PALEONTOLOGICAL RESOURCES ASSESSMENT FOR DAPPLEGRAY SCHOOL INTERSECTION PROJECT CITY OF ROLLING HILLS ESTATES, LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

Willdan Engineering
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HANA RESOURCES™
Environmental Enterprise Solutions

August 30, 2021

CERTIFICATION STATEMENT

I, J.D. Stewart, Ph.D., hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

August 30, 2021

Date

J.D. Stewart, Ph.D., Paleontologist

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SECTION 1. Project Description and Summary

1.1. Introduction

HANA Resources, Inc. (HANA) was retained by Willdan Engineering to prepare this Paleontological Resource Assessment for the proposed Dapplegray Elementary School Intersection Project (Project). This letter report documents the results of the paleontological resources monitoring and mitigation program of the proposed Project along Palos Verdes Drive North adjacent to the Dapplegray Elementary School in the City of Rolling Hills Estates, Los Angeles County, California.

The scope of work for this report included a paleontological records search through the Natural History Museum of Los Angeles County's Vertebrate Paleontology Section, a pedestrian survey, a literature search, a review of geological maps, and impact analyses that are documented in the following text.

1.2. Personnel

This Paleontological Resources Assessment was compiled by Dr. Joe Stewart, PhD. He is a qualified professional paleontologist under the criteria of SVP (2010). Qualifications of the author are provided in Appendix A.

1.3. Project Summary

1.3.1. Location

The Project is located along Palos Verdes Drive North in the City of Rolling Hills Estates, Los Angeles County, CA (**Exhibit I,** *Project Vicinity Map*). The Project includes work along Palos Verdes Drive North, extending approximately 800 feet northwest and east of the intersection with Dapplegray Elementary School entrance (**Exhibit II,** *Project Location Map*). The project improvements will enhance the traffic flow along Palos Verdes Drive North, improve the ADA access at the intersection, modify the median island, adjust the equestrian trail and improve bus stops. The project consists of widening the intersection to add an additional through lane for eastbound and westbound Palos Verdes Drive North. This improvement will enhance the traffic flow on Palos Verdes Drive North, which is a primary roadway providing access to the cities on the peninsula including Rolling Hills, Rancho Palos Verdes, Palos Verdes Estates, and Rolling Hills Estates. To accommodate the widening, the current traffic signal equipment will be modified, retaining walls will be designed, as well as other improvements (**Exhibit III,** *Concept Plan Map*).

The Project lies within the City of Rolling Hills Estate, California. As shown in Exhibit 1, the project is in an unsectioned part of Township 5 South, Range 14 West, San Bernardino Baseline and Meridian on the Torrance 7.5-minute US Geological Survey quadrangle. The Project's eastern end lies a bit more than 1000 feet west of the Palos Verdes Reservoir. This segment of Palos Verdes Drive slopes to the east. The elevation of the project site ranges from approximately 440 to 460 feet above mean sea level (AMSL).

