).

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that bedrock deposits of the Pleistocene-age San Pedro Sand once existed in a portion of the southwestern and northwestern corners of the Piers District. Their map also indicates that the formation was present along the west-side of the 22nd Street/Marina District.

Timms Point Silt

Introduction. Timms Point is the type locality of the Timms Point Silt (Woodring et al., 1946), where the formation overlies the Malaga Mudstone member of the Monterey shale. The exposed thickness in San Pedro is between 30 and 80 feet, but the maximum thickness is about 120 feet. The Timms Point Silt consists of brownish sandy siltstone and silty sandstone. The formation also occurred on Deadman Island before destruction of the island in 1928 (Powell and Ponti, 2007). The Timms Point Silt was deposited during the middle Pleistocene between approximately 500 and 300 ka (Ponti, 1989; Powell and Ponti, 2007). Regionally, the Timms Point Silt is underlain by the Pleistocene-age Lomita Marl and the Miocene-age Malaga Mudstone member. The Timms Point Silt is overlain by the Pleistocene-age Palos Verdes Sand and San Pedro Sand, and by Quaternary alluvium.

Paleontology. Fossil localities are locally common in the Timms Point Silt and have been recorded from a number of coastal sites in the Palos Verdes Hills. Woodring et al. (1946) described 16 fossil localities from the Timms Point Silt, eight of which are in the project area. There are fossils from 82 localities at the Natural History Museum of Los Angeles County (Kennedy, 1975; LACM online database). Fossils collected from these sites primarily consist of

well-preserved remains of nearshore marine invertebrates that include foraminifera, coral, byrozoans, brachiopods, snails, and bivalves (Woodring et al., 1946; Kennedy, 1975). Also recovered from these localities are fossil vertebrates that include shark, ray, and bony fish (Woodring et al., 1946; Kennedy, 1975). The age is Irvingtonian (Kennedy, 1975).

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that bedrock deposits of the Pleistocene-age Timms Point Silt were formerly present along the west-side of the Port O' Call/S.P. Slip District. Their map also indicates that the formation was present at the northern-end of the 22nd Street/Marina District at Timms Point.

Malaga Mudstone of the Monterey Shale

Introduction. In the Palos Verdes Hills, the Malaga Mudstone is the uppermost member in the Miocene-age Monterey Shale and consists of light chocolate-brown or olive-gray, massive, radiolarian mudstone and fine-grained siltstone (Woodring et al., 1946; Kennedy, 1975). According to Woodring et al. (1946), this unit was exposed in street cuts, ravines, and sea cliffs in the San Pedro area, most notably at Timms Point and at the former Fort McArthur Lower Reservation, where it is 92 to 183 m thick. The Malaga Mudstone was deposited during the late Miocene approximately 10 to 12 Ma and is underlain by the Miocene-age Valmonte Diatomite and Altamira Shale members of the Monterey Shale. The Malaga Mudstone member is overlain by non-marine terrace deposits and the Pleistocene-age San Pedro Sand, Timms Point Silt, and Lomita Marl.

Paleontology. Fossil localities are rare in the Malaga Mudstone, but have been recorded from coastal sites in the Palos Verdes Hills. Woodring et al. (1946) described three fossil localities from the Malaga Mudstone, one of which occurs in the project area. There are fossils from 13 localities at the Natural History Museum of Los Angeles County (Kennedy, 1975; LACM online database). Fossils collected from these sites primarily consist of remains of open-marine microfossils that include diatoms, foraminifera, radiolarians, and sponge spicules (Woodring et al., 1946; Kennedy, 1975). Taken together, these fossils indicate a deep-marine environment at bathyal depths, probably greater than 915 m water depth (Woodring et al., 1946).

Distribution in Project Area. The geologic map of Woodring et al. (1946) indicates that the Malaga Mudstone of the Monterey Shale underlies the northern-end of the 22nd Street/Marina District at Timms Point. It may also underlie the western margin of the 22nd Street/Marina District east of the former Fort McArthur Lower Reservation.

