



**PALEONTOLOGICAL RESOURCES
ASSESSMENT FOR THE CHEVRON
PERRIS HYDROGEN FUELING STATION
PROJECT, RIVERSIDE COUNTY,
CALIFORNIA**

An analysis of existing data in support of
CEQA review

November 27, 2023

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**Paleontological Resources Assessment for the Chevron Perris Hydrogen Fueling Station Project,
Riverside County, California**

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Executive Summary

Stantec Consulting Services Inc. (Stantec) conducted a paleontological resources assessment on behalf of the Chevron Products Company for the Chevron Perris Hydrogen Fueling Station Project (the Project) on portions of an approximately 3.9 acres of land located at 4063 North Webster Avenue, in the City of Perris, Riverside County, California. This paleontological study was conducted in support of the proposed hydrogen fueling station and the supporting access roads and pads.

The proposed Project is subject to compliance with the California Environmental Quality Act (CEQA) and City of Perris (2005) requirements regarding the Project's potential impacts on paleontological resources. The lead agency for this Project is the City of Perris. As part of CEQA compliance, a paleontological resources assessment was conducted to assess potential impacts of the proposed Project on paleontological resources.

This paleontological resources assessment consisted of an analysis of existing data including museum records searches from the National History Museum of Los Angeles County and the Western Science Center, a review of the most recent geologic mapping, and relevant scientific literature. This research was used to assign paleontological potential rankings of the Society of Vertebrate Paleontology (2010) to the geologic units present in the Project area, either at the surface or in the subsurface. Following this, Project plans were reviewed to identify any potential impacts to paleontological resources and develop appropriate mitigation recommendations to reduce potential impacts to less than significant.

The results of this study indicate that the Project area is underlain by very old alluvial fan deposits that date to the middle to early Pleistocene (Morton 2003), which are assessed as having high paleontological potential; In order to avoid impacts to paleontological resources and satisfy CEQA and City of Perris (2005) requirements, Stantec recommends a qualified paleontologist meeting professional standards as defined by Murphey et al. (2019) be retained as the designated Project Paleontologist to oversee all aspects of paleontological mitigation. Stantec recommends the following mitigation activities for the Project:

- The Project Paleontologist should develop and oversee the implementation of a Paleontological Monitoring and Mitigation Plan tailored to the Project plans that provides for:
 - Worker's Environmental Awareness Program training that communicates requirements and procedures for the inadvertent discovery of paleontological resources during construction, to be delivered by the paleontological monitor to the construction crew prior to the onset of ground disturbance.
 - Full-time paleontological monitoring of earthwork and ground disturbing activities into previously undisturbed sediments across the Project area undisturbed geologic units with high paleontological potential to be conducted by a paleontological monitor meeting industry standards (Murphey et al. 2019). The Project Paleontologist may alter the



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frequency of monitoring or spot checks after construction begins, based on subsurface conditions.

- Final reporting of the results of the monitoring program.
- In the event that paleontological resources are encountered during construction activities, all work must stop in a safe radius around the finds while the paleontological monitor documents the find. The Project Paleontologist shall assess the find. Should the Project Paleontologist assess the find as significant, the find shall be collected and curated in an accredited repository along with all necessary associated data and curation fees.

Based on the findings in this study and the implementation of the above mitigation recommendations, the proposed Project should not cause an adverse impact to paleontological resources. Therefore, additional paleontological resource studies are not recommended or required at this time. Changes to the Project plans or Project area from those assessed in this study will require additional assessment for impacts to paleontological resources.



Acronyms / Abbreviations

CEQA	California Environmental Quality Act
CNG	Compressed Natural Gas
GIS	Geographic Information System
LACM	Natural History Museum of Los Angeles County
Ma	Million years ago
PRC	Public Resources Code
PRPA	Paleontological Resources Preservation Act
SVP	Society of Vertebrate Paleontology
UCMP	University of California Museum of Paleontology
US	United States
WSC	Western Science Center