Exhibit I: Project Vicinity Map

Exhibit II: Project Location Map

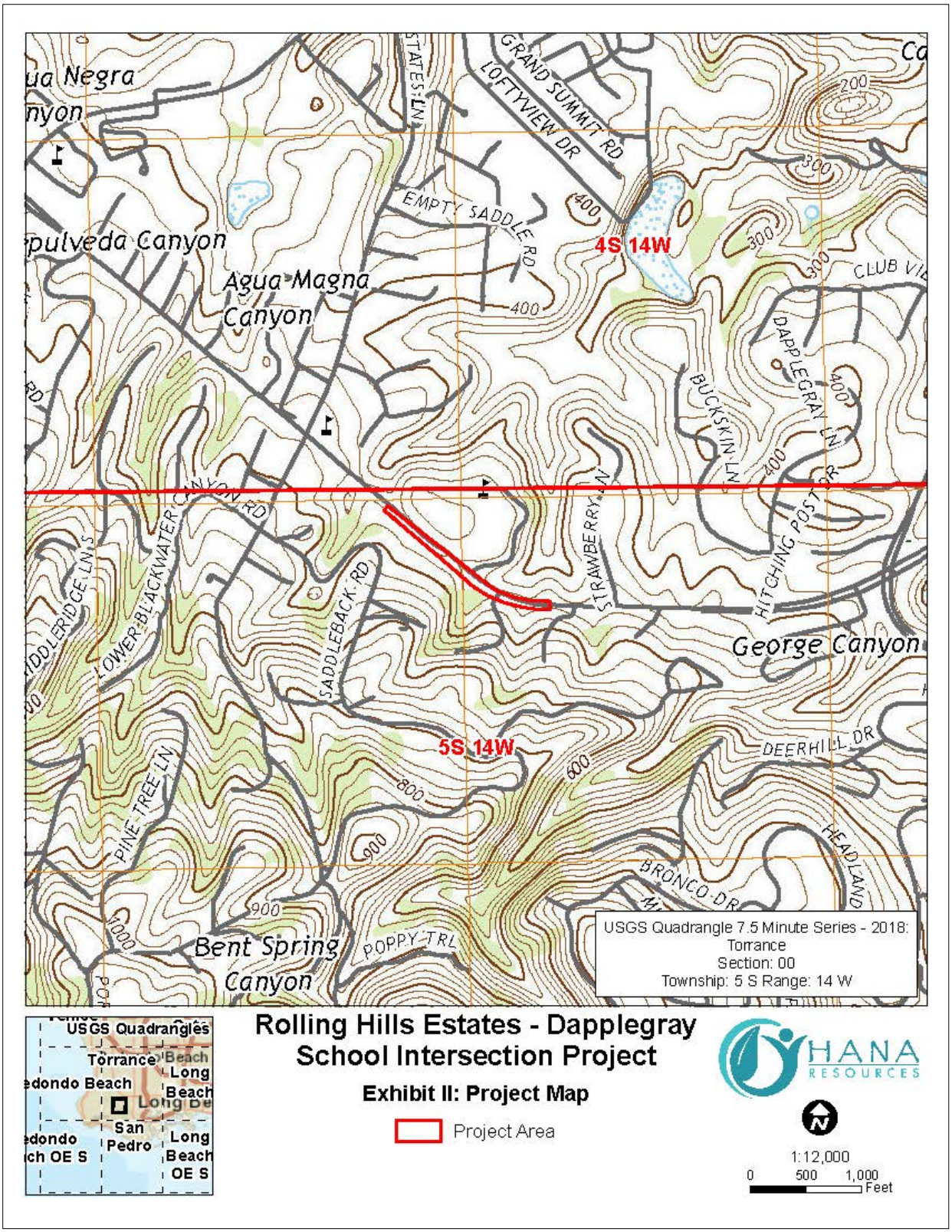
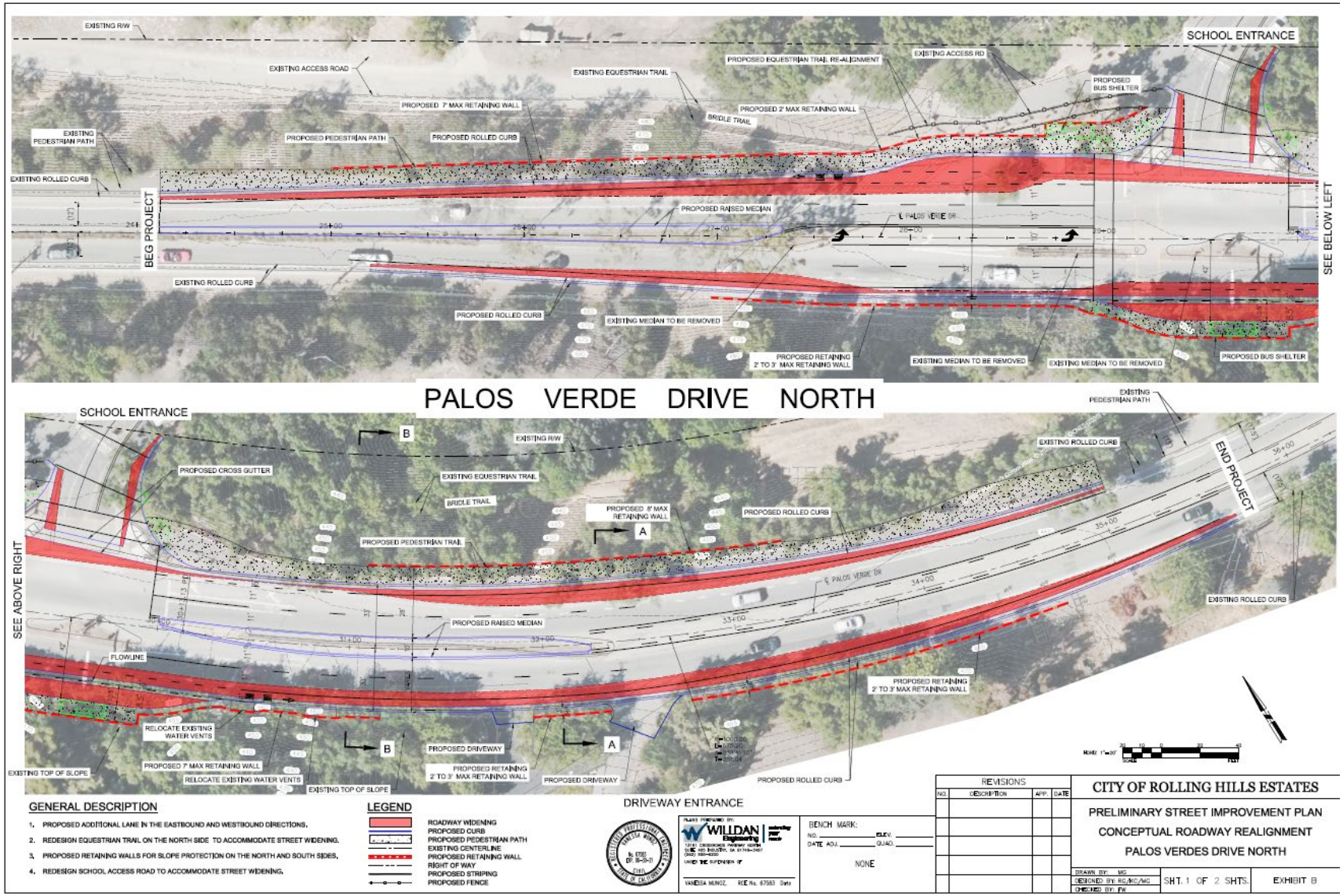