IMPACT ANALYSIS

Specific impacts to paleontological resources for each of the seven alternative project designs are described in the following section. Because of the preliminary nature of the seven alternative project designs, the impact descriptions given below are generally qualitative rather than quantitative.

Proposed Project

Piers District. The Proposed Project involves relatively extensive dredging, excavation, and modification of the shoreline in the Piers District, as well as excavations associated with modifications to Harbor Boulevard and with the addition of a 4000-space, surface and structured parking lot. Excavations for buildings and other structures are also proposed for the Piers District. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Proposed-Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Proposed Project involves relatively extensive dredging, excavation, and modification of the shoreline in the Downtown Harbor District, as well as excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under the Proposed Project. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Proposed-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Proposed Project involves excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under the Proposed Project. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent

(i.e., depth of bedrock, depth of excavations, etc.) of Proposed-Project impacts on paleontological resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Proposed Project involves excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under the Proposed Project. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Proposed-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Proposed Project involves excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Proposed-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Proposed Project involves extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 1--Alternative Development Scenario 1

Piers District. The Alternative 1 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Piers District, as well as excavations associated with modifications to Harbor Boulevard and with the addition of a 4200-space, surface and structured parking lot. Excavations for buildings and other structures are also proposed for the Piers District under Alternative 1. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative 1 Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Alternative 1 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Downtown Harbor District, as well as excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under Alternative 1. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-1-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Alternative 1 Project proposes excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under Alternative 1. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-1-Project impacts on paleontological

resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Alternative 1 Project proposes excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under Alternative 1. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-1-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Alternative 1 Project proposes excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-1-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Alternative 1 Project proposes extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 2--Alternative Development Scenario 2

Piers District. The Alternative 2 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Piers District, as well as excavations associated with

modifications to Harbor Boulevard and with the addition of a 2000-space, surface and structured parking lot. Excavations for buildings and other structures are also proposed for the Piers District under Alternative 2. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-2-Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Alternative 2 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Downtown Harbor District, as well as excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under Alternative 2. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-2-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Alternative 2 Project proposes excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under Alternative 2. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-2-Project impacts on paleontological resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations

located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Alternative 2 Project proposes excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under Alternative 2. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-2-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Alternative 2 Project proposes excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-2-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Alternative 2 Project proposes extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 3--Alternative Development Scenario 3 (Reduced Project)

Piers District. The Alternative 3 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Piers District, as well as excavations associated with modifications to Harbor Boulevard and with the addition of a 3500-space, surface and structured

parking lot. Excavations for buildings and other structures are also proposed for the Piers District under Alternative 3. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-3-Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Alternative 3 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Downtown Harbor District, as well as excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under Alternative 3. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-3-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Alternative 3 Project proposes excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under Alternative 3. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-3-Project impacts on paleontological resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Alternative 3 Project proposes excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under Alternative 3. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-3-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Alternative 3 Project proposes excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-3-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Alternative 3 Project proposes extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 4--Alternative Development Scenario 4

Piers District. The Alternative 4 Project proposes excavations associated with modifications to Harbor Boulevard and with the addition of a 3500-space, surface and structured parking lot. Excavations for buildings and other structures are also proposed for the Piers District under Alternative 4. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic

interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-4-Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Alternative 4 Project proposes relatively extensive dredging, excavation, and modification of the shoreline in the Downtown Harbor District, as well as excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under Alternative 4. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-4-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Alternative 4 Project proposes excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under Alternative 4. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-4-Project impacts on paleontological resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Alternative 4 Project proposes excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina

District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under Alternative 4. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-4-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Alternative 4 Project proposes excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-4-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Alternative 4 Project proposes extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 5—No-Federal-Action Alternative

Piers District. The Alternative 5 Project proposes excavations associated with modifications to Harbor Boulevard and with the addition of a 3500-space, surface and structured parking lot. Excavations for buildings and other structures are also proposed for the Piers District under Alternative 5. We infer that much of the Piers District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the