Glossary

Paleontological Monitor	An individual who has academic training (B.S., B.A., M.A., or M.S.) with an emphasis in paleontology or demonstrated equivalent experience (a minimum of two years of cumulative professional or nonprofessional work in laboratory preparation, curation, or field work related to paleontology, as well as documented self-taught knowledge of the discipline of paleontology). [Murphey et al. 2019]
Paleontological Monitoring	Full-time observation of construction activities in high potential geologic units by a paleontological monitor, under supervision of the project paleontologist.
Paleontological Resource	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) [Society of Vertebrate Paleontology 2010]
Project Paleontologist	Someone with an advanced academic degree (M.A., M.S. or Ph.D.) with an emphasis in paleontology or demonstrated equivalent professional experience (e.g., minimum of 3 years [or 75 projects] of project experience with paleontological mitigation is considered equivalent to a graduate degree), in combination with 2 years (or 50 projects) of demonstrated professional experience and competency with paleontological resource mitigation projects at the level of field supervisor. [Murphey et al. 2019]



1 Introduction

Stantec Consulting Services Inc. (Stantec) conducted a paleontological resources assessment on behalf of the Chevron Products Company for the Chevron Perris Hydrogen Fueling Station Project (the Project) on portions of an approximately 3.9 acres of land located at 4063 North Webster Avenue, in the City of Perris, Riverside County, California. This paleontological study was conducted in support of the proposed hydrogen fueling station and the supporting access roads and pads.

The proposed Project is subject to compliance with the California Environmental Quality Act (CEQA) and City of Perris requirements regarding the Project's potential impacts on paleontological resources. The lead agency for the Project is the City of Perris. As part of CEQA compliance, a paleontological resources assessment was conducted to assess potential impacts of the proposed Project on paleontological resources.

1.1 Project Description

The Project will install new Compressed Natural Gas (CNG) compound with concrete block wall for security and equipment spacing; install hydrogen truck access to new offloading area; build new hydrogen equipment compound with concrete block wall for security and equipment spacing; install two hydrogen dispensers with canopy; install new electrical service; install new paving at existing north lot; widen existing driveway entrance on the west end of property; and install new fuel canopy with three islands for CNG and diesel dispensers.

1.2 Project Location

The proposed Project is located at 4063 North Webster Avenue in the City of Perris, California (Figure 1). The Project area is bound by North Webster Avenue on the west and local roads north of Ramona Expressway, which is to the south of the Project area. The Project area is approximately 3.9 acres and is located on Riverside County Assessor Parcel Number 302-260-053. Specifically, the Project area is located in portions of Section 6, Township 4 South, Range 3 West, as depicted on the Perris, California United States (US) Geological Survey 7.5-minute series topographic quadrangle (Figure 2).

1.3 Paleontological Resources

Fossils are any evidence of ancient life. This includes the remains of the body of an organism, such as bones, skin impressions, shell, or leaves, as well as traces of an organism's activity, such as footprints or burrows, called trace fossils. In addition to the fossils themselves, geologic context is an important component of paleontological resources, and includes the stratigraphic placement of the fossil as well as the lithology of the rock in order to assess paleoecologic setting, depositional environment, and taphonomy. Fossils are protected by federal, state, and local regulations as nonrenewable natural resources.



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1 Introduction



Figure 1. Vicinity map



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1 Introduction

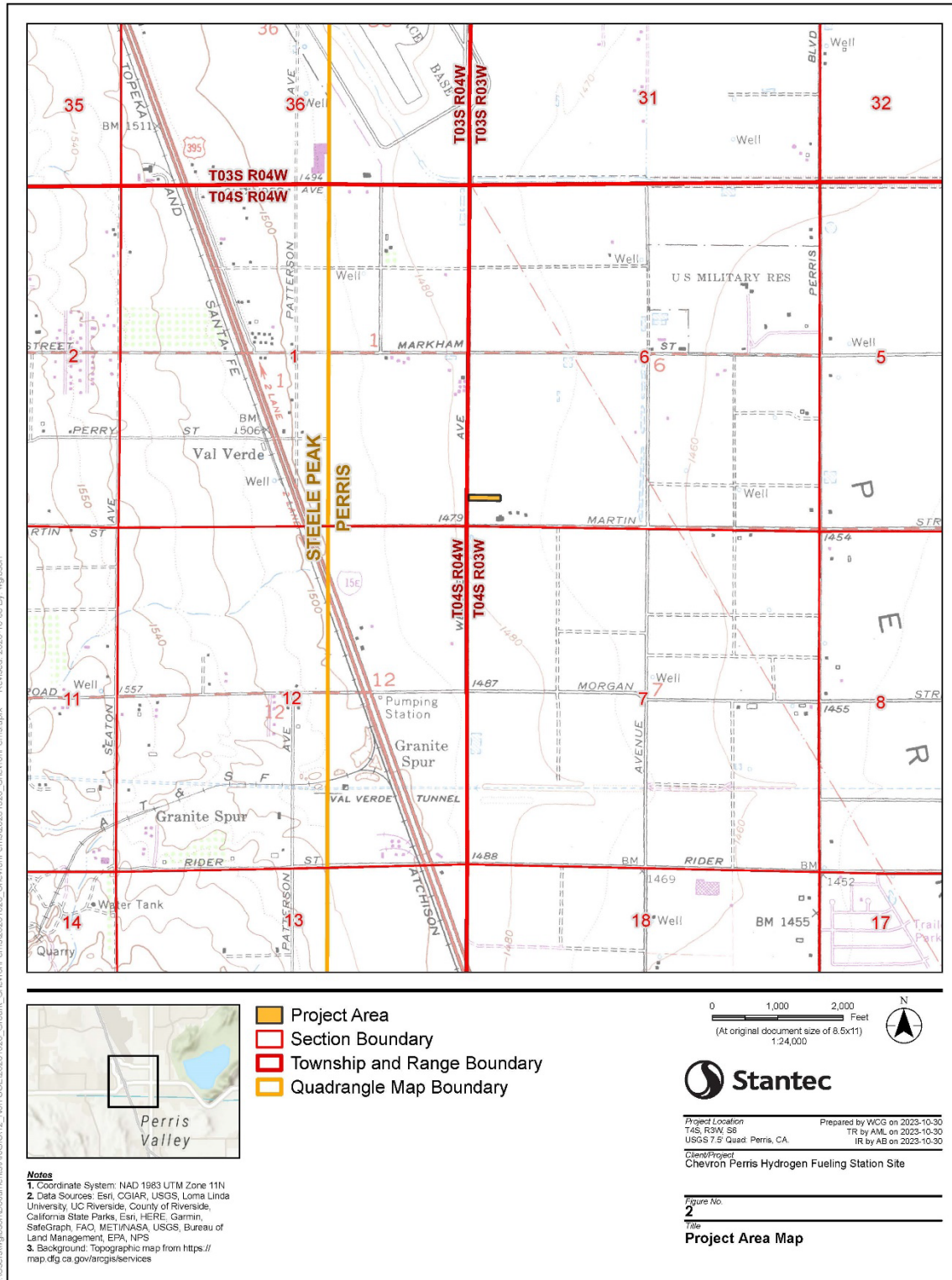


Figure 2. Project area map



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1 Introduction

While CEQA does not define a significance threshold for paleontological resources, the standards of the Society of Vertebrate Paleontology (SVP) (2010) are often used in the absence of a legal definition of significance. The SVP defines significant paleontological resources 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].

Furthermore, the Paleontological Resources Preservation Act (PRPA) defines paleontological resources as:

Any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth, except that the term does not include— (A) any materials associated with an archaeological resource (as defined in section 3(1) of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470bb(1)); or (B) any cultural item (as defined in section 2 of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001)). [PRPA Sec. 6301]

Using these definitions, the concept of scientific importance, or significance, is included in the definition of paleontological resources; thus, not all fossils are considered to be paleontological resources.

It should be noted that the threshold for significance varies with factors including geologic unit, geographic area, and the current state of scientific research, and may also vary between different agencies (Murphey et al. 2019). Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002, Murphey et al. 2019, Murphey and Daitch 2007, Scott and Springer 2003). In general, these studies assess fossils as significant 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.
- 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.



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2.0 Regulatory Framework

- 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 geologic unit known to contain significant paleontological resources is considered sensitive to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from the definition for archaeological resources as follows:

It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case. [SVP 2010: 2].

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are often contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity.

In summary, in the absence of observable paleontological resources on the surface, paleontologists must assess the potential of geologic units as a whole to yield paleontological resources based on their known potential to produce significant fossils elsewhere. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

2.0 Regulatory Framework

California and the City of Perris have enacted multiple laws and regulations that provide for the protection of paleontological resources. This investigation was conducted to meet these requirements regarding paleontological resources on the lands proposed for development.

2.1 State of California

2.1.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA (Public Resources Code [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.)



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2.0 Regulatory Framework

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.

2.1.2 PUBLIC RESOURCES CODE

The California PRC (Chapter 1.7, Sections 5097) includes additional state-level requirements for the assessment and management of paleontological resources. These statutes require reasonable mitigation of adverse impacts to paleontological resources resulting from development on state lands, define the removal of paleontological sites or features from state lands as a misdemeanor, and prohibit the removal of any paleontological site or feature from state land without permission of the applicable jurisdictional agency.

2.2 Local Regulations

2.2.1 CITY OF PERRIS GENERAL PLAN

The City of Perris (2005) has developed paleontological sensitivity mapping that divides the City into five regions for the purpose of developing paleontological mitigation recommendations. The Project is located in Area 1 (High Paleontological Sensitivity) on this map (City of Perris 2005: Exhibit CN-7). The Conservation Element of the City of Perris (2005) General Plan includes a Goal for the protection of historical, archaeological and paleontological sites (Goal IV). This goal is supported by Policy IV.A, which requires compliance with state and federal regulations to ensure preservation of significant historical, archaeological, and paleontological resources. There are several implementation measures for this policy, the following of which pertain to paleontological resources:

- IV.A.1 For all private and public projects involving new construction, substantial grading, or demolition, including infrastructure and other public service facilities, staff shall require appropriate surveys and necessary site investigations in conjunction with the earliest environmental document prepared for a project.
- IV.A.4 In Area 1 and Area 2 shown on the Paleontological Sensitivity Map (Exhibit CN-7), paleontologic monitoring of all projects requiring subsurface excavations will be required once any excavation begins. In Areas 4 and 5, paleontologic monitoring will be required once subsurface excavations reach five feet in depth, with monitoring levels reduced if appropriate, at the discretion of a certified Project Paleontologist.
- IV.A.6 Create an archive for the City wherein all surveys, collections, records and reports can be centrally located.



3.0 Professional Standards

The SVP (2010), the Bureau of Land Management (2022), and a number of scientific studies (Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003) have developed guidelines for professional qualifications, conducting paleontological assessments, and developing mitigation measures for the protection of paleontological resources. These guidelines are broadly similar, and include the use of museum records searches, scientific literature reviews, and, in some cases, field surveys to assess the potential of an area to preserve paleontological resources. Should that potential be high, accepted mitigation measures include paleontological monitoring, data recordation of all fossils encountered, collection and curation of significant fossils and associated data, and in some cases screening of sediment for microfossils.

This study has been conducted in accordance with these guidelines and the recommendations provided herein meet these standards.

4.0 Geologic Setting

The Project area is located in the Peninsular Ranges geomorphic province. The Peninsular Ranges formed as a volcanic island arc collided with the west coast of North America and was accreted onto the margin of the continent, resulting in the expansion of the continent westward. The Peninsular Ranges are part of a larger subduction zone that extends all along western North America, with this particular geomorphic province extending from the Los Angeles Basin in the north to Baja in the south, and extending to Santa Catalina, Santa Barbara, San Nicolas, and San Clemente Islands on the west and the Colorado Desert on the east (Norris and Webb 1990). The core of the Peninsular Ranges formed as the core of a magmatic arc in the Mesozoic that resulted from active subduction along the Pacific Plate boundary (Harden 2004).

The plutonic rock that forms the core of the Peninsular Ranges was emplaced in the west 140–105 million years ago (Ma) and consists of mafic plutonic rocks, while the eastern batholith was emplaced 99–92 Ma and consist of silica-rich granodiorites and tonalities (Kimbrough et al. 2001). These plutonic rocks intruded into the older rocks of a Paleozoic carbonate platform, heavily metamorphosing them (Harden 2004). There was volcanic activity associated with the subduction zone as well, with the Santiago Peak Volcanics deposited around 130–120 Ma as primarily andesitic and silicic flows, that were then metamorphosed by the ongoing batholith emplacement (Fife et al. 1967). Later in the Cretaceous, marine sedimentary rocks accumulated over the plutons and volcanic rocks, deposited as turbidity currents in what was an ocean at the time (Kimbrough et al. 2001). These rocks are in turn overlain by more recent sedimentary deposits leading up to the present day, that have been heavily uplifted and faulted by tectonic activity throughout the Cenozoic. These deposits were marine through the Eocene and then shifted to terrestrial volcanic and sedimentary strata by the Oligocene and lower Miocene (Powell 1993).

Locally, the Project area is in the Perris Valley, a truncated upland, or peneplain, located in the central portion of the Perris Block, a relatively structurally stable core of Cretaceous granitic rocks and the older,



5.0 Methodology

intruded metasediments of the Paleozoic carbonates bounded on the west by the Chino Fault and on the east by the San Jacinto Fault Zone (Kistler et al. 2003). The Perris Valley is surrounded by highlands, the closest of which are the San Jacinto Mountains to the west of the Project area, which have been shedding sediment into the Valley as they have been uplifted. The Perris Valley can be characterized as small granitic mountains and uplands surrounded by broad alluvial plains.

5.0 Methodology

The paleontological resource assessment reported herein consisted of an analysis of existing data incorporating museum records searches from the Natural History Museum of Los Angeles County and the Western Science Center and a review of the scientific literature, and geologic mapping.

To assess if paleontological resources are likely to be encountered in any given area, the paleontological potential of the geologic units present in the area is assessed. Paleontological potential of a geologic unit consists of both (a) the potential for yielding abundant vertebrate fossils or for yielding significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data (SVP 2010). Unlike archaeological resources that often have a limited aerial extent, paleontological resources may occur throughout a geologic unit, and so paleontological potential is assessed for the unit as a whole. Provided below is the methodology used during the current study to assess the potential of the Project to impact paleontological resources.

The paleontological assessment presented here was conducted by Stantec Paleontologist Batbaatar Jigjidsuren, Ph.D., and Principal Paleontologist Alyssa Bell, Ph.D., Geographic Information System (GIS) maps and figures were drafted by GIS Technician Wesley Gibson, B.S.. Stantec's work in support of the Project was managed by Principal Project Manager Gary Grelli, MBA, who coordinated all work and provided quality assurance and control.

5.1 Analysis of Existing Data

In order to assess the paleontological potential of the Project area, the most recent geologic mapping of the Project area and vicinity (Morton 2003) was consulted to identify all geologic units present at the surface or likely present in the subsurface. Records searches were obtained from the Natural History Museum of Los Angeles County (LACM) and the Western Science Center (WSC) (Appendix A) and a review of the scientific literature was conducted to determine the history of each of the geologic units mapped as present at the surface or likely present in the subsurface of the Project area for preserving paleontological resources.

5.2 Paleontological Resources Assessment

The results of the desktop analysis were used to assign the paleontological potential rankings of the SVP (2010) to the geologic units likely present in the Project area. These rankings are designed to inform the development of appropriate mitigation measures for the protection of paleontological resources and are



5.0 Methodology

widely accepted as industry standards in paleontological mitigation (Murphey et al. 2019; Scott and Springer 2003). These rankings are as follows:

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. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations that are 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.), some volcanoclastic formations (e.g., ashes or tephra), and some low-grade metamorphic rocks.

Undetermined Potential. Rock units for which little information is available in the literature or museum records concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study and field work is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.

Low Potential. Rock units that are poorly represented by fossil specimens in institutional collections or, based on general scientific consensus, only preserve fossils in rare circumstances (e. g., basalt flows or Recent colluvium) have low paleontological potential.

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).

Following the assessment of paleontological potential, an impacts assessment was conducted comparing planned Project activities in terms of locations, depths, and ground disturbance methods with mapped geologic units. Where potential adverse impacts from Project activities were identified, mitigation recommendations were developed to reduce those impacts to less than significant.

5.3 Paleontological Impacts Assessment

Impacts to paleontological resources can be classified as direct, indirect, or cumulative. Impacts can also be considered as adverse impacts or as positive impacts. Direct adverse impacts on paleontological resources are the result of damage or destruction of these nonrenewable resources by surface disturbing actions including construction excavations. Therefore, in areas that contain paleontologically sensitive geologic units, ground disturbance has the potential to adversely impact paleontological resources, by damaging or destroying them and rendering them permanently unavailable to science and society. Positive direct impacts, however, may result when paleontological resources are identified during construction and the appropriately documented and salvaged, thus ensuring the specimens are protected for future study and education.

Indirect impacts typically include those effects which result from the continuing implementation of management decisions and resulting activities, including normal ongoing operations of facilities



6.0 RESULTS

constructed within a given project area. They also occur as the result of the construction of new roads and trails in areas that were previously less accessible. This increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting, thus constituting an adverse indirect impact. Human activities that increase erosion also cause indirect impacts to surface and subsurface fossils as the result of exposure, transport, weathering, and reburial.

Cumulative adverse impacts can result from incrementally minor but collectively significant actions taking place over time. The incremental loss of paleontological resources over time from construction-related surface disturbance or vandalism and unlawful collection would represent a significant cumulative adverse impact, because it would result in the destruction of non-renewable paleontological resources and the associated irretrievable loss of scientific information.

The impact assessment conducted here takes into consideration all planned project activities in terms of aerial and subsurface extents, including the possibility of subsurface geologic units having a different paleontological potential than surficial units. For example, 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 overly older units that have high paleontological potential. In areas with this underlying geologic setting surficial work may be of low risk for impacting paleontological resources while activities that require excavations below the depth of the surficial deposits would be at greater risk of impacting paleontological resources. For this reason, the impact assessment takes into consideration both the surface and subsurface geology and is tailored to Project activities.

6.0 RESULTS

6.1 Project Area Geology and Paleontology

Geologic mapping by Morton (2003) indicates the Project area consists of very old alluvial fan deposits (Figure 3). This geologic unit is of middle to early Pleistocene age, deposited from 129,000 years to 2.5 Ma, and consists of well-dissected, well indurated, reddish-brown sand deposits. They commonly contain duripans and locally present silcretes in some layers (Morton 2003). As defined by the SVP (2010), fossils must be over 5,000 years in age, and as such these Pleistocene-aged sediments may preserve fossils.

6.2 Paleontological Potential of Geologic Units in the Project Area

Neither the WSC nor LACM have records of fossil localities documented within one mile of the Project area (WSC 2023; LACM 2023). However, the LACM has localities within 25 miles of the Project area from similar sedimentary deposits as mapped in the Project Area (Table 1). The closest of these localities is approximately 10 miles from the Project area, where a fossil horse was recovered from a gravel pit (LACM 2023). Other localities preserved horses, peccaries, camels, and other fossils from Pleistocene-aged sediments.



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Figure 3. Project geology



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6.0 RESULTS

Table 1 Summary of the records search from the Natural History Museum of Los Angeles County

Locality Number	Geologic Unit	Age	Taxa	Approximate Location
LACM VP 4540	Unnamed Formation: gravel pit	Pleistocene	Horse family (<i>Equidae</i>)	Junction of Jackrabbit Trail & Gilman Springs Road; San Jacinto Valley: 10.3 miles south-southwest from Project area
LACM VP 5168	Unnamed Formation: clay	Pleistocene	Horse (<i>Equus</i>)	Point Marina Drive in East Bay Section of Canyon Lake: 11.5 miles south from Project area
LACM VP CIT 570—CIT572, 6059	Unnamed Formation	Pleistocene	Horse (<i>Equus</i>); peccary (<i>Platygonus</i>); camel (<i>Camelops</i>)	South of Lake Elsinore: 15.3 miles south-southwest from Project area
LACM VP 1207	Unnamed Formation	Pleistocene	Bovidae	Hill on east side of sewage disposal plant; 1 mile N-NW of Corona: 18.2 miles west-northwest from Project area
LACM VP 7811	Unnamed Formation: eolian, tan silt	Pleistocene	Whip snake (<i>Masticophis</i>)	W of Orchard Park, Chino Valley: 21.1 miles northwest from Project area

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology.

A review of the scientific literature covering areas across Riverside County and neighboring Los Angeles County indicates that Pleistocene fossils representing a rich Ice Age fauna are often found in similar sediments as those mapped in the Project area. These include animals still found in North America today, such as deer, bison, sheep, and horses; creatures now absent in North America, such as camels, lions, cheetahs, and sloths; and extinct creatures such as mammoths, dire wolves, and saber-toothed cats (Jefferson 1991 a and b, Graham and Lundelius 1994, McDonald and Jefferson 2008, Miller 1971, Reynolds and Reynolds 1991). In addition to these iconic large animals, a wide variety of small animals can be preserved as well, including reptiles such as frogs, salamanders, snakes (Hudson and Brattstrom 1977), and birds (Collins et al. 2018, Jones et al. 2008; Miller 1937, 1941). These fossils are important for recreating the history of Southern California, in particular studying climate change (e.g., Roy et al. 1996), extinction (e.g., Barnosky et al. 2004, Jones et al. 2008, Sandom et al. 2014, Scott 2010), and paleoecology (e.g., Connin et al. 1998).

An exceptional example of fossil preservation in Pleistocene-aged sediments is located about 15 miles southeast of the Project area, where nearly 100,000 identifiable fossil specimens representing 105 vertebrate, invertebrate, and plant species were collected from over 2,000 individual localities during the construction of the dam at Diamond Valley Lake (Springer et al. 2009) and are now housed at the WSC. This site represents the second largest late Pleistocene fossil assemblage, after the La Brea Tar Pits in Los Angeles, known from the American southwest (Springer et al. 2009).

Given this extensive record of significant fossils recovered from Pleistocene-aged alluvial sediments, this unit is assessed as having high paleontological potential.



7.0 Recommendations and Management Considerations

6.3 Potential Impacts to Paleontological Resources from Project Activities

The Project plans to install a new CNG facility with access roads. This will entail demolition of existing structures and excavation, grading, and paving activities associated with new construction across the Project area. As very old alluvial fan deposits are mapped at the surface, these activities will occur in sediments with high paleontological potential.

Should paleontological resources be encountered during construction, their damage or destruction would constitute a direct adverse impact. Therefore, Stantec has developed recommendations for mitigation that will reduce direct adverse impacts to less than significant. It is not anticipated that the Project will pose indirect or cumulative adverse impacts to paleontological resources, as the final Project will not entail increased exposure or erosion of native sediments beyond the duration of the ground disturbance described above.

7.0 Recommendations and Management Considerations

The paleontological resources assessment described herein conducted an analysis of existing data to assess the potential of the geologic units in the Project area to preserve paleontological resources. The results of this assessment show that geologic units with high paleontological potential are present across the Project area.

Project activities may include demolition, excavation, grading, and paving. Of these activities, those that involve disturbance of previously-undisturbed sediments in the Project area may encounter fossils and risk adverse impacts to paleontological resources. Therefore, demolition and paving are unlikely to pose an impact to paleontological resources, while excavations and grading may pose impacts. Therefore, mitigation is recommended for these activities (Table 2).

Table 2. Summary of recommendations

Type of Ground Disturbance	Recommended Mitigation
Demolition	None recommended
Excavation	Paleontological monitoring
Grading	Paleontological monitoring
Paving	None recommended

In order to reduce to less-than-significant potential impacts to paleontological resources, Stantec recommends a qualified paleontologist meeting professional standards as defined by Murphey et al. (2019) be retained as the designated Project Paleontologist to oversee all aspects of paleontological mitigation. Stantec recommends the following mitigation activities for the Project:

- The Project Paleontologist should develop and oversee the implementation of a Paleontological Monitoring and Mitigation Plan tailored to the Project plans that provides for:



Paleontological Resources Assessment for the Chevron Perris Hydrogen Fueling Station Project, Riverside County, California

8.0 REFERENCES

- Worker’s Environmental Awareness Program training that communicates requirements and procedures for the inadvertent discovery of paleontological resources during construction, to be delivered by the paleontological monitor to the construction crew prior to the onset of ground disturbance.
- full-time paleontological monitoring of earthwork and ground disturbing activities into previously undisturbed sediments across the Project area undisturbed geologic units with high paleontological potential to be conducted by a paleontological monitor meeting industry standards (Murphey et al. 2019). The Project Paleontologist may alter the frequency of monitoring or spot checks after construction begins, based on subsurface conditions.
- Final reporting of the results of the monitoring program.
- In the event that paleontological resources are encountered during construction activities, all work must stop in the immediate vicinity of the finds while the paleontological monitor documents the find. The Project Paleontologist shall assess the find. Should the Project Paleontologist assess the find as significant, the find shall be collected and curated in an accredited repository along with all necessary associated data and curation fees.

Based on the findings in this study and the implementation of the above mitigation recommendations, the proposed Project should not cause an adverse impact to paleontological resources. Therefore, no additional paleontological resource studies are recommended or required at this time. Changes to the Project plans or Project area from those assessed in this study will require additional assessment for impacts to paleontological resources.

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APPENDICES



Appendix A Locality search results – Natural History Museum of Los Angeles County



Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

October 22, 2023

Stantec Consulting Services Inc.
Attn: Batbaatar Jigjidsuren

re: Paleontological resources for the Chevron Perris Hydrogen Fueling Station (Project #2057297530)

Dear Batbaatar:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Chevron Perris Hydrogen Fueling Station project area as outlined on the portion of the Perris USGS topographic quadrangle map that you sent via e-mail on October 12, 2023. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP 4540	junction of Jackrabbit Trail & Gilman Springs Road; San Jacinto Valley	Unnamed Formation (Pleistocene, gravel pit)	Horse Family (Equidae)	Unknown
LACM VP 5168	Point Marina Drive in East Bay Section of Canyon Lake	Unknown formation (Pleistocene; clay)	Horse (<i>Equus</i>)	Unknown
LACM VP CIT 570 – CIT572, 6059	South of Lake Elsinore	Unknown Formation (Pleistocene)	Horse (<i>Equus</i>); peccary (<i>Platygonus</i>); camel (<i>Camelops</i>)	Unknown
LACM VP 1207	Hill on east side of sewage disposal plant; 1 mile N-NW of Corona	Unknown formation (Pleistocene)	Bovidae	Unknown
LACM VP 7811	W of Orchard Park, Chino Valley	Unknown formation (eolian, tan silt; Pleistocene)	Whip snake (<i>Masticophis</i>)	9-11 feet bgs

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As

such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

A handwritten signature in black ink that reads "Alyssa Bell". The signature is written in a cursive style and is set against a light yellow rectangular background.

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

Appendix B Locality search results – Western Science Center





November 9th, 2023

Stantec Consulting Services Inc.
Batbaatar Jigjidsuren
911 S Primrose Avenue, Unit N.
Monrovia, CA 91016

Dear Dr. Jigjidsuren,

This letter presents the results of a record search conducted for the Chevron Perris Hydrogen Fueling Station located in the city of Perris, Riverside County, CA. The project site is located north of Ramona Expressway, west of Brennan Avenue, and east of N. Webster Avenue on Township 4 South, Range 3 West, Section 6 of the *Perris, CA* USGS 7.5 minute quadrangle.

The geologic units underlying the project area are mapped primarily as alluvial sand and clay from the Holocene epoch (Dibblee and Minch, 2003). Holocene alluvial units are considered to be of high preservation value, but material found is unlikely to be fossil material due to the relatively modern associated dates of the deposits. The Western Science Center does not have localities within the project area or within a 1 mile radius.

While the presence of any fossil material is unlikely, if excavation activity disturbs deeper sediment dating to the earliest parts of the Holocene or Late Pleistocene periods, or expands to include nearby Pleistocene sediments, the material would be scientifically significant. Excavation activity associated with the development of the project area is unlikely to be paleontologically sensitive, but caution during development should be observed.

If you have any questions, or would like further information, please feel free to contact me at bstoneburg@westerncentermuseum.org.

Sincerely,

A handwritten signature in black ink, appearing to read 'Brittney Stoneburg', written in a cursive style.

Brittney Elizabeth Stoneburg, MSc
Collections Manager