Exhibit III: Concept Plan Map



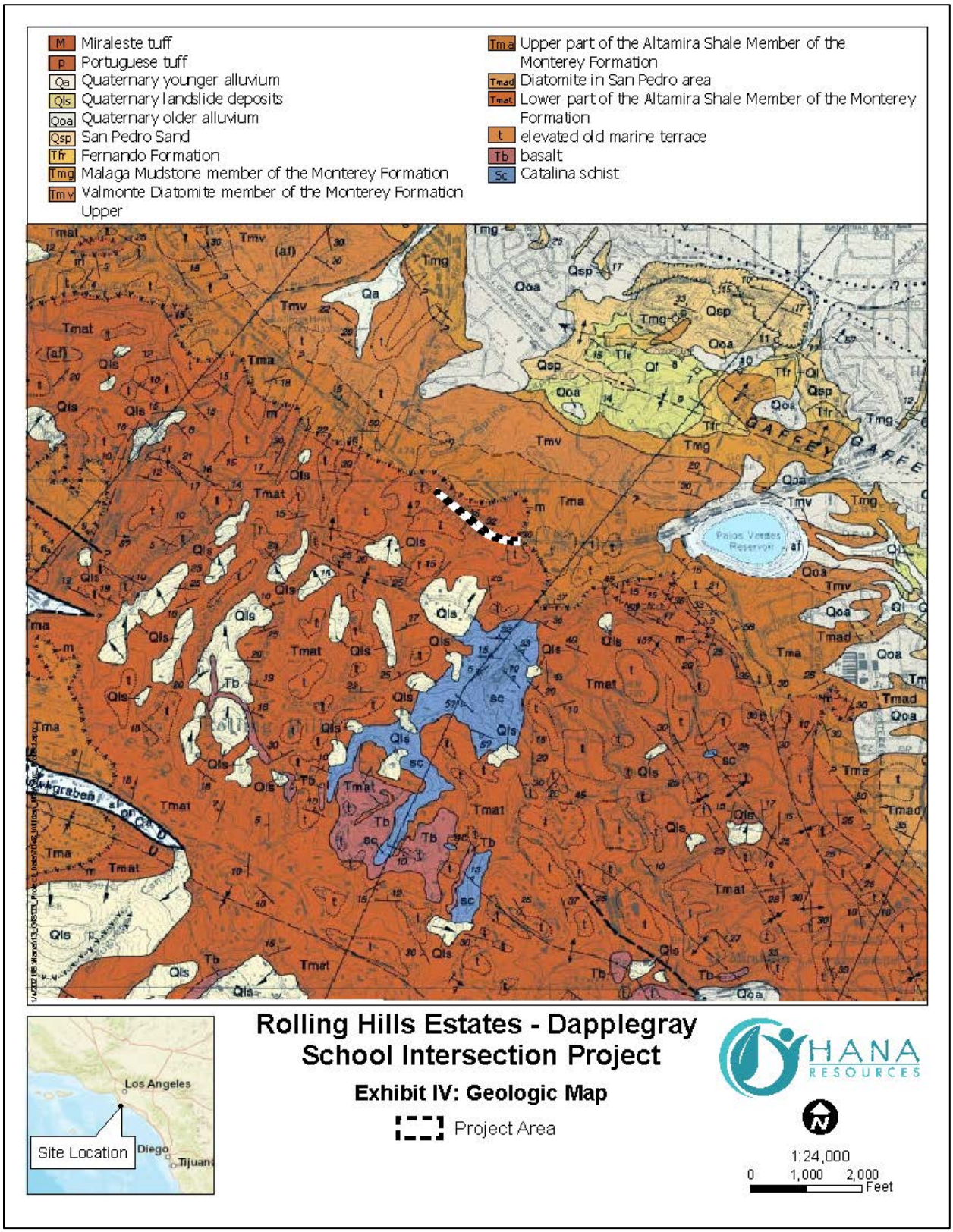
SECTION 2. Settings

2.1. Geological Setting

The present-day Los Angeles Basin is located at the north end of the Peninsular Ranges Geomorphic Province (Wagner, 2002) and is bounded on the east and southeast by the Santa Ana Mountains and the San Joaquin Hills, on the northwest by the Santa Monica Mountains, and the province boundary is situated on an east-trending zone of faults. The basin was formed about 15 million years ago during the Neogene, when the land was underwater and during a crustal disruption caused by a clockwise shift in the surrounding mountains. This weakening led to the formation of a large bowl of the basin and sediment from the sea and rivers accumulated in thick layers in the undersea bowl. Then, about five million years ago, the crustal stretching collapsed, and the basin was forced to the surface. What is now the Palos Verdes Peninsula was submerged until an early Pleistocene uplift along the Palos Verdes Fault brought it above sea level. At that time, most of downtown Los Angeles was still under water. During parts of the Pleistocene Epoch, the peninsula was an isolated island.

The project site is in the Palos Verdes Hills on the Palos Verdes Peninsula of Los Angeles County. Dibblee et al. (1999) mapped the geology of the site as lying entirely within the lower part of the Altamira Shale Member of the Monterey Formation (Tmat) of middle Miocene age (**Exhibit IV,** *Geologic Map*). The Palos Verdes Fault which trends southeast – northwest and passes the Project a bit over one mile to the northeast.

Exhibit IV: Geologic Map



2.2. Regulatory Setting

2.2.1. State

The California Environmental Quality Act (CEQA) provides protection for paleontological resources through environmental legislation. Direction regarding significant impacts on paleontological resources is found under Appendix G (part V) of the CEQA Guidelines. The guidelines state, "A project will normally result in a significant impact on the environment if it will …disrupt or adversely affect a paleontological resource or site or unique geologic feature, except as part of a scientific study." Per section 5097.5 of the Public Resource Code, it is unlawful to remove paleontological remains without authorization and can result in a misdemeanor. In addition, Section 622.5 of the California Penal Code sets the penalties for damage or removal of paleontological resources.

2.2.2. Los Angeles County

The County of Los Angeles General Plan Conservation and Open Space Element (2015) contains goals and policies regarding paleontological resources. The Conservation and Open Space Element establishes the goals of preserving and protecting sites of historical, archaeological, and scientific values, and defines the following policies relative to paleontological resources:

- Mitigate all impacts from new development on or adjacent to historic, cultural, and paleontological resources to the greatest extent feasible
- Support an inter-jurisdictional collaborative system that protects and enhances historic, cultural, and paleontological resources
- Promote public awareness of historic, cultural and paleontological resources
- Ensure proper notification and recovery processes are carried out for development on or near historic, cultural, and paleontological resources

2.2.3. Professional Standards

The Society of Vertebrate Paleontology (SVP) 2010 guidelines provided Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. These guidelines are recognized throughout the paleontological resource management community.

SECTION 3. Paleontological Resources

3.1. Records Search

Willdan Engineering requested a paleontological records search from the Natural History Museum of Los Angeles County (LACM). The records search report (Appendix B) indicated that a whale fossil had been found a bit more than a mile south of the Project, and that three other whale fossils had been found one to two miles west of the Project. It also stated that fossil fish had been found approximately 2.5 miles west of the Project. All these fossils were found in the Altamira Shale Member of the Monterey Formation, which is the geologic unit being impacted by the Project.

3.2. Literature Search

The geology of the Palos Verdes Peninsula was covered by Woodring et al., (1946).

A limited amount of research has been published on the vertebrate paleontology of the Miocene deposits of the Palos Verdes Peninsula. For fishes, apart from the account of David (1943), only that of Bell et al. (2009) comes to mind. Cōcke (2015) figures several types of whales, a desmostylian, a leatherback turtle, many kinds of fish, several kinds of shark teeth, and a partial skeleton of *Isurus hastalis*, the ancestor of the great white shark, from the Altamira Shale. Downs (1956) reported a partial skeleton of an otariid pinniped from the Altamira Shale. Likewise, there is little published on the Miocene arthropods of the Palos Verdes Peninsula. A single paper included a new taxon of stomatopod (Hoff and Schram, 1998).

ESA (2020) wrote a report on a water main replacement project in the Palos Verdes Hills. Significant fossils were recovered in both the Altamira Shale and the Valmonte Diatomite. Altamira Shale fossils included a shark tooth and many fish species.

3.3. Pedestrian Survey

Dr. Stweart walked the length of the Project on both the north and south sides of Palos Verdes Drive North. Outcrops of the Altamira Shale were seen in exposures above street level, but only sand was seen on unpaved surfaces. No paleontological resources of any type were seen.

3.4. Geotechnical Report

A geotechnical investigation was done for the Project (Willdan Engineering Group, 2021). It was based on four hollow-stem borings from 13 to 31 feet. That report made no attempt to identify the geologic units encountered. The record for the hole near the west end shoed 13 feet of disturbed silty sand and sandstone. The second hole, nearer the Dapplegray driveway, showed 3 feet of silty sand and 18 feet of bedrock, consisting of sandstone over siltstone over sandstone. The third hole, somewhat of the Dapplegray driveway, showed 15 feet of sandy clay which showed some signs of disturbance, over 10 feet of clay over 6 feet of clasystone bedrock. The fourth hole toward the east end 15 feet of clayey sand over 6 feet of sandstone bedrock.

SECTION 4. Conclusions

The paleontological records search shows several vertebrate fossils found in the same unit as occurs at the Project site. Another project found numerous significant fossils in the same unit (Altamira Shale), but encountered only disturbed sediment in the Project vicinity. The depth of disturbance for this project is unknown, but it is possible that significant paleontological resources could be impacted. Therefore, this report concludes that a Paleontological Resource Impact Management Plan (PRIMP) should be formulated by a qualified professional paleontologist. It should include monitoring of Project disturbances of undisturbed sediment, wet-screening of sand samples, identification of any significant fossils encountered, reporting of the Project monitoring and findings, and curation of any significant fossils in a permanent scientific collection fulfilling the qualifications provided by the guidelines of the SVP (2010). These steps would reduce the Project impact to paleontological resources to a less than significant level.

SECTION 5. References

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APPENDIX A

RESUME

J. D. Stewart, Ph. D.

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Overview

I currently am employed as a vertebrate paleontologist with 45 years of experience in paleontology and more than 35 years of experience in the geology and paleontology of California. I have been involved in the permitting or construction of more than ten power plants, and have directed the paleontological monitoring and mitigation program for Path 15, a major transmission line project. My publications include more than 40 peer-reviewed articles in books and journals. My research specialties are fossil fishes and Pleistocene vertebrate faunas, especially those of California deserts.

Areas of Expertise

NEPA and CEQA Compliance
Project Management
Principal Investigator
Paleontological Management and Treatment

Years of Experience

45 Years

Education

MA, Systematics & Ecology, University of Kansas, 1979
PhD, Systematics & Ecology, University of Kansas, 1984

Registration/Certification

Certified Paleontologist, Orange and Riverside counties, California

Project Specific Experience

North Dakota Department of Transportation, Long X Bridge Replacement, Watford City, ND. 2019-2021. This $54 million project involved construction of a new bridge, removal of a hill in order to move the approach of highway 52 to the new bridge, and removal of the old bridge. 362,000 cubic yards of sediment were excavated. Another major aspect of the project was the creation of a 20' high wildlife corridor tunnel beneath the new and existing highway. Dr Stewart supervised the construction monitoring. He supervised specimen preparation and specimen identification, reporting, and transfer to the South Dakota Geological Survey. Excavations here led to the discovery that the bison and other Pleistocene fossils were deposited (or redeposited) by landsides

Caltrans and County of San Bernardino Public Works Department, Shadow Mountain Road Grade Separation Project Paleontological Assessment and Monitoring Plan, Helendale, CA. 2016-2020. Increased vehicular and railroad traffic has created traffic problems in the communities of Helendale and Twin Lakes. The Shadow Mountain Road Grade Separation Project is the proposed solution to improve loc al traffic and safety by providing a new bridge over the Mojave River, and a new grade separation crossing over the BNSF railroad between Shadow Mountain Road and the Historic Trails Highway. Dr. Stewart directed the survey of the project footprint and wrote the paleontological assessment and paleontological resource monitoring plan.

Orange County Parks Planning and Design, Upper Newport Drain Repair, Newport Beach, CA. 2014-2018. Erosion had overrun and exposed a 30" diameter culvert piping along 300 linear feet down a steep hillside from Newport Mesa to the Newport Bay. The old piping had to be excavated, removed, replaced with larger pipe, covered, and landscaped. Dr. Stewart wrote the paleontological resource mitigation and monitoring plan for the project, directed the monitoring, and the processing of thousands of pounds of sediment. This produced 120 significant vertebrate fossils. He also identified the fossils and wrote the final report.

Colorado Department of Transportation. I-25 Raton Pass Recontour, Trinidad, CO. 2017: This project involved blasting and removal of 13,700 cubic yards of rock from a cliff face on the east side of I-25 south of Raton, CO. Dr. Stewart monitored the removal of the blasted rock, cut plant fossils out of boulders, wrote the final report, and supervised the transport of the fossils to the Denver Museum of Nature and Science.

Museum Associates, New Los Angeles County Museum of Art Permanent Collections Project, Los Angeles, CA. 2016-2018: The Museum Associates propose to construct a new building in Hancock Park to house the permanent collections. Completion of the EIR required completion of a Paleontological Resources Assessment and a Paleontological Resource Monitoring and Mitigation Program. Dr. Stewart wrote both those documents and assisted in writing the paleontological resources section of the EIR.

Recurrent Energy LLC, RE Crimson Solar Project, Blythe, CA. RE Crimson Solar Project (Project) is a utility-scale solar photovoltaic (PV) and energy storage project that would generate up to 350 megawatts (MW) of renewable energy using photo-voltaic technology with up to 350 MW of integrated energy storage capacity. Dr. Stewart supervised the survey of nearly 2,500 acres of Bureau of Land Management land which resulted in the documentation of 957 fossil localities. He also wrote the technical report.

Riverside County Transportation Commission, SR-91 Corridor Improvement Project, Corona, CA. 2013-2017. This $1.4 billion project extended the 91 Express Lanes from the Riverside County/Orange County line to Interstate 15, providing the first tolled express lanes in Riverside County. This design-build project also added general purpose lanes, auxiliary lanes, and an express Lane Connector between eastbound 91 and southbound I-15 and between northbound I-15 and westbound 91. Dr. Stewart performed a pre-construction survey, wrote the paleontological resource monitoring plan, supervised monitoring of construction activities, supervised the excavation of a partial bison skeleton, supervised preparation of the specimens, and wrote the final report.

NRG Marsh Landing, Marsh Landing Generating Station, Concord, CA. 2008-2013. The Marsh Landing Generating Station (MLGS) is a nominal 760-megawatt (MW) electricity generating facility consisting of four simple cycle natural gas-fired combustion **turbines. Dr. Stewart performed the survey of the project site and wrote** the paleontological resource section for the application for certification. After the project was certified in 2010, Dr. Stewart served as the paleontological resource specialist for the construction of the plant. He supervised the paleontological resource monitors and wrote the final report.

BrightSource Energy, Inc., Sonoran West Solar Energy Generating Station, Blythe, CA. 2012-2013. This project was planned to be a thermal solar project on 6,500 acres of federal and private land. Dr. Stewart supervised the survey, which produced 1,057 vertebrate fossils. He supervised the identification of these fossils and the transporting of these fossils to the San Bernardino County Museum. He also wrote the final report.

Work Chronology

AECOM, Principal Paleontologist, San Diego, California, 20018-present.

URS Corporation, Principal Paleontologist, San Diego, California, 2007-2018

PCR Services Corporation, Principal Paleontologist, Irvine, California, 2005-2007.

Jones and Stokes, Project Paleontologist, Sacramento, California, 2003-2005.

Brian F. Smith & Associates, Project Paleontologist, Poway, CA, 2003-2005

Natural History Museum of Los Angeles County, California, Assistant Curator of Vertebrate Paleontology, 1985-2003.

Professional Societies/Affiliates

Society of Vertebrate Paleontology

Research Associate, Natural History Museum of Los Angeles County

Certifications

General Site Worker
Certified paleontologist in Orange County
Certified paleontologist in Riverside County

Publications

Stewart, J. D., and M. E. Hakel. In press. First Pleistocene Record of *Equisetum* from the Mojave River. Desert Symposium Proceedings.

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APPENDIX B

RECORDS SEARCH

Natural History Museum
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NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Research & Collections

e-mail: paleorecords@nhm.org

April 2, 2021

Hanna Resources

Attn: J.D. Stewart

re: Paleontological resources for the Rolling Hills Estates - Dapplegray School Intersection Project (#7048-01)

Dear J.D.:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Dapplegray School Intersection project area as outlined on the portion of the Torrance USGS topographic quadrangle map that you sent via e-mail on April 1, 2021. 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.

Locality Number	Location	Formation	Taxa	Depth
LACM VP 7925	Uncertain, possible Chadwick School on Academy Dr, Rolling Hills Estates	Monterey Formation (Altamira Shale)	Sperm whale (Physeteridae)	Unknown
LACM VP 3068	Hillside south of 5202 Kingspine Road, Rolling Hills Estate	Monterey Formation (indurated silty to sandy shale)	Baleen whale (Cetotheriidae)	Surface
LACM VP 4284	Silver Spur School, 5500 Ironwood St, Rolling Hills Estates	Monterey Formation (Altamira Shale)	Baleen whale (Cetotheriidae)	Surface
LACM VP 3159	Palos Verdes Hills; quarry on the highest hill one block S of Hawthorne Blvd &	Monterey Formation (Altamira Shale)	Fish (Osteichthyes)	Unknown

	two blocks W of Highridge Rd			
LACM VP 7140	Miraleste High School, S end of football field	Monterey Formation	Toothed whale (Odontoceti)	Unknown
LACM IP 12021, 2889	Palos Verdes Golf Club	Monterey Formation (Valmonte Diatomite)	Nautilid (*Aturia sp.*); other unspecified invertebrates	Unknown

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

This records search covers only the records of the Natural History Museum of Los Angeles County ("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,

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

enclosure: invoice