Piers District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-5-Project impacts on paleontological resources in the Piers District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Downtown Harbor District. The Alternative 5 Project proposes excavations associated with modifications to Harbor Boulevard. Excavations for buildings and other structures are also proposed for the Downtown Harbor District under Alternative 5. We infer that the western half of the Downtown Harbor District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is similar to the position of today's shoreline (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Downtown Harbor District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-5-Project impacts on paleontological resources in the Downtown Harbor District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Ports O' Call/S.P. Slip District. The Alternative 5 Project proposes excavations associated with modifications to Harbor Boulevard and Samson Way in the Ports O' Call/S.P. Slip District. Excavations for buildings and other structures are also proposed for the Ports O' Call/S.P. Slip District under Alternative 5. We infer that the western half of the Ports O' Call/S.P. Slip District is potentially underlain by the San Pedro Sand and Timms Point Silt, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the Ports O' Call/S.P. Slip District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand and Timms Point Silt) in the subsurface in the Ports O' Call/S.P. Slip District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-5-Project impacts on paleontological resources in the Ports O' Call/S.P. District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand and Timms Point Silt have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

22nd Street/Marina District. The Alternative 5 Project proposes excavations associated with modifications to Harbor Boulevard, Cresent Avenue, and 22nd Street in the 22nd Street/Marina District. Excavations for buildings and other structures are also proposed for the 22nd Street/Marina District under Alternative 5. We infer that the western margin of the 22nd Street/Marina District is potentially underlain by the San Pedro Sand, Timms Point Silt, and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations

presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is within the 22nd Street/Marina District (Figure 3), we infer a high potential for the existence of bedrock (i.e., San Pedro Sand, Timms Point Silt, and Malaga Mudstone) in the subsurface in the 22nd Street/Marina District. In addition, the original "Timms Point," which is the type locality for the Timms Point Silt, is located within the 22nd Street/Marina District (Figure 2). Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-5-Project impacts on paleontological resources in the 22nd Street/Marina District. However, it is clear that any excavation operations located in deposits of the San Pedro Sand, Timms Point Silt, and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Beach District. The Alternative 5 Project proposes excavations associated with modifications to Harbor Boulevard and with buildings and other structures in the Beach District. We infer that the western margin of the Beach District is potentially underlain by the Palos Verdes Sand and Malaga Mudstone, based on the position of the shoreline in 1859 and the geologic interpretations presented by Woodring et al. (1946) (Figure 3). As the position of the 1859 shoreline is near the western margin of the Beach District (Figure 3), we infer a high potential for the existence of bedrock (i.e., Palos Verdes Sand and Malaga Mudstone) in the subsurface in the Beach District. Without being able to review site-specific excavation plans and a more comprehensive geotechnical report of subsurface conditions in the areas of excavation, it is not possible to accurately assess the extent (i.e., depth of bedrock, depth of excavations, etc.) of Alternative-5-Project impacts on paleontological resources. However, it is clear that any excavation operations located in deposits of the Palos Verdes Sand and Malaga Mudstone have the potential to temporarily unearth and permanently destroy sensitive paleontological resources.

Outer Harbor/Warehouse District. The Alternative 5 Project proposes extensive development in the Outer Harbor/Warehouse District. However, any construction-related excavations will be confined to areas underlain by artificial fill materials. Such work will not result in any significant impacts to sensitive paleontological resources.

Alternative 6—No-Project Alternative

As the Alternative 6 Project proposes no action, there will be no impact to sensitive paleontological resources in any of the six districts under this alternative.

Impact Summary

Based on the proposed developments for each project alternative and on the presumed different levels of earthwork, we rank each proposed alternative project according to the level of impact to sensitive paleontological resources, from highest to lowest: (1) Proposed Project, (2) Alternative 1 Project, (3) Alternative 3 Project, (4) Alternative 2 Project, (5) Alternative 4 Project, (6) Alternative 5 Project, and (7) Alternative 6 Project.